Formulating the Concept, Principles, and Parameters for Performance-Related Incentives (PRI) in Government

Cluster III: Department of Science & Technology (DST)

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Executive Summary

The study examined the feasibility of performance related incentives (PRI) in the Department of Science and Technology, Bose Institute, Indian Association for Cultivation of Science, and Survey of India. There is clear need for PRI in all these organizations. Scientists in these organizations are eager to participate in developing mechanisms for PRI implementation. Organizations need to ensure that objective metrics are evolved and assessment is transparent.

Implementing PRI is a strategic change for the organizations and will require greater decentralization and autonomy. For these changes to be successful, top management support, proper technological infrastructure, and training for PRI processes are required.

Framework for Implementing PRI

- Performance measures have been identified on the basis of classification of scientists and their profile of activities. The suggested measures largely assess the impact on outputs/outcomes.

- To the extent possible, objective and quantifiable measure have been evolved. In case where subjective measures are used, external expert/peer review mechanisms for assessment of performance need to be clearly developed and periodically reviewed. In scientific community, external expert/peer review method is an internationally accepted best practice.

- Measures need to be relevant to the goals of the organization and reflect the changing mandate. The measures should encourage greater business orientation and adaptation of new technology.

- PRI is to reward output/outcomes that are significantly better than those expected as routine in a particular job.

- PRI needs to be implemented in stages. In Stage 0, the basic framework and measures need to be worked out through consultative processes. ***Stage 0 is the most critical stage for the successful implementation of PRI that includes building employee trust and acceptability of PRI and developing the framework for subsequent implementation.*** Over the Stage 1 to 3, the framework should be improved upon on the basis of internal and external benchmarking.

- The amount of PRI will be given in steps up to a maximum specified percentage. While setting the targets, first the basic targets that need to be exceeded to qualify for PRI should be established and then stretch targets should be instituted in a step wise manner. The quantum of incentives associated with these steps is then based on these pre specified targets.

- The targets should be set so as to maintain “budget neutrality”, to the extent possible. This can be done, by focusing on increasing commercialization of technology, reducing laboratory and other costs. Where such explicit measures can not be implemented (for example, in some aspects of basic research), improvements in scientifically set targets should be incorporated for qualifying for PRI.

- We have recommended PRI linked to fixed/basic pay and not annual increments. Incentives are the payments made without affecting the basic salary where as increments lead to increase in basic salary.

- Effective implementation of PRI will require a review of promotional policies, including existing schemes like Flexible Complementing Scheme (FCS), Modified FCS, and Assured Career Progression Scheme (ACPS). These are contrary to the basic tenets of proposed model for PRI. Future promotion scheme should be based on the parameters identified for PRI. Care should be taken to see that good performers under PRI are considered for promotion.

- While all scientists are eligible for PRI, in practice, the number of scientists qualifying for PRI and quantum of PRI will be determined by their performance and pre specified targets. Care should be taken that PRI should not get viewed as "entitlements" in future. Proper check mechanisms such as Steering Committees need to be instituted to ensure that targets are meaningful and challenging.

Support Needed for Effective Implementation

- The rate of change of technological, social and economic environment will have bearing in the future role of DST and those in its sphere of influence. Performance measures need to incorporate these changes.

- For effective implementation of PRI, government's role in providing good working conditions is important. These conditions include: availability of adequate infrastructure facilities (like laboratories, library, databases, computers etc.), streamlined funding processes, information systems for monitoring projects, support for peer networking, support for self development, networking of labs, appropriate governance structures for patents, etc.

- It is also important that facilities are up to date and are accessible to those who need them. Information systems for monitoring projects are to be used as a tool for planning purposes for senior managers.

- The suggested implementation plan outlines the need for Steering Committee and a Planning and Implementation Committee. A stage wise implementation plan has been worked with details of objectives, key tasks and people/committees involved.

- An important aspect of implementing PRI is setting targets for the forthcoming performance cycle. In case of scientists in Group I there is a greater focus on individual work. On the other hand, more focus is on unit-level scientifically set targets for Group II. Target setting should be a consultative process with clear two-way communication.

- Annual Confidential Reports (ACR) should be replaced by Annual Performance Management Reports, bringing in a transparent process and proper autonomy should be given to do the job. In order to track individual performance in team activities, there is need for having proper technological support and formal mechanisms for review by external experts/peers/team members.

- Ownership of any new strategic initiatives by a "core" group at the top level though a definite phase of its implementation is vital for its success.

- In addition to PRI, organizations can also evolve other mechanisms to reward performance. For example, organization may create research funds based on individual/department performance.

Measuring Effectiveness

- There should be mechanisms to assess the effectiveness of PRI related processes. Such mechanisms need to be designed right from the inception of PRI.
- Evaluation should be an ongoing process and institutionalized. The structure, mandate, and working principles of a designated committee to oversee this evaluation process should be established.

Chapter 1: Introduction

Accountability and efficiency of government employees has become very critical for competent public administration. One of the key ways of achieving this is by linking performance to incentives. Performance Related Incentives (PRI) had been debated since the Fourth Central Pay Commission but had not implemented. Government faced a lot of criticism for selectively implementing the recommendations of the Fifth Central Pay Commission that increased the burden on public exchequer without bringing in the desired work ethos.

Expectations from PRI are manifold and some of them are discussed below:

1. **To incorporate public accountability**: Metrics developed to measure employees' customer orientation will bring the much needed shift in their focus from political bosses to ordinary citizens. Transparent system will be a deterrent to corruption among employees.

2. **To provide motivation to employees**: Currently only promotion is linked to performance and so employees have no other incentive to improve efficiency and customer-orientation.

3. **To compete with private sector for managerial talent**: Steep rise in salary and job conditions like autonomy is making private sector jobs seems much more attractive to the younger generation. If government wants to attract good talent in future then PRI with delegation and transparency holds the key.

4. **To reduce undue burden on central exchequer**: The increase in salary will not be across the board but will depend on what each employee deserves.

However, these expectations can only be met with a well thought of and well-designed PRI structure. Looking at the global scene, we find that India is already slow to respond to this need. OECD member countries have started introducing PRP from the mid-1970s because of the economic and budgetary difficulties faced by them.

The proposed study aims to address the following key issues:

- Identifying performance metrics and assessors,
- Linking performance to incentives, and
- Formulating guidelines for enabling conditions.

This study examines the above issues for the Department of Science and Technology. Science and technology are viewed as key drivers for national economic and social growth. However, budgetary constraints in the face of increasing research demands make it necessary to examine ways to bring about a strategic change in the process of managing research outputs/outcomes.

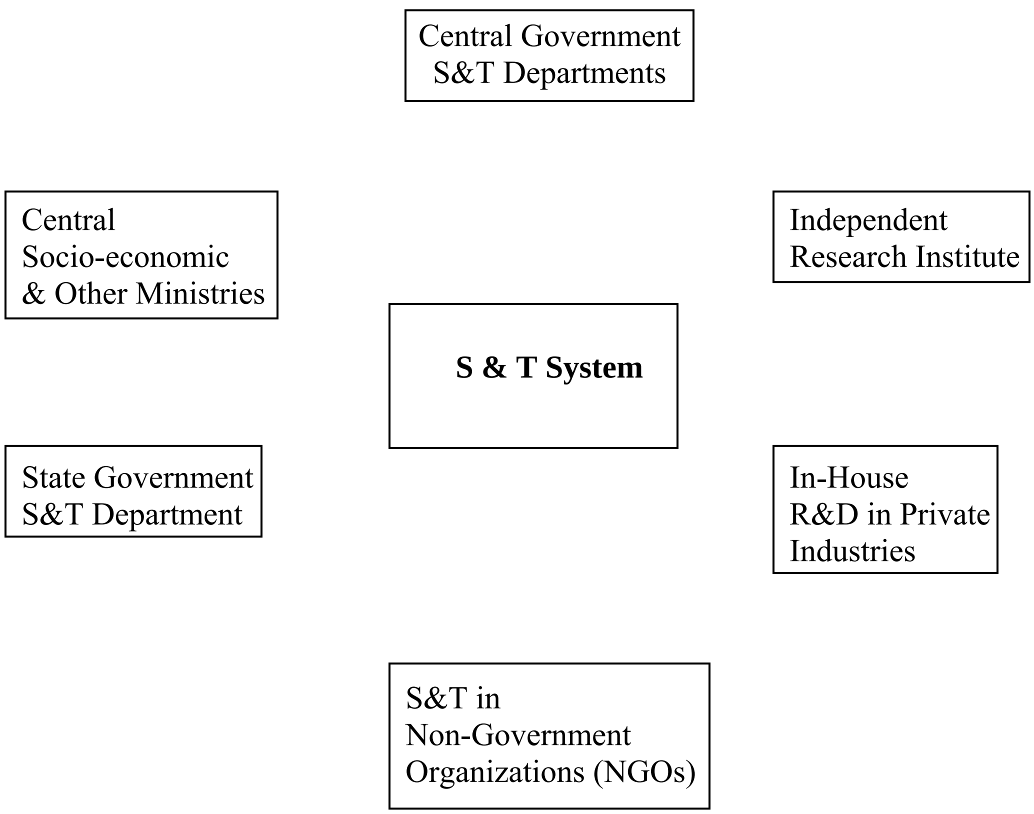
Chapter 2: Background

Excerpted from www.dst.gov.in accessed on 25th June, 2007

Department of Science & Technology (DST) was established in May 1971, with the objective of promoting new areas of science and technology (S&T) and to play the role of a nodal department for organizing, coordinating and promoting S&T activities in the country.

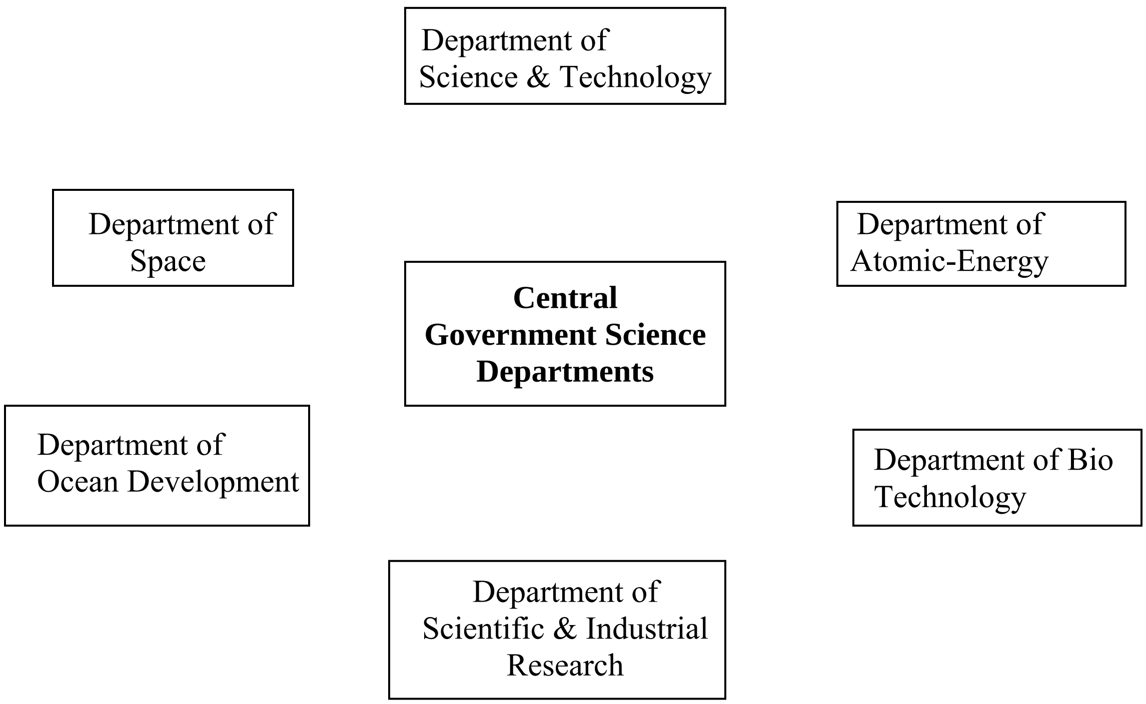
The DST works under the overall framework of the S&T System in India represented in Figure 1. These inter linkages require it to work in close collaboration with a number of other central and state government departments, independent research units, private industry, socio-economic ministries at the central and state level and NGOs.

Figure 1: S&T System in India



The DST is one of the major S&T departments of India. Others are Department of Space, Department of Atomic Energy, Department of Ocean Development, Department of Biotechnology and Department of Scientific and Industrial Research (Figure 2).

Figure 2: Science and Technology Departments, Government of India



The DST has major responsibilities for specific projects and programs as listed below:

- Formulation of policy statements and guidelines on science and technology; and coordination of areas of science and technology, in which a number of institutions and departments have interests and capabilities;
- Support to basic and applied research in national institutions throughout the country and provision of minimum infrastructural facilities for testing and instrumentation;
- Support to critical technology programs;
- Support to autonomous research institutions, whose specialization range from advanced medical research materials to astronomy;
- Fostering international cooperation and establishment of special joint centers/projects;
- Support socially oriented S&T interventions in rural areas for weaker sections;
- Support knowledge-based and innovation driven entrepreneurship development to create self-employment opportunities;
- Popularization of science and technology;
- Providing scientific services in terms of surveying and maps for Defence, External Affairs, state governments and several other developmental agencies through Survey of India (SOI) and National Atlas and Thematic Mapping Organisation (NATMO);
- Providing meteorological services for agriculture, water Resources management, disaster warning, civil aviation as well as providing seismicity data through India Meteorological Department (IMD); and
- Management of information systems for S&T.

Mandate

The Department's mandate includes the following (Figure 3):

1. i) Support to basic and applied research in national institutions
   ii) Support minimum infrastructural facilities for testing and instrumentation
2. Technology development and commercialization - technology development board
3. Autonomous research institutions
4. Fostering international cooperation in S&T
5. Socially oriented S&T interventions for rural and weaker sections
6. Support S&T entrepreneurship development for promotion of knowledge based technology driven entrepreneurs
7. Popularization of S&T
8. Promotion and development of S&T in states
9. Scientific surveys and services through Survey of India and National Atlas and Thematic Mapping Organization (NATMO)

10. Providing meteorological services through India Meteorological Department (IMD) and National Centre For Medium Range Weather Forecasting (NCMRWF)
11. Management of Information Systems for S&T

Figure 3: DST's Mandate

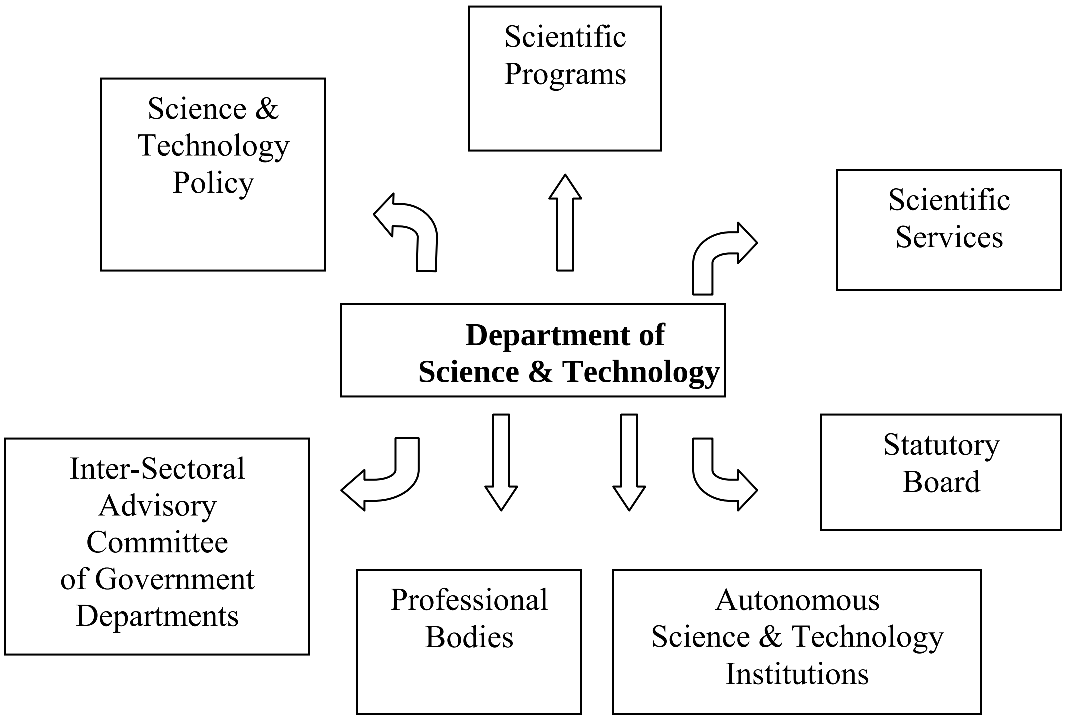
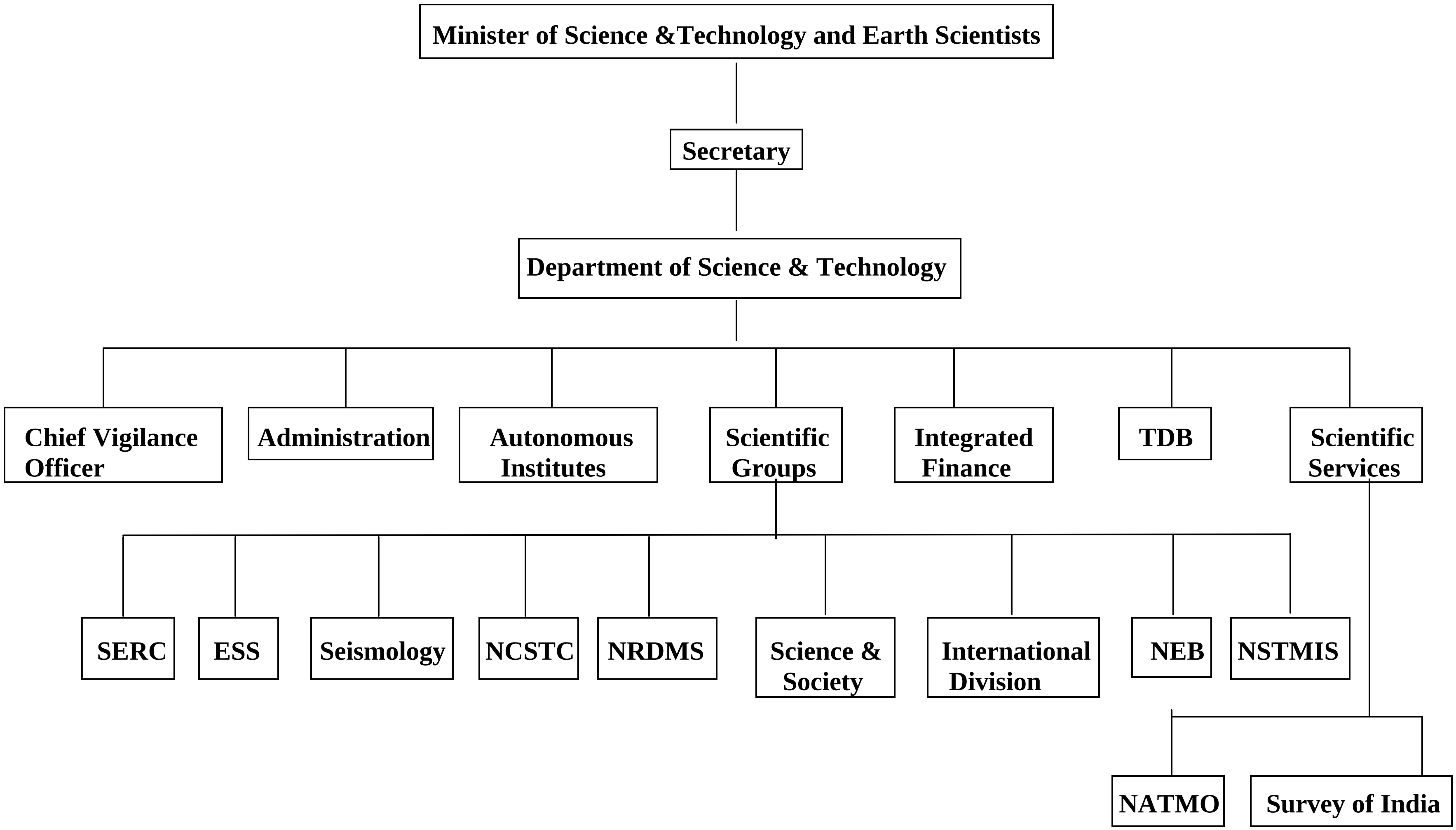


Figure 4 presents the organizational structure.

Figure 4: Organizational Structure of DST



Scientific Services

There are two organizations providing scientific services: National Atlas and Thematic Mapping Organization and Survey of India (SOI). For this study we have selected SOI.

Survey of India (SOI): is the national survey and mapping organization of the country. SOI bears a special responsibility to ensure that the country's domain is explored and mapped suitably to provide base maps for expeditious and integrated development.

Activities/ Charter of Duties

SOI acts as adviser to the Government of India on all survey matters, viz geodesy, photogrammetry, mapping and map reproduction. Its main duties and responsibilities are enumerated below:

- All geodetic control (horizontal and vertical) and geodetic and geophysical surveys.
- All topographical control, surveys and mapping within India.
- Mapping and production of geographical maps and aeronautical charts.
- Surveys for developmental projects.
- Survey of forests, cantonments, large scale city surveys, guide maps, cadastral surveys etc.
- Survey and mapping of special maps.
- Spellings of geographical names.
- Demarcation of the external boundaries of the Republic of India, their depiction on maps published in the country and also advice on the demarcation of inter-state boundaries.
- Training of officers and staff required for the department, trainees from central government departments and states and trainees from foreign countries as are sponsored by the government.
- Research and development in cartography, printing, geodesy, photogrammetry, topographical surveys and indigenization.
- Prediction of tides at 44 ports including 14 foreign ports and publication of tide tables one year in advance to support navigational activities.
- Scrutiny and certification of external boundaries of India and coastline on maps published by the other agencies including private publishers.

SOI consists of the Surveyor General’s Office, 22 Geo-spatial Data Centers (GDCs), four regional Printing Groups and seven Specialized Directorates: Business & Publicity

Directorate, Dehra Dun, GIS & Remote Sensing Directorate, Geodetic & Research Branch, Dehra Dun, National Geo-spatial Data Centre, Dehra Dun, National Spatial Data Infrastructure (NSDI), New Delhi, Survey Training Institute, Hyderabad, and, Digital Mapping Centre, Dehradun

Autonomous Institutions

There are 17 autonomous institutes under DST, specializing in basic and applied science research. For this study, two institutes that were selected are the Bose Institute, Kolkata and Indian Association for the Cultivation of Science, Kolkata. Both institutes are headed by a director under a governing council. Key streams of science are represented by the corresponding departments. Workshops, Library, etc. are also under the Director.

Bose Institute, Kolkata: is a multi-disciplinary research organization with stress on fundamental research. The institute has on its staff highly qualified and experienced scientists working in the field of biological, biochemical, chemical and physical sciences. It is organized into various departments such as Physics, Chemistry, Botany, Microbiology, Biochemistry, and Biophysics, and the research sections on plant molecular and cellular genetics, animal physiology, immuno-technology and environmental science.

There are service centers such as Regional Sophisticated Instrumentation Centre (RSIC), Central Instrumentation Facility, DIC, Library, Workshop etc. The wide ranging and comprehensive base of available scientific infrastructure also comprises of the Acharya J. C. Bose High Altitude Research Centre at Darjeeling and experimental field stations at Falta and Madhyamgram in West Bengal.

Basic research and scientific programs in different areas at Bose Institute has attracted considerable extramural funding from both national and international agencies. In addition, efforts are being made to invite and attract more time-bound contractual R&D projects from the industry to enhance internal revenue. The current drive to explore additional resources of income for the institute is expected to yield at least 20% higher revenue generated from extra-mural and contractual research.

Indian Association for the Cultivation of Science, Kolkata: is a national institution for higher learning whose primary purpose is to foster high quality fundamental research in frontier disciplines of the basic sciences. It is the oldest such Institute in Asia. Sir C.V. Raman who was associated with IACS is credited with creating a vibrant research environment. Raman Effect was discovered in 1928 during his association with IACS, for which Raman received a Nobel Prize in Physics in 1930. IACS continues to attract eminent scientists involved in leading edge research.

The principal agencies supporting research by funding in IACS are Department of Science and Technology (New Delhi) and Government of West Bengal. Various research projects from several funding agencies in India and abroad including projects supported by DST also generate funds.

IACS currently has eight departments:

1. Materials Science
2. Solid State Physics
3. Spectroscopy
4. Theoretical Physics
5. Biological Chemistry
6. Inorganic Chemistry
7. Organic Chemistry
8. Physical Chemistry

There are also three active units:

1. Energy Research
2. MLS Professor of Physics
3. Polymer Science

Three new centers have been created:

1. Centre for Theoretical Sciences
2. Centre for Advanced Materials
3. Centre for Renewable Energy Sources

IACS has a doctoral and post doctoral program.

A unique feature of IACS is a strong synergy existing between theoretical and experimental sciences. It has been at the leading edge of both theoretical and experimental sciences. The faculty members of Chemistry and Physics wings are especially acknowledged leaders in their fields.

Over last two decades, IACS has initiated research activities based on strong technological bias. Several patents have been filed, and pilot plans to study the efficacy of alternative sources of energy have been initiated. IACS has world class activity in fields such as synthetic chemistry, biomimetric chemistry and chemistry and physics of materials, ultra fast chemical dynamics, drug design and in theoretical chemistry/physics etc.

Chapter 3: International Review

The Drivers for Accountability in R&D Organizations

Development of science and technology, at the national level, has an impact not only on economic but also on social development. Due to the huge costs involved in R&D and the need to make the outcomes available to a large population which may not be able to privately for the benefits, and in recognition of the role of science and technology in development, most governments have publicly funded science and technology programs.

In the context of budgetary constraints nearly all over the world and the rising costs of research, there is an increasing pressