EXECUTIVE SUMMARY

Peer review is the name of process by which the work ideas of individual or group is assessed by another individual or group considered to have a level of expertise near to that of assessed. Thus the reviewers are deemed to be the peers of the assessed. The purposes of the peer reviews are to inform decisions either on the allocation of funds among a number of applicants (research grant agency peer review) or on the publication of result of research (editorial peer review). The peer review system is one of the most firmly entrenched institutions in academia, widely accepted as the best way to deal with research funds.

Most within the research community consider the merit of peer review as an article of faith but is it really the most equitable and impartial way to distribute scarce research funds. Some, however, argue that peer review if biased and inefficient, stifles true innovation. Others claim it has its place, but should not be the sole method for deciding who gets funded. Defenders of peer review admit it is not perfect but it is by far the best imaginable system.

Another opinion says that Peer Review works very well for large, well established systems of research. It does not work as well where something is developmental, inter disciplinary, innovative or at the cutting edge. The growth in funding opportunities is a good thing for researchers but is a tremendous burden for reviewers.

The biggest flaw with the current system is found to be its winner-take-all nature i.e. a proposal that scores just above the cut off point receives funding, but one that falls just below receives nothing. It is unlikely able to discriminate which of the two nearly equal proposals is truly better and hence the nil' award may be counter productive.

A sound fund allocation policy will necessarily involve a subset of values and regulations that will ensure on efficient matching of resources and objectives

achieved over a specified period. As an exercise towards achieving the best required goals, relevant material has been collected in India and also the practices as existing in various other countries specially these with comparatively large involvement of funds, about the transparency in R&D Funding and Peer Review. These have been grouped under various broad heads such as. Introduction, Practices in other Countries, Science & Technology Audit, Existing Practices in India, Allied Significant Factors in Peer Review, Present and Future State of Peer Review and finally Observations and Conclusions. These are briefly summarized as below: Also included are few relevant and worth-while annexures on the subject.

(A) INTRODUCTION

Introductory chapters under this have five heads namely (A1) Peer Review in General, (A2) Peer Review a tool for Cooperation and Change, (A3) Scientific Peer Review, (A4) The Arbiter of Scientific Quality, Manuscript Peer Review and (A5) Peer Review Systems for Government Sponsored Research.

(A1) Peer Review in General - Since Peer Review is found to be a process of subjecting an author's scholarly work or ideas to the scrutiny of others who are experts in the field, focus is laid on its methodology, selection of reviewers, ways of review, criticism of process, system failures, frauds followed by dynamic/open peer review for the sake of enhancement in Transparency.

(A2) Peer Review-A Tool for Cooperation and Change- Above study conducted sometime back examines the practice of Peer Review and the related effect of peer pressure in the context of international organizations particularly the OECD. It outlines the main features of these two concepts and attempts to establish a model based on the different peer review mechanisms used at OECD. These create a catalyst for performance enhancement which can be far-reaching and open-ended.

(A3) Scientific Peer Review- Considering the possible failings of peer review, and the potential for bias and abuse of the process, certain principles as outlined, for conduct might help to minimize problems while maintaining the advantages. Also outlined are certain rules and guidelines that should be followed by peer reviews for quality and transparency.

(A4) The Arbiter of Scientific Quality-Manuscript Peer Review - Sense about Science - a charity devoted to the promotion of evidence based approaches to scientific issues believes that peer review is one essential arbiter of scientific quality and that information about the status of research results is as important as the findings themselves. It has produced a timely guide to the whole process simultaneously listing the challenges for peer review.

(A5) Peer Review Systems for Govt. Sponsored Research- The peer review systems adopted for government approved research funding can be roughly sorted out into two types. One type was first adopted by the office of the Naval Research (ONR) and the National Science foundation (NSF); the other type was that introduced by the National Institute of Health (NIH). ONR-NSF system places greater responsibility on the individual program manager, funding is handled by a single NIH institution called the Division of Research Grants.

(B) PRACTICES IN OTHER COUNTRIES

Country-wise data of major countries on the aspect of Peer Review and its Transparency are grouped under this head. Also included are the relevant analyses wherever called for. Country-wise material, in brief, is as under;

(B1) British Academy Policy on Peer Review and Grants- The Peer Review process used to assess research grants applications are similar in many respect to those for publication. Procedures adopted by Arts of Humanities Research Council (AHRC), and by Economical Social Research Council (ESRC), for Peer Review of large grants are listed. Also included are British Academy peer review

process which itself is a research funder. Special inclusions are few examples of good practice and also the transparency of peer review practices.

(B2) Peer Review in UK- Education, Research and Development Directorate, North Bristol, U.K has very recently come out with revised version of R&D Policy and Scientific Peer Review. Observations made there-in are expected to result in reasonably fair and transparent review which can be useful and principles can be applied for various scientific fields in Research and Development. Information regarding the peer review undertaken for a study, is held on the R&D office Research Projects database and is included in the audit/monitoring of studies covered by a separate policy.

(B3) Peer Review Mechanism for Funding Medical Research CANADA- The steps involved for any researcher wishing to undertake research and apply for research funds include development of the concept, completion of an application, institutional review and granting agency review. For the sake of increased transparency, review processes in Canada and also to ensure the optimal utilization of research are clearly outlined. Mechanisms are reported to use the limited funds efficiently and encourage scientific thinking and methodology in Canadian researchers.

(B4) Peer Review Experiences in Japan- RyOkichi Hirono, professor emeritus, Seikei University has covered above topic in detail in a recent paper in Jakarta. Outlines of the topics broadly covered are introduction, history of OECD (Organization for Economic Cooperation and Development), peer review in Japan, its mechanism major findings and some salient impacts of OECD peer reviews, merits of OECD PR process and lastly some lessons for non-member countries from OECD peer review mechanism.

(B5) Policy Mix Peer Reviews (Sweden, Romania, Spain)- The Policy Mix Peer Review follows the open method of coordination (OMC). Three CREST (Scientific and Technical Research Committee members Sweden, Romania and

Spain had volunteered to have their policies directed towards open method of coordination (OMC). The main objective of the peer review process was to help countries better understand the Policy mixes needed to raise R&D intensity by improving overall innovation system performance. The overall remit of the group is to encourage mutual learning amongst member states. Covered briefly are the highlights of Peer Review in Sweden, Spain and Romania and also the emerging generic lessons from the country reviews.

(B6) Expanding Role of Peer Review in Science Policy (USA)- This chapter explores what appears to be the increasing domain of peer review processes in science policy. The expansion of its domain in several areas is described, i.e. the allocation of federal funds, the evaluation of research programs, the evaluation of knowledge inputs to policy, the admission of expert testimony in federal courts, and in state science policy. Concluding remarks comprise of brief evaluation of these trends.

(B7) Peer Review Programs in Transparent Environment (USA)- In May 2005 American Institute of Certified Public Accountants (AICPA) Board of Directors established task force to recommend changes to the profession's peer review programs that would advance the Board's and the AICPA Council's desire for greater transparency of peer review results. Task Force recommends supplemental enhancements and revisions to peer review, as well as additional actions the AICPA should take, such as an expanded peer review communication strategy. Relevant and important topics addressed by Task Force are current peer review model and its appropriateness, Reporting Model of Peer Review, Oversight Issues, Strategy for Communication and Education, Greater Transparency, Decline in Quality Peer Review, Inconsistency in peer performance, services in scope of practice, Practice during peer review and finally Task Force recommendations/ conclusions.

(C) S&T AUDIT & PR OF AUDITORS

(1.1) Science/Technology Audit Enhances Transparency- Science Audit can promote transparency in R&D sector. Since funding is reported to be exponentially increasing in Science Departments such audit is gaining importance for the sake of transparency in funding as well as in peer review. Included herein are the objectives of the technology audit and the formation of auditing team.

(1.2) Audit of Science, Engineering and Technology Skills- As brought out in discussion paper of Departments of Education, Science and Training, Australia, Country's future prosperity relies heavily an Science, research and innovation and its ability to perform successfully in a highly competitive global market. Need is thus felt for an audit of Science, Engineering and Technology (SET) skills. Topics finding mention are the, process for such audit and SET classification for Audit.

(1.3) Peer Review of Auditors- As suggested in the caption, Securities and Exchange Board of India (Sebi) is reportedly amending the listed companies agreement to stipulate that audit firms who hold a peer review certificate will only be eligible to conduct audit of listed companies. Since process of peer review will largely depend on the quality of the reviewers, the selection process followed by ICAI for empanelment of peer reviewers is expected to be quite robust. As peer review will be only a post mortem review, it is better to adopt prevention rather than cure.

