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## **M.Lib. Sem - III**



### **Paper - I**

**INFORMATION AND COMMUNICATION**

In Economic and Social Planning

In Management and Decision Making

1. Database Management System (DBMS);
2. Management Information System (MIS); and
3. Decision Support Systems (DSS).

Steps in the use of Information

## VALUE OF INFORMATION

The two worlds of the value of information

### INFORMATION

#### INFORMATION

In simpler terms, the processed data is information.

Data → Process → Information

Information consists of data that have been retrieved, processed or otherwise used for informative or inference purpose, argument or as a basis for forecasting or decision making. The way in which the data of a message are structured is crucial to their effect as information.

#### General Concept

According to Shera, information is that, which is transmitted by the act or process of communication, it may be a message, a signal, a stimulus, it assumes a response in the receiving organism and therefore, possess response potential.... its motivation is inherently utilitarian... it is instrumental and it usually is communicated in an organised or formalised pattern, mainly because such formalisation increases potential utility.

#### A Property of Data

According to *ALA World Encyclopedia of Library and Information Service*, information is a property of data resulting from or produced by a process that produced the data.

According to Ford : "The structure of any text which is capable of changing the image structure of a recipient is information."

#### Psychological Explanation

"Information is the product of the human brain in action. It may be abstract or concrete. When an individual begins to think, a variety of images and sensations flash across his mind. This makes some information to accumulate in his mind and his memory retains some pieces of knowledge". Says Viswanathan.

#### Inference

From the above statements, we can infer that:

- (a) Information is the data that have been retrieved and processed;
- (b) Information may be a message, a signal, or a stimulus;
- (c) Information is meant for communication and it is capable of bringing a change in the recipient;
- (d) What we often call information is only a random collection of data, until it is used by someone to achieve a specific purpose; and
- (e) Information reduces the uncertainty when used.

#### DATA AND INFORMATION

According to Faibisoff and Dely, data can be numerically expressed, that is, quantified, quantifiable or objective. Data is highly repetitive. Information is not highly repetitive or quantified or quantifiable. It is characterised as narrative and subjective. Data then are number or unit facts, frequently repeated. Whereas, information is an idea. Information is a symbol or a set of symbols, which has the potential for meaning.



**Illustration**

Let us take the datum '9 6 1946'. This may be a date (9th June, 1946), a telephone number, an account of a person in a bank, or any thing like. When we attribute a value or meaning to a datum, it is called information.

Since the invention of printing, there has been a continuous revolution in the generation, transfer and communication of information in fact has been growing at an exponential rate which is often referred to as "information explosion".

Information is Cumulative—Human activity can be viewed as a process of building-up knowledge. The knowledge conserved by human, we call as 'Universe of Knowledge'. The individual knowledge is the sum-total of ideas comprehended by a person. An individual gathers information either by (sensory) experience or through formal education or both.

The information available can be elaborated, consolidated, interpreted and used for varied purposes basing on the kind of information. The information can be used as raw-material for elaboration and generation of new information. The broad areas of application of information are : (i) Recreative; (ii) Creative (or technological); (iii) Economic (or Financial); (iv) Management; (v) Planning and Decision making.

**Origin of the Term**

Information comes from in-forming, con-forming, forming in our mind, things received externally by impact or stimulus. These have to be given shape and be understood in any form they should appear. Information is therefore a vital element that can appear in two different ways:

*as a phenomenon*

- that is produced in our environment, independently of ourselves, and is perceived either consciously or subconsciously.

- that is produced by our noosphere, which shapes our surroundings and marks the development of our daily activities.

*as a process*

- created by ourselves from documents aimed with further use in mind;
- resulting from another process, the documentary one, that consciously influences the activity of the human intellect and affects the scientific, technical or artistic development of mankind.

For information to exist, i.e., for that impact or stimulus to occur within us, data must be transmitted and perceived.

**Theories of Information**

Most theoretical studies on information do not distinguish between a phenomenon and a process. They merely assume that one or the other is involved and refer to them indistinctively. They do not even consider that there could be a general phenomenon of information and the specific case of an informative process linked with information science and techniques. We will now analyse some theories that merit consideration for their originality. The so-called traditional theories have been sufficiently studied by other researchers and there is plenty of bibliography to be consulted.

