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EVALUATION OF R&D PROJECTS WITH AID OF LIBRARY AND INFORMATION SCIENCE TOOLS AND TECHNIQUES: SOME THOUGHTS

45

P.N. Mishra, N.G. Goswami and K.C. Panda

ABSTRACT

Library and information science deals with the universe of knowledge. It has a great contribution in development of nation through collection, organisation and dissemination of information resources to potential knowledge seeker. This subject area can fit in any subject domain. It has a major role in helping generation of knowledge. Some observation related to R&D environment being presented. The role of information scientists are being discussed by considering various angles in making value added service to R&D fraternity. To judge the value of various technological activities of R&D like technology based output analysis that includes various parameters like patents, copyright, software developed, process developed, technology transfer, etc. The R&D publications in cooperation with citation analysis, and impact factor are essential metrics. The knowledge and skill of information personnel play a vital role to solve the problem of decision maker concerned with any R&D institution/organisations. This is essential to sustain in global challenging era. Therefore, decision makers as and when required data pertaining to frame performance indicator. This paper discusses some thought related to recently successfully executed R&D projects at National Metallurgical Laboratory, Jamshedpur, Jharkhand, purely based on the skill and expertise of the subject area—Library and Information Science as sample of the case study is being presented in this paper. The thought content only discussed the outline of the study only.

Keywords: R&D Projects, Bibliometric Methods, National Metallurgical Laboratory, Impact Factor, Citation Analysis.

Introduction

Evaluating the productivity of an institutional research and development activities highlights the contribution of the institution and the individual scientists engaged in research. It also provides some insights into the complex dynamics of research activity and enables

policymakers and administrators to provide adequate facilities and gauge the research activities in a proper direction. A well-known productivity indicator is the number of publications produced by scientists, institutions, or research group.

To monitor and control over scientific communication, it is essential to have output with value added analysis from the database, i.e. important gradient for reflection of publications by applying statistical analysis. Hence, statistical analysis applied to bibliographic data required a method, known as bibliographic method. The term, "bibliometric" which was first coined by Pritchard (1969) to describe a flourishing body of research dealing with the statistical character of literature (Wallace, 1987; p. 43). It is a well-developed and flourishing sub-domain of Library and Information Science. The researchers in the scientific disciplines from the bigger, but the most diverse interest group is bibliometric. Due to their primary scientific orientation, their interests are strongly related to their specialty. This domain may be considered as an extension of 'science information' by metric means. Here one can also find join borderland with quantitative research in information retrieval. Bibliometric is truly an interdisciplinary field.

Recently two projects on effectivity measurement of R&D projects successfully executed at National Metallurgical Laboratory, Jamshedpur. The tools and techniques for evaluating projects were mainly based on bibliometrics methods. The data collected through various sources.

What is Bibliometric Analysis

Scientific research underlies much progress in our modern world and it plays a vital role in the economic, social, and physical development of a country. Scientific and technological research needs huge investment and because of this, governments and institutions around the world provide considerable financial support for scientific research. Naturally, they want to know their money is being invested wisely; they want to assess the quality of the research for which they pay in order to make informed decisions about future investments. On the other hand, science and technology are the driving forces of our contemporary society. Analysis of these forces and evaluation of the quality and quantity of scientific research are indispensable in any national science policy or research management strategy (Moed, 2002).

Bibliometric indicators discussed here represent the quantitative side, rather than their qualitative aspect. But quantitative elements are clearly also present in peer review, e.g. number of publications in high prestige scientific journals. Conversely, citations given to research work can be seen as bibliometric analysis performed at the macro level (e.g. a whole country) yield at best general assessments of fields as a whole, for instance, how good a country's performance is in physics, chemistry, psychology or immunology, without a reliable breakdown to the individual research groups or programs. Therefore, research performance should be analyzed systematically on the meso level of larger institutions such as universities or major parts of universities, like faculties or institutes. After an overall assessment of these larger institutions, performance analysis can be narrowed down to the most important level: the micro level, that is, the real "workfloor" of research practice: departments, research groups and programs within universities and large institutes judgments, "votes" of colleague-scientists in favor of the work cited (<http://www.itas.fzk.de/tatup/031/raan03a.htm>).

Why Evaluation of Projects Required

Any government, public, private funded organization require the reports (as data) on their major assignment as already performed, which can be used as performance indicators. There are several parameters like invention, rendered R&D services, handling major R&D projects, consultancy services, and publications. The communication of research finding is usually considered as an image and reputation as the same is always required by the decision-makers of any institution/organization to take judicious decision for framing the strategy according to their needs.

Science is a driving force of our modern society. Particularly, excellent scientific work is the cradle of breakthroughs in our knowledge of the world. Therefore, evaluation of scientific research is crucial. Review by colleague-scientists, "peers", is applied to judge research proposals, appointments of research staff and evaluation of research groups or programs. Peer review is typically a qualitative assessment of research performance.

Methodology

To measure effectiveness of Grant-in Aids Projects and in-house projects at National Metallurgical Laboratory during 1995-2010, data was collected from various sources like questionnaires, NML project database, annual reports (1995-2010), project reports, on-line database like Science Citation Index, Metal Abstracts. To judge the quality and quantity of research papers Impact Factor Lists-2009 have been incorporating in the study, whereas citation data was collected through SCI database. Data were further classified, categorized, designed, analyzed, and computed for deriving interpretation for achieving various objectives.

