CHAPTER - I

INTRODUCTION

The whole World is today witnessing unprecedented developments especially in the field of Science and technology. The phenomenal development in the retrospect can be seen as an interpretation of man's past in the light of his ideal development. Technological solutions based on R&D are necessary in all areas. It is imperative for any country to evaluate its activity in science and take step to direct it to national objectives or development goals. Knowledge of the state of science should form the foundation of informed decision-making at any level from Nation, State, and Sector to institution.

The basic research activities are more or less accumulated in science and technology. The key to any effective improvement in higher education is the teacher, his vision, his motivation his determination, and his hard work. Systems, structures, syllabi, teaching methods, evaluation processes all have their value; but what counts in the enthusiasm of the teacher and his readiness to give of his best. The motivation that can give him such enthusiasm is not necessarily a function of his wages. Education can be reformed only through the efforts of the academic community, not by the politician.¹
The reputation and credibility of a university is more or less based on the quality and quantity of new knowledge generated by it. The social role of University can be divided into two. The first is transmitting the accumulated knowledge to next generation; that is education. The second role is creating knowledge through research activity.

A University is defined by Oxford Advanced Learner’s Dictionary of Current English as an institution for the advancement and dissemination of knowledge, conferring degrees and engaging in academic research.

Teaching and research are the most important function of a University. The achievement in the research fields takes a university the glorious position. This is more true in the case of scientific research because it has become the life-breath of a progressive state. Science communication becomes more important in this context. The research output of the University needs to be effectively disseminated and distributed for its acceptance and timely application for social benefits. The research productivity of a University is usually indicated through the research publications that emanate from the various teaching and research departments. Scholarliness is revealed through many ways and academic publication is one of the major tools to evaluate the scholarliness.

Harold Laski once observed that “the true epochs in a University’s life are not marked by its buildings, its books or even the growth of its numbers -they are marked by the great teachers it has possessed.”
The present study deals with research output in terms of journal article, conference papers, reports, books, chapter in books; produced by the faculty members of science Departments, Faculty of Science, University of Kerala between 1980 and 1999 using scientometric techniques. There are ten Departments under faculty of science such as Aquatic biology, Biochemistry, Botany, Chemistry, Demography and population studies, Geology, Mathematics, Physics, Statistics and Zoology. The study does not include publications brought out by the faculty before joining and after leaving the University.

Scientometrics is a new branch of knowledge, which uses bibliometric measurements for the evaluation of scientometric progress, level of scientific development, Social relevance and impact of the applications of science and technology. The term scientometrics is derived from the Russian term ‘naukometria’ which means the study of the measurement of scientific and technological progress.\(^3\) Lancaster\(^4\) pointed out that the following bibliometric criteria for assessing research productivity.

1. How many publications are produced;

2. How many publications of what types are produced;

3. The quality of the sources (Journal);

4. How much the work of an individual, groups or organisation is cited;
5. What is the quality of the citation

(eg. as judged by the quality of the cited journal);

6. How many publications are produced per individual, per man hour expanded, per $ expended; and

7. How many citations are received per individual, per man-hour expended, per $ expended

Due to proliferation of knowledge and increasing tendency for research in the field of science and technology a number of scientific communications are being published in recent years. The availability of sophisticated computerised statistical software packages for data analysis have encouraged quantitative studies on information. The outcome of such efforts is the emergence of a new branch of science, whose prime emphasis is the application of the mathematical and statistical models and methods to study and measure the scientific communication. This science is being referenced to as scientometric. It is devoted to quantitative studies of science and technology. It is the most significant method to evaluate the number of publications and its change over time.

1.1 Relevance of the study

The University of Kerala has been placing great thrust on scientific research from its inception in 1937. In the preamble to the University Act, special mention is made of the desirability for making greater and more systematic provision for the furtherance of original research in the various
branches of applied sciences. The research in science was concentrated on these days on several subject fields such as chemistry, Biology, Entomology, Mycology, Economic biology, Marine biology, Medicine etc., Since the university has been adding new departments of science, both pure and applied, to cope with the tremendous development in the global scene of science and technology. Now the University has ten Departments under the faculty of science.