Martin Leupolt considers information to be a very general process, with an extensive content, in which the transmission of data plays an important role, with the accompanying grammatical, semantic and sigmatic problems. In order to study each aspect of information, the concept content has to be reduced by applying the corresponding adjective.

Hence, one studies:

- information process,
- information requirements,



- demands for information,
- sources of information,
- information activities,
- problems of information,
- information studies,
- effects of information,
- social influence of information,
- information centres,
- information systems,
- professionals in information, and so the theory begins to take shape.

#### 'Informology' and 'Informatika'

The innovation he introduces is a new term: "**informology**", instead of "informatika". It is well known that the Russian school, with all its followers, used "**informatika**" when referring to information science. Basically it is synonymous with "information science". Moreover, since the term can create confusion with that of "informatica", used in several countries, Leupolt proposes a new term—"informology", which is not without scientific basis but has not been readily accepted. Informology in fact is the same as informatology, a term proposed by former Pauline Altherton in 1965 which also has not achieved the desired acceptance. Wersig has reflected upon the problem when considering that "Dokumentation" was old-fashioned and that a more suitable term ought to be adopted. The German language appears to have two terms that would be ideal: "Informationswissenschaft" and "Informationskunde". (Information science and information's theory). Leaving aside the terminological questions, Leupolt's theories seem sufficiently important and should be further reflected upon. He considers "informology" to generally represent a social process in which different aspects or types ought to be considered.

#### Other Theories

Emilia Curras while discussing the theories of information further states that another original theory considers that "information is a physical act accompanied by a mental act". This is the same process of perceiving—a mental act—a message on a tangible support—a physical act. A difference is established between "semantics" and "support". Semantics is defined as the mental effect of information. Support is a physical phenomenon associated with a mental effect. The idea of "support" is consequently enriched as it is applied to unconventional forms.

The theory goes on to speak of "equivalent information" referring to information items involving the same semantics but different supports. An example of this would be the same piece of news emitted by radio or by telegram.

"Different information" refers to information items with differing semantics and supports, e.g., two distinct items of news.

"Univocal information" is that in which a single support coincides with a single semantics. The best example in this case would be a book.

"Neighbouring information" means different news items that produce a similar effect. An example would be some news on the weather accompanied by a related piece of news on fishing.

Helmut Arntz claims that information should be considered according to its level of influence on our ego:

genetic level—"genetic information", which appears, or has consequences, in our instinct; and

ontological level—"ontological information", which affects the development of our intelligence and can be controlled and increased.

The former is innate in all human beings and provides the substratum i.e., the emotional and physical conditions,



for perceiving and elaborating ontological information. Until only very recently, the genetic information of an individual was considered to be beyond the control, manipulation of influence of man. Genetic engineering now provides means and methods for changing the course of evolution of individuals, with all the subsequent consequences.

### **Transmission of Information**

"Information does not enter into a living organism. What do enter the stimuli that are converted into information upon reaction by the neurones or the central nervous system, giving rise to output or responses. Information enters into social organisations or entities. It is re-processed by the different subsystems and, in particular, by the information and data processing centre or centres, which represent the organisation's nervous system. The transmission of information is a highly complex process, despite the fact that its basic concept is very simple. It is merely an input device, a transducer that modifies or changes the energy or message, and an output device that acts upon the medium. For information to exist, there has to be a succession of coding and decoding processes. These chains can be very long and how they work centrally is unknown.

We cannot complete these comments on theories on information without including that of "infodynamics". This word was first used by Jean Voge, in 1977, to link information with dynamics, just as thermodynamics links caloric energy with dynamics. It is assumed that information has an energetic characteristic similar to the caloric quality. Consequently an increase in information produces disorder in the system with internal repercussions and a resulting reaction that has to be controlled in order to retrieve an equilibrium. Equilibrium and disequilibrium states occur constantly and require precise compensation by calculating the quantity of information to be produced. Just as in the case with a liquid, the temperature has to be controlled so that it does not undergo a change in physical state", says Dr. Ms. Curras.

### **CHARACTERISTICS OF INFORMATION**

Information has an "origin". It is communicated from the origin or from a "source" where information is. The information to be communicated can be termed as "message". The message needs a "medium" for communication. The message is aimed to be communicated to a 'recipient'. At each step, the information possesses certain characteristics.