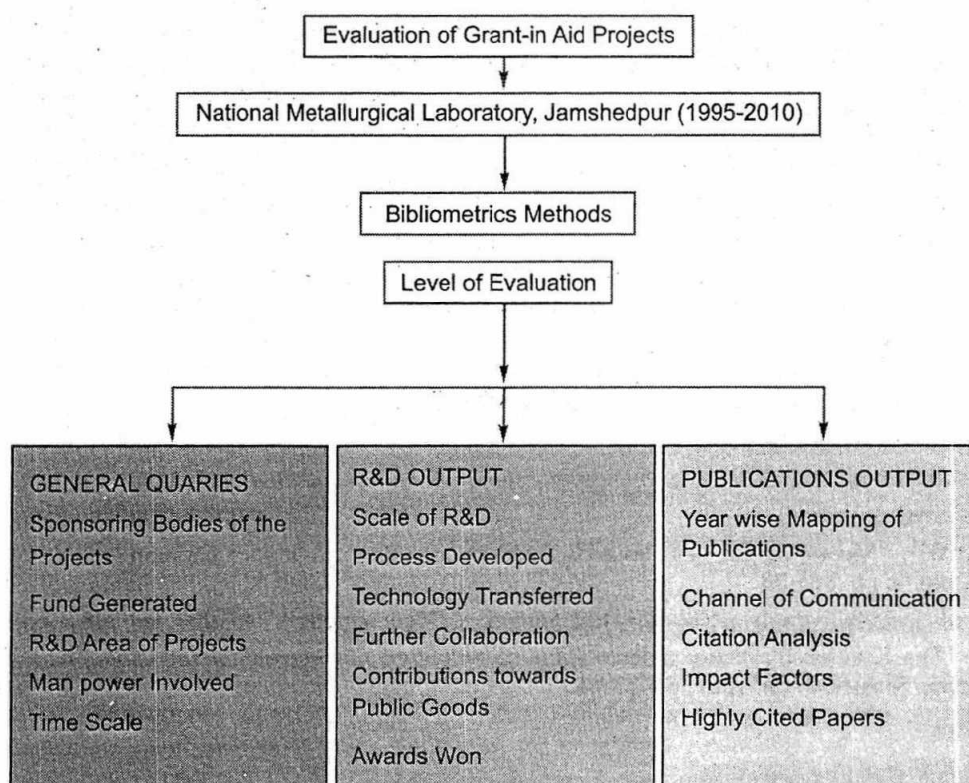
Objectives

The effectiveness of any R&D project must be periodically evaluated. It helps in determining its worth in light of its potential for further R&D programme through sponsored project assigned by various agencies like government, R&D sectors, and industries under public sector, private sector, academic institutions, non-governmental organizations (NGO). This scientometrics study has been initiated for tracing various facts, which will help decision-makers for taking further required action. Implementation of programme relates to society in particular and global in general. The output of the study will help competent authorities; evaluate R&D projects headed by government/private/public sectors/academia/NGO. This study has includes the following objectives.

1. Year wise growth of GAP/OLP;
2. Extra contributory fund generated through GAP;
3. Time scale of GAP/OLP;
4. R&D area wise distribution GAP/OLP;
5. Distribution of sponsoring bodies;
6. R&D output
 - 6.1. Scale of R&D programme;
 - 6.2. Process developed by the concerned R&D;
 - 6.3. Technology transferred; if any

- 6.4. Collaboration for further R&D programme;
 - 6.6. Technology reported (patents/copyright generated);
 - 6.7. Contribution towards public goods;
 - 6.8. Awards/Honors won by GAP/OLP.
7. Publications output;
- 7.1. Year wise publications of papers during 1995-2010;
 - 7.2. Channels of communication;
 - 7.3. R&D area wise distribution of papers;
 - 7.4. Major R&D area wise distribution of papers, citations, RCI and ACI;
 - 7.5. Top fifteen highly cited papers as per SCI Database.

Scheme of Work



Conclusion and Discussion

This study has considered maximum parameters to convey the entire spectrum of projects that always needs to justify its real worth. The model and methodology for R&D evaluation has been developed and acquired through involvement in R&D projects. The Grant-in aids projects and OLP projects (in-house projects) were analysed and extracted output according to level of research like basic research, applied research, basic+applied research, industrial research.

During 1995-2010, National Metallurgical Laboratory has received 204 Grant-in aid projects, sponsored by various agencies from government, public, private, academia, R&D. Some projects were assigned by overseas agencies. Largest number of projects were assigned by Department of Science & Technology, Government of India. The duration of the projects ranged from six months to five years. The value of projects were more than ` 55 crore. About 97 per cent projects were accomplished in scheduled time frame, as laid down by the sponsoring bodies. The maximum 22 projects received in 2003 and maximum revenue was generated in 2008. Projects were received in the area of material characterization, alloys development, steels, waste management and utilization. The R&D output reflects that 55 process were developed and only one technology could be transferred, which fall in the area of materials science and technology. However, 21 technologies are under negotiation for transfer to party. During the tennure of projects 40 patents and 14 copyrights were filed based on projects findings. About 58 students from various reputed academic institutions ranging from B.Tech level to Phd are benefited by projects, their curricula were based on projects subjects area, based on performance of research findings basic level of research won maximum number of awards. During 1995-2010, a total 608 papers were reported under grant-in aids projects. The trends of publications highlights that during 16 years SCI show increasing trends and its healthy sign as performance indicators published under sponsored projects. The findings show that the projects under basic research contributed 226 research papers, received 845 citations, and alone shared 64.50 per cent of the total 1310 citations, the average impact factor of paper were 1.552. The highly cited paper were published under water quality-assessment area, received 88 citations during 2002-2010, other highly cited papers fall in the domain of, corrosion protection and prevention and waste management and utilization and materials science and technology.

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