All these indicate that the research output of the University within the field of science and technology is remarkable. A quantitative analysis of the research output is most relevant in the present context. Such a study has not been undertaken by any investigator till date.

1.2 Title of the study

The title of the study is “Scientometric analysis of research productivity of faculty members in the science Departments of the University of Kerala.”

Definition of Key terms

Scientometric analysis

“The application of quantitative methods to the history of Science”\(^5\)
Research Productivity

The scientific output of research in terms of publications works such as journal article, conference papers, Reports / working papers, Books, chapter in books etc.

Faculty members in the Science Department:

Faculty comprises Professors, Readers and Lectures of the University Department under the faculty of science, University of Kerala.

1.3 Objectives of the study

The study is intended to identify and determine the following with regard to the Scientific productivity of the faculty members in the Science Departments of the University of Kerala.

1. To find out the relative contribution of Scientific productivity in different Science Department and the year-wise growth of literature.

2. To determine the authorship pattern in publication and identify the gender-wise distribution of publication.

3. To identify the most productive journal selected by faculty members to publish the articles and their country-wise preferences.

4. To examine the faculty affiliation in publication.
5. To find out the individual research productivity and prepare a rank list of faculty members.

6. To examine the single authorship and principal authorship and their characteristics in publication.

7. To find out the characteristics of inter-publication difference with reference to research productivity in the following areas.
   a. Designation-wise difference
   b. Gender-wise difference
   c. Department-wise and time taken for the first publication and their characteristics.

8. To determine the most productive age group of the faculty members.

9. To find out the factors which influencing research productivity.

1.4 Methodology

The necessary bibliographic details were noted in a 7.5 "x 3.5" cards from the annual report of the University of Kerala from 1980-1999 (20 years). Normal count procedure was followed. Full credit was given to each author (faculty member) regardless of who happens to be the first name or the last name.

All forms of publications such as Journal articles, conference papers, reports/working papers, Text books and chapter in books are
analysed using scientometric techniques. Data which are not available in annual reports were collected from University records for analysis. The statistical tools such as SPSS and MS Excel are used for data analysis.

1.5 Hypotheses

The following hypotheses are formulated.

1. Faculty from Lab-oriented Departments have more publications than Faculty from non lab-oriented Departments.

2. Female faculty members need more time to bring out research publication than male faculty members.

3. Multiple authorship is common feature in scientific publication.

1.6 Limitations

The data for the study is solely collected from the annual reports of University of Kerala from 1980-1999 (20 years). In 1988 no publication data were included in the annual report. Different forms of publications such as journal articles, conference papers, Books, chapters in book, Report/working papers etc. were considered for the study. Detailed analysis is made only on the basis of the journal articles produced, since articles in scholarly journals are usually considered to be the tangible end result of research activities.
1.7 Organisation of the Study

The study is organised under six chapters as follows

Chapter 1. Introduction

In this chapter a brief description about the relevance of the study.

Objectives, methodology, hypothesis etc. are provided.

Chapter 2. Review of Literature.

This chapter presents a brief review of related literature in the field of study.

Chapter 3. University of Kerala and its Science Departments: An overview

In this chapter a brief historical background of the University of Kerala and the research activities in the Science departments are discussed.

Chapter 4. Bibliometrics, Informetrics and Scientometrics: Developments of the concepts and its application.

This chapter provides a short description of the origin, definition, and developments of the concept Bibliometrics, Informetrics and Scientometrics: and its application.

Chapter 5. Analysis of Data
The statistical analysis and interpretation of collected data regarding the research productivity of faculty members of University of Kerala during the period under study is provided in this chapter.

Chapter 6. Findings and conclusion

The findings and conclusions derived from the statistical analysis of data collected are given in this chapter.

Bibliography

Appendix
REFERENCES