#### **Origin/Source**

The validity of information will depend upon the origin or source. Before information is communicated to a user, we should check the origin or source of information (or message). Always it is not possible for us to check the origin of the information. In such a case, we must check the source from whom or from where the information is received. When the information is received from a valid, reliable and genuine source then only, it should be considered for communication to a recipient or end user.

#### **Message**

The information to be communicated should be checked as to whether it possesses the following characteristics or not.

#### **Accuracy**

The information to be communicated must be accurate, i.e., it must meet the exact requirements of the recipient. It should be precise and free from error.

#### **Appropriateness**

The information must serve the purpose of the user. All the information relevant to the purpose of the user should be collected, collated and presented to him so that his just needs are satisfied.



*Timeliness*

The information should be timely. The value of information depends on timeliness. Timely information saves losses and wastage, avoids duplication and saves from going on unintended lines.

*Comprehensiveness*

The message must be understandable. It should include all the relevant information. It should be in a simple and understandable language.

*Explicitness*

It should be clearly and fully expressed. The message should not leave any doubt in the mind of the user as to its validity, comprehensiveness, etc. The recipient must be able to receive the message in straight and clear terms.

*Availability and Accessibility*

The information must be available and accessible to the user. Otherwise, there will be no use in merely communicating about the existence of a particular piece of information.

*Verifiability*

This has two implications. The message should be verified for its validity, accuracy, appropriateness, comprehensiveness, etc. before it is communicated to the recipient. When the communication is not direct or from a known source, the recipient must be able to verify on his own about the validity, etc. of the message.

*Biasfree*

The information should be biasfree. It should not try to impose opinion on the user or influence him. It should not have any slant to one among alternatives without any positive reason or based on a principle.

**Medium***Communicability*

An individual scientist receives information through numerous media. May be oral, by speaking and listening, documentary, by reading and writing; and visual by displaying and observing.

The message should be communicated through an appropriate medium. In order to increase the effectiveness of the message a combination of two or more media may be used. For example, script and photographs; tables and graphs; etc.

**Recipient**

From the point of view of the recipient, information should possess the following three characteristics:

*Adaptability*

The information should be adaptable for a new use, need, situation, etc. It should be enabled to be used for a purpose or in a way different from that for which it was meant for.

*Cost-Effectiveness*

The information should, improve the performance of a system at an acceptable cost or at no cost, or should reduce the cost without unduly effecting performance. It is desirable to define a unit of cost of the relevant reference found for the user, since this takes the system's performance into account.

Generally speaking costs tend to rise with the number of documents processed and particularly with the exhaustivity of the search process. On the other hand, costs can be reduced by a more rigorous acquisition policy based on an examination of the distribution of sources among the retrieved references.



### Currency

The information should be timely available. It should not be obsolete as well. Timely information will be of high value and cost-effective also. Currency should be regarded as one of the basic characteristics of information.

### NATURE OF INFORMATION

"Information is a resource of immense economic and social value. It is vital to the proper functioning of a democratic society, a crucial tool in a productive economy and also for an effective government, a central part of the growth and well-being of individuals," said the National Commission on Libraries and Information Science (UK).

### FACTORS THAT GOVERN THE NATURE

#### Properties of Information

Burt Nanun explains that information has peculiar properties, which make it very difficult to generalize about it. For instance.

- (a) It is not homogeneous like electricity or grain, but rather is extremely heterogeneous, with virtually infinite variation in response to individual conjunctions of supplier, processor, user and channel of communication.
- (b) It is rarely of value in itself, but rather requires a context, structure, or model within which it can be interpreted.
- (c) Demand for information is a function of such variables as age, perishability, convenience, reliability, source etc., as well as more traditional economic variables such as cost quantity and availability of supply.
- (d) The role of information in an organization is so central to its management and functioning that it must be viewed as a fundamental factor of production like money and man-power.

- (e) Both suppliers and users of information often need special protection by means of government intervention such as copy right and patent laws, privacy legislation and fraud statutes.

### Approaches to Information

Information is a social process — its nature and value are closely related to the information needs and approaches of information. Wersig and Neveling (1975) account the following approaches of information based on which the nature of the information can be assessed.

- (i) *The structural approach*: In this approach information is viewed as structure of the world or static relations between physical objects which may be perceived or not.
- (ii) *The knowledge approach*: This approach records knowledge that is built on the basis of perception of the structure of the world. But the problem with this approach is that the term 'information' may erroneously be used for term 'knowledge'.
- (iii) *A message approach* : The mathematical theory of communication uses this approach. It is concerned with the transmission of symbols representing a message.
- (iv) *The meaning approach* : In this approach the semantic content of a message is accepted as information.