(D) PRACTICES IN INDIA

(D1) Overview of Funding Practices in India- Attempt has been made to collect the latest data and procedures followed by leading Funding Agencies in the country on the topic of peer review and its transparency such as All India Council for Technical Education (AICTE), Council of Scientific and Industrial Research (CSIR), Defence Research and Development Organization (DRDO), Department of Atomic Energy (DAE), Department of Ayurveda, Yoga,

Naturopathy, Unani, Siddha and Homeopathy (AYUSH), Department of Biotechnology (DBT), Department of Coal (DOC) Department of Ocean Development (DOD), Department of Science Technology (DST), Department of Scientific and Industrial Research (DSIR), Indian Council of Medical Research (ICMR), Indian Meteorological Department (IMD), Indian Space Research Organization (ISRO), Department of Space (DOS), Ministry of Communications & Information Technology (MOCIT), Department of Information Technology, Ministry of Environment and Forest (MOEF), Ministry of Food Processing Industries (MFPI), Ministry of New & Renewable Energy (MNRE), Ministry of Power-Central Power Research Institute (CPRI), Ministry of Social Justice & Empowerment (MOSTE), Ministry of Water Resources (MOWR), Petroleum Convention Research Association (PCRA) and University Grants Commission (UGC).

(D2) Comparative Study of Response to Questionnaire - A simple questionnaire prepared on the subject was forwarded to various central Government departments and agencies to elicit required information for further appropriate analysis. Response, though, has not been as expected, attempt is made for comparative study of responses received. Also included are the suggestions/observations emerging from Interactive Meet of experts.

(E) ALLIED SIGNIFICANT FACTORS IN PEER REVIEW

(E1) Peer Review in Fostering Regional Integration- Organization for Economic Cooperation and Development (OECD) has brought out a policy brief in May 2007 on the subject "Fostering Reginal Integration: Peer Review Southeast Asia". Though the subject is not directly related to R&D funding it will be found that some principles and observations therein can be equally relevant for transparency in peer review for R&D Funding. Peer Review has been a hallmark of OECD working methods for more than 40 years and currently covers a wide range of policy areas. The Policy Brief looks at how peer reviews can

Review followed by lessons from participating in OECD economic development reviews.

(E2) Bicameral Review of Research Proposals- It is reported that too much is expected from peer review process. First we expect it to provide ratings on the qualities of the applicants, second we expect it to provide information on whether the proposed budget are realistic and third we expect it to provide feed back to the applicants so that they can improve the research proposed. A 'reform' in the form of 'Bicameral' method of reviewing research proposals seems to be the answer. It would reform the peer review process by the separating grant applicators into two distinct parts, a retrospective part and a prospective part. Peer-review should be entirely retrospective and concerned with past performance relative to funds received. Prospective view, concerned solely with budget, should be performed in house by the funding bodies. Paper on the subject includes system's principles and practice, and what actually happens under the system. Besides alternate models like Department Model and Productivity Model, various ways are suggested here for improvements in existing system.

(F) PEER REVIEW- PRESENT AND FUTURE - In October 2006, the Czech Science Foundation (GACR), European Heads of Research Council's (EuroHORCS) an European Science Foundation (ESF) organized an international conference of Peer Review-its present and future state. The European Science Foundation was established in 1974 to create a common European platform for cross-border cooperation in all respects of scientific research. Czech Science Foundation was established in 1993 as an independent institution for support of research projects all over the World through long-term funding based on peer review evaluation and through agreements with research councils all over the world. European Heads of Research Councils is the association of the heads of public national research and research funding organizations in Europe. Established in 1992 as an informal association of national research councils and analogous public non-university research

organizations in Europe. Established in 1992 as an informal association of national research councils and analogous public non-university research organizations of the EU Member States. An attempt has been made here to describe Peer Review in Pan-European Research Funding Schemes, Peer Review in National Funding Agencies, Peer Review in scientific publishing and Assessment and selection of Research Proposals, both national and international. Also included are Transnational Research Funding Programmes and Peer Review for Evaluation of Research Institution. Also identified are the issues and the long term perspectives on the subject. Science policy context for excellent peer review suggests that a search for alternatives or mechanisms to improve it should be continued.

(G) OBSERVATIONS

(G1) This Chapter includes observations as drawn from the various materials collected on the subject.

(G2) Included here are observations/suggestions at Interactive Meet by Experts. These are found to be useful and also provide sufficient material for further thought.

(H) CONCLUSIONS

Finally some very important and pertinent points are seen in the foregoing material on the subject. These are briefly brought out under few heads such as (1.1) Identified Issues, (1.2) Science Policy Context for excellent Peer Review, and (1.3) Key questions and suggestions emanating from Interactive Meet.