

INTRODUCTION

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CHAPTER I

INTRODUCTION

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CHAPTER I

INTRODUCTION

Information is one of the fundamental resources indispensable for development in all the vital spheres of life of the civilized society. Modern society can rightly be designated as information society in which information has become the strategic import for all major societal activities and the outcome of these activities result in the generation or creation of new information. In other words, information has acquired the status of a commodity for consumption and production. The informatization of a society depends on its ability to treat information as a resource.

Fritz Machlup (1962) indicated that the United States was the major player in the production of information in the four main sectors—Education, Communication Media, Information Machinery and Information Services. In 1958, they accounted for 29% of the U S Gross National Product (GNP). Peter Drucker (1968) pointed out that the difference between advanced and less developed nations lies in the ability to generate and use knowledge resources in the form of experts, scientists, libraries, information centres and new technologies.

The economic growth enjoyed by the developed nations in the world today has been spearheaded by scientific and technological discoveries and their development and applications. A solid foundation for development is found in the country's tradition of research and scholarship passed on to younger generations in the form of scholarly publications and patents.

Currently scientific and technical publications from the developed countries have a predominant place in the world of science and technology research. The less developed countries depend on the developed ones for scientific information to propel research and the development of the nation. Hence the governments of developing countries must pay more attention to information production, i.e., research and development activities to be passed on to the future generation and reduce the dependence on the information import.

In the process of the scientific information production, or output, the information consumption is the essential input. Hence in these input-output processes, we have to increase the output of information and knowledge by the optimum use of the available information and knowledge. Hence for the purpose of maximum output of information/knowledge certain strategies and policies at the national level have to be formulated. The two knowledge theories, putforth by Mathew, (1985) on the information consumption-production of the scientists have greater importance in the context of this input-output processes and also to increase the output of scientific information of the nation for the over all development. In the process of the national productivity of scientific and technological information, the Universities could play an important role.

There are various theories of knowledge expounded in Epistemology, Metaphysics, Philosophy of Science, Cognitive Psychology, and Cybernetics etc. that explain the nature, origin, meaning, purpose and limits of knowledge. The theories of knowledge and information are also dealt in the Philosophy, Psychology, Computer

Science besides Library and Information Science. They have become highly complex and multidisciplinary in nature.

The complex process of information consumption (input) and information production (output) needs to be studied in detail with sound theoretical and methodological foundations. However this question of developing theories and methodology poses a great challenge to Information Scientists and Information Technologists at international level. This specific area of research remains as an almost virgin field, with a lot of challenges and possibilities. Information Scientists are still now reluctant to explore this area of research even though information generation and use are the very basis of modern Information Science. The present study is a major pioneering attempt in this regard. Being a pioneering study it could not rely much on any of the existing models and approaches and there is a need to develop original models and approaches of its own.

1.1 Need and Significance of the Study

In the developing countries, Universities have to play an active role in transforming traditional society into the modern information society by creating the information consciousness and sustained demand for information, a critical source for development, and finally by meeting the information needs of the society. Universities have the social obligation for producing specific, technical and skilled manpower required for the society. Universities have a major role in information generation since major part of scientific and technical publications are from the Universities. (Mathew, 1981)

Productivity in scientific and technological information of a country determines its overall development. Having a population of more than 100 crores and gifted with high intellectuals and diversified resources in India, the scientific and technological productivity is not upto the desired level. Our scientists, who were not so productive and creative in India, have become highly productive with their valuable creations when they are employed in Western countries. This phenomenon needs to be studied in depth.

The very survival and growth of India, in this age of globalization and cutthroat competition, depends on its ability to increase scientific and technological information productivity, especially at university level. This is the basic task of Universities that they have to train younger generation of scientists and technologists with information handling abilities coupled with advanced level of scientific and technical information consumption and production.

Information consumption is a general function that every individual performs while information production of advanced nature is a complex one and performed by a few. They are responsible for the nation's overall development through their scientific and technological contributions. The Universities with courses and curricula at the post graduate level and advanced research programmes develop information handling skills and expertise that will lead to advanced level information consumption and production of the scientists.

The scientific and technological productivity of the Universities in Kerala is at low level, inspite of acquiring different systems and components of modern technologies especially with the assistance from

University Grants Commission and Government of India. The basic reasons for such low productivity are still now unearthed. There is an urgent need for the study of the basic factors that lead to the high level information consumption and production of scientists in the Universities in Kerala, including the application of Information Technology for this purpose. The present study is a theory-based application study quite different from the conventional bibliometric study. The present study also aims at formulating policies and strategies so that India could improve its scientific information productivity, which leads to the overall development. An attempt has been made to integrate information technology and scientific productivity so as to formulate correct policies. The present study also aims at the testing of the validity of the knowledge theories formulated by Mathew (1985) and the role of the information technologies in augmenting the information consumption production processes. The present study is on the scientific productivity of physical scientists of Universities in Kerala measured in terms of their information production.

The investigator's back ground in Physical Sciences, Information Science and familiarity on Information Technology applications on the research processes helped him to pursue the present study, that too with an interdisciplinary approach. The theoretical basis of the research guide especially in the areas of theory, strategy and policies and in areas related to information technology also helped the investigator in conducting the present study.

It may be noted that no study of this kind has so far been conducted in the specific context of the Third World. However a comparison of

information generation of different faculties of the University of Calicut was made by Adiyodi in 1993. There is no useful model to assess the efficiency of scientific community with regard to their increased information productivity. It is believed that the study enables to assess the present University Education System for fulfilling its function of equipping individual with expertise in the generation of scientific information and increasing the information generation capacity of university teachers and researchers through the wider application of information technology.

1.2 Statement of the Problem

The study is entitled as **“A study of the Scientific Productivity and Information Use Pattern of Scientists in the context of New Information Technology with special reference to Universities in Kerala.”**

1.3 Definition of the Terms

The word ‘study’ means the careful examination or observe carefully (Oxford English Dictionary, 1970).

‘Productivity’ means the quality or fact of being productive, capacity to productiveness (Oxford English Dictionary, 1990). The productivity of the scientists in the context of scientific research is measured by his/her output on publications. This is a hypothesis, which has been accepted since the beginnings of the twentieth century, says Voos (1974). Hence the concept of scientific productivity has been used in the same sense as the number of publications especially research papers published in journals by scientists.

‘Information’ is defined as the communication or reception of knowledge or intelligence, something obtained or received through informing, the process by which the form of an object of knowledge impressed up on the apprehending mind so as to bring about the status of knowing (Webster’s Third International Dictionary of the English Language, 1968)

‘Use’ means utilisation or employment for or with some aim or purpose (Oxford English Dictionary, 1970).

‘Pattern’ is mode, design, plan etc from which something can be made (Oxford English Dictionary, 1970).

‘Scientists’ in the context of the present study are the teachers and research scholars working in the physical sciences teaching and research departments of Universities in Kerala.

‘Information Use Pattern of Scientists’, refers to the use of various information sources by the Scientists. The various information sources in the present study are research journals, abstracting/indexing books/monographs, reprints/pre-prints, consultation with others, attending seminars and membership in learned societies etc.

‘Information Technology’ according to UNESCO is “the scientific, technological and engineering disciplines and management techniques used in information handling and processing their applications, computers and their interaction with men and machines and associated social, economic and cultural matters”. Information Technology in its wider sense can be defined as any technology related to recording, presentation, and communication of information and knowledge emerged from time

immemorial. On the other hand “New Information Technology” connotes the massive application of electronic or digital technologies for the recording presentation and communication of information and knowledge. The new information technologies include online services, optical storage of information, electronic publishing, electronic mail, networks, artificial intelligence, expert systems etc.

Universities in Kerala: Universities in Kerala comprises the four main Universities in Kerala, viz., Calicut, Kerala, Mahatma Gandhi Universities and Cochin University of Science and Technology. All these universities have well-established physical sciences teaching departments.

1.4 Variables of the Study

The study has been designed with the major independent variables, the personal characteristics such as age, sex, designation, experience in teaching and research, subjects, doctoral theses produced, information consumption time and the use of various information sources and the dependent variable, namely, number of papers published.

1.5 Objectives

1. To assess the level of scientific productivity of physical scientists measured in terms of published works including new inventions and guiding doctoral research works as information production in the Universities in Kerala.

2. To explore the various factors that affect the information productivity of physical scientists in the Universities under study.

3. To examine whether there exists a direct correlation between information productivity of physical scientists and use of library and information resources and services termed as information consumption so as to test the validity of the generalised theory of information/knowledge consumption-production correlation.

4. To identify the various stages of information consumption growth for information production, among the scientists, so as to test the validity of the stage theory of information/knowledge consumption growth.

5. To examine the role of information technology in augmenting the scientific information consumption and information production.

6. To suggest the ways and means for increasing the efficiency of Physical scientists with regard to use of library and information resources, and thereby information consumption and production.

1.6 Hypotheses

- 1) There exist differences with regard to information consumption and information production for different categories of physical scientists in the Universities of Kerala.
- 2) There exist similarities in the pattern of information use among the different category of physical scientists.
- 3) The proper application of information technology could augment the information consumption production processes of the physical scientists in the Universities in Kerala considerably.

1.7 Methodology in Brief

The study is very much based on the theoretical aspects with practical implications. It is hoped that the present study provides basic methodological and theoretical explanation for Information Science especially with regard to information or knowledge consumption and production by the scientific community and also the role of Information Technology in their tasks.

The data for the study has been collected by administering the specially developed questionnaires and conducting interviews among physical scientists of the four major Universities in Kerala, namely University of Calicut, University of Kerala, Mahathma Gandhi University and Cochin University of Science and Technology. In the categories of physical scientists both the teachers and research scholars of these universities have been taken into account. The data collected has been analysed using appropriate statistical techniques for interpretations.