### Nature by Kind

Koblitz (1969) distinguishes three kinds of information with which we can note the nature of information at various stages being used in the society. The three kinds of information are:

- (i) *Semantic information (as a message)* is "a unit composed of meaning and carrier for the purpose of transmission of knowledge and experience from one subject to



another." Here, the information is having the nature of a message. In this process information has clear meaning and transmitted the knowledge and experience of one person to the other. This is ever ending process and widely seen in the society.

- (ii) *Semantic information (as a process)* is of purposeful action for the creation (including handling), storage, searching and dissemination of information, and coupled with sensory perception (unilateral), logical perception (inner reflexion) or exchange of information between humans (bilateral).
- (iii) *Documentary information* which is "information containing new factors or statements of analytical or synthetic character. The nature of documental information is of facts or statements which have analytical or synthetic character. And these facts and statements are supported by evidences. Koblitz also called it factographic information.

#### **Nature based on User's Approach**

Melvin J. Voigt made the analysis of the composite nature of information based on the user's approach to information. The nature of information is closely related to the approach of the user basing on time, purpose in relation to his work, stage of his work, general interest, amount of information already available etc. The approaches to information are:

- (i) Current approach, (ii) Everyday approach and (iii) Exhaustive approach.

The need for information differs from person to person and the many roles they daily assume viz., worker, parent, citizen, decision-maker, patient, teacher, consumer, judge etc. Moreover, information is a strange commodity, although it has definable costs of production and distribution, it is of undeniable value to a user.

Burt Nanun says that "the problem of assessing user needs in the future is further exacerbated by the fact that

the environment of user needs is rapidly changing. Virtually everything in the social environment affects user needs and in turn is affected by information usage.

#### **Commodity Approach**

Some scientists have correlated the nature of information with that of energy. In their definitions, Mc Carthy states that "information is a commodity no less tangible than energy; if any thing, it is more pervasive in human affairs." Another definition given by Drucker compares "information like electricity, is a form of energy .... information is energy for mind work." Wiener discussed relationships between information and energy. According to him, "information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it ... The transfer of information cannot take place without a certain expenditure of energy, so that there is no sharp boundary between energetic coupling and information coupling."

Rathswol states that the nature of information is generally talked in terms of four concepts — commodity, process, state of knowing and environment — and that two approaches have been taken in each case — definitional and criterial. According to Rathswol there are four concepts of information and they are:

- (a) *Commodity* : This concept refers to the empirical content of communication and knowledge. Information as a commodity represents some thing e.g., some event, some state of the world.
- (b) *Process*: This concept refers to the structural and organizational aspects of communications and knowledge. Information as a process is represented by something, e.g., genetic structure.
- (c) *State of knowing* : This concept relates directly to the effect of information in terms of changes in a human knower. Information as a state of knowing relates



directly to the structural - functional aspects of human knowing activity.

- (d) *Environment*: This concept refers to man-machine and man-man systems etc., command and control systems, within which certain data - information transformation occur.

## NATURAL CHARACTERISTICS

### Exponential Growth

Since the invention of printing, there has been a continuous revolution in the generation, transfer and communication of information. Information, in fact has been growing at an exponential rate which is often referred to as "Information explosion". Information is carried and communicated through various media. These can broadly be categorised into two—the 'documentary media', and the 'non-documentary media'. In the documentary media, book production more than doubled in a decade. Presently more than 10,000 titles are published every working day and thus, more than 3 million in a year. The production of periodicals rose from 10,000 titles in 1900 AD to 170,000 titles in 1971 A.D.

### *Doubling of Knowledge*

According to American National Education Association:

It took until 1750 for man's knowledge at the time of Christ to double. The second doubling was completed 150 years later in 1900. The fourth doubling of all man's knowledge took place in the decade of 1950s. Looked at another way, technology has multiplied by 10 every 50 years for over 2,800 years. In 1950 there were one million scientists and engineers in the world; in 1900 there were 100,000; in 1850-10,000; and in 1800-1,000.

According to Rider—American Libraries which try to collect every thing appearing on a given subject double their size every 16 years.

## Information Is Cumulative

### *Gathering of Information*

Human activity can be viewed as a process of building-up of knowledge. The knowledge is built-up in two ways—individually and collectively. The knowledge conserved by human, we call as 'Universe of knowledge'. The individual knowledge is the sum-total of ideas comprehended by a person. An individual gathers information either by (sensory) experience or through formal education or by both.

### *Storing Information*

The knowledge acquired by an individual is stored in his brain or in material form by recording the ideas using a medium. The retention of ideas in human mind will depend upon the frequency of application, interpretation and use. The recorded information can be retrieved at any time without missing any of the item stored. Further recorded information will be available for wider public use and is subject to interpretation.

### *Application*

The information available can be elaborated, consolidated, interpreted and used for varied purposes basing on the kind of information.

The information can be used as raw-material for elaboration and generation of new information. Scientific and technical information can be regarded of this kind.

Apart from the *private information*, there is a class of *public information*. Private information is information possessed by an individual or organisation. Whereas, public information is the one having social implication and application.

The broad areas of application of information are:

- (i) Recreative;
- (ii) Creative (or technological);



- (iii) Economic (or Financial);
- (iv) Management;
- (v) Planning and Decision making.

#### Generating Information

New ideas are generated in each and every branch of human activity from time to time. Apart from new ideas, we give new interpretation to known ideas. We also borrow ideas from other disciplines and try to apply them in a new context.

The new ideas are generated by observation, experimentation and synthesis.

#### Information is Inter-Disciplinary

Information has now become inter-disciplinary in nature. The old division of knowledge into separate disciplines has virtually broken down. Each discipline is now interacting with other disciplines and in the process, new inter-disciplinary information is generated.

Shera stated that "today there are unmistakable indications that all higher education is moving away from a vertical toward a horizontal dimension that transcends traditional disciplinary boundaries to seek a universal function common to all curricula."

#### Typology of Interdisciplinarity

Heinz Heckhausen identified the following six types of interdisciplinarity among subjects:

(a) *Indiscriminate Interdisciplinarity* : All "encyclopaedic endeavours" end up with "curricular mix-ups". Librarianship is a typical example of an encyclopaedic endeavour.

(b) *Pseudo-interdisciplinarity*: Disciplines using the same analytical tools are at times considered to produce interdisciplinarity fields. This association represents 'phase relation' among disciplines. The so-called interdisciplinarity expected on the basis of analytical tools being common is

pseudo-inter-disciplinarity because there is no integration between the tool discipline and the host disciplines.

(c) *Auxiliary interdisciplinarity* : This type of interdisciplinarity results from cross-disciplinary use of methods, one discipline being constantly dependent upon the method of another auxiliary discipline.

Use of Boolean logic in the retrieval process is an example of auxiliary interdisciplinarity. Here library science is depending on Boolean logic and thus logic is regarded as an auxiliary discipline.

(d) *Composite interdisciplinarity*: Here diverse disciplines are brought together as problem-solving techniques. The respective material field do not overlap, yet present a composition. In Ranganathan's terminology these are described as "Clustered" subjects.

(e) *Supplementary interdisciplinarity* : This type of interdisciplinarity exists between disciplines in the same material field. Their respective subject matters partially overlap. Communications is an example of this type of interdisciplinarity. Ranganathan called these subjects as "Compound Subjects."

(f) *Unifying interdisciplinarity* : When two or more disciplines move towards their unification at the theoretical integration level, a unifying interdisciplinarity results. These are the "Fused Subjects."

#### Information Scatter

##### *In Related and Unrelated Disciplines*

Due to interdisciplinarity nature, information is found scattered in numerous sources, sometimes in related and sometimes in unrelated disciplines. The scientist has to cull-out the information from related disciplines to study a discipline in its totality. But, it is highly difficult for him to hunt for information in unrelated disciplines. This task can only be accomplished with the help of an information officer.



Tools like indexes and abstracts; information analysis and consolidation centres; and information liaison officers can come to their rescue.

#### *Utility in Relation to Scatter*

The quality and quantity of papers produced create problems for users and publishers. There are two other closely related problems that affect both the user and publisher of scientific literature;

- (a) Increasing specialisation in science; and
- (b) The fragmentation or dispersion of literature on a particular subject.

A highly specialised research paper may have to be published in a journal whose scope is very broad due to non-existence of specialised journal. This will put other scientists at disadvantage. Because, they will have to spend a lot of time in locating the information. Further, the broad scoped journals are likely to lose their popularity owing to progressive reduction of core articles.

