ABSTRACT

Mechanical engineering has been in the fray from several thousand years. It has emerged as an important field of discipline during the industrial revolution in Europe in 18th century. An analytical study of research communication reveals valuable information regarding the growth of a particular subject and its importance to the community. The problem, however, is the quantum of literature already available.

Scientometrics is one such area which provides techniques to analyze the vast amount of scientific research outcome of a subject, personality, journal, country, etc. in a methodological manner. The key countries emerging in the international economic order are BRICS (Brazil, Russia, India, China & South Africa), with South Africa joining them lately. Asia has a long history of engineering growth, and this study plans to highlight the research growth with particular reference to India, China, South Korea, and Japan. The research pertaining to mechanical engineering, in Asia has been taken up in this research. China, India, Japan, and South Korea are the top contributing countries in Asia in mechanical engineering research during the period 2000-2014. In total 145,423 articles are taken up and scientometric techniques are applied to understand the growth, impact of the research which will be of significant assistance of those working, planning to work in mechanical engineering areas, and also those would like to strengthen and improve the research capabilities which will help them in effective decision making.

A total of 1,45,423 articles were taken up for study are downloaded from Web of Science, a bibliographical and citation database offered by Clarivate Analytics which provides access to quality content published in over 8850 journals across 150 subjects. The patterns of growth of global output from 2000-2014 are compared within each of the countries taken into consideration for study. The articles pertaining to the areas of 'Aerospace Engineering', 'Industrial Engineering', 'Manufacturing Engineering', 'Mechanical Engineering', 'Mechanics', 'Robotics', 'Thermodynamics' are taken up for study.

Citations are a measure of impact. The main goal of the study is to present a comparative assessment of the status of mechanical engineering research literature in Asia as depicted through the major contributing countries (China, India, Japan, and South Korea) using different scientometric parameters. This study is the first attempt
of its kind to describe and explore the actual picture of research interests within mechanical engineering, by analyzing the literature. It builds on the professional experience of the author, a mechanical engineer and a library professional. The growth of the mechanical engineering literature is most times exponential other than being sometimes gradual, and the extent of inter-personal collaboration among scientists to be measured.

This thesis thus tries to fill this existing gap with the help of a strong sketch of the mechanical engineering scholarly literature. The goal of the scientometric analysis here is to pursue further the representations of the new structure of mechanical engineering with the help of citations contained in the published data. The results of this study will add to the body of knowledge within information science, help assess and promote research within mechanical engineering, and assist information professionals such as librarians, knowledge managers, etc., with a better understanding of the needs of the mechanical engineering community while they plan for collection development, maintenance and information services.

The thesis also highlights the article level metrics and brings in recently developed analytical software to the research which wasn't covered in the previous studies.