Elson-Dew estimated that any particular article in a highly specialised periodical is likely to be of interest to only about 10% of the workers in the subject area. Covered, an article in a general periodical may be of interest to only 2% of the readers, and the article in a local publication maybe of interest to as few as one quarter of 1% of the scientists in the field.

Lancaster feels that an individual subscriber may have to pay for 20 or 30 papers that do not directly concern him in order to get one paper of direct relevance: This situation has led to an increase in the number of highly specialised journals.

Bradford discovered that a comparatively small number of "key" journals contribute a very large number of all the articles in a particular subject field. He ranked the journals in the order of decreasing productivity of papers. In a study

of Applied Physics and Lubrication he found out that. 9 Journals covered 429 articles, next 59 journals covered 499 articles and the next 258 journals accounted for 404 articles, in other words first nine journals contributed for one-third of the articles found on the subject, the next 5×9 journals accounted for another one-third, and the next 5×9×9 journals for the remaining one-third. The first group thus becomes the nucleus of periodicals in a subject.

### **Information is a Resource**

#### *A Natural Resource*

Information is regarded as a natural resource like energy, coal, water, etc, vital for national development. An important 'input' for nation building Mr. David Saronoff, Former President of Radio Corporation of America once said that the impact of fast, reliable and inexpensive information would be as great as that of electricity on national and international economy. IBM the giant computer company says that information is like an inexhaustible and renewable source of energy.

#### *Information is the Major Criterion*

Presently the world is divided on economic consideration into (economically) developed and (economically) developing countries. In future the division will be based on possession of information into information-rich or data-rich nations and information-poor or data-poor nations, says Schiller.

#### *Information is a Commodity*

Some view information as a commodity and use this perception to make a case for regulating its flow just as other commodities are regulated. If information is thought of as being on a "Continuum ranging from raw data to finished information", its regulation will be affected in the future by the value of information as it is perceived by tax authorities. But it is not easy to assign value to ideas to even to determine ownership, even though information can be very expensive



to produce. The other issues in the flow of information will be discussed later.

## USE OF INFORMATION

### In Research and Development

#### *Impact of Information Explosion*

Mr. Weinberg in his report to White House submitted in 1963 stated that:

"We shall cope with the information explosion in the long run only if some scientists and engineers are prepared to commit themselves deeply to the job of sifting, reviewing and synthesizing information i.e. handing information with sophistication and meaning not merely mechanically. Such scientists must create new science not just shuffle documents: their activities of reviewing, writing books, criticizing and synthesizing are as much a part of science as is traditional research."

ASLIB carried out a survey on the impact of information on R & D in 1960s. The response from 245 R & D personnel was analysed as follows :

<i>Finding</i>	<i>Number of responses</i>
(a) Information made available indicated duplication of the work of others	43
(b) Information, had it been known earlier would have led to:	
(i) Planning the research differently	36
(ii) Alter the plan of research in progress	60
(iii) Saving of time, money and research potential	106

#### *Wastage of Resources for want of Timely Information*

##### UK

The estimated cost of unintended duplication in scientific research in UK due to delay in the supply of information in the 1960s was Rs. 21.6 million.

##### USA

The estimated annual cost by way of unintended duplication of governmental research in the field of electronics in the 1960s was Rs. 15 million.

The estimated cost of 5 years of research on electronic translation equipment in USA proved to be duplicating the work already done and published in Russia was Rs. 18.7 million.

According to a report of the Controller General of US, the US Airforce and NASA spent a whole year inadvertently developing similar space vehicles—Atlas Agena B and Atlas Vega. This costed a wastage of Rs. 135 million.

#### *Information Pollution*

With the increase in the volume of information it is becoming difficult to locate and pull out specific information. Special Assistant to the President of USA states in 1965 that:

"Chaos, duplication and waste are the words used more and more frequently by responsible members of our nation's scientific community to describe the problem they face in being unable to refer effectively to the records of the previous accomplishments."

J. D. Bernal long back stated that:

"It may be easier to find out a fact by experiment or to build-up a theory than to ascertain from the published documents whether these have been discovered or deduced before."

The explosion of literature do not really indicate the growth of new ideas. According to Bourgeois, Former Director, National Library (Switzerland) "out of 100 technical articles only 8 furnished a really original contribution to learning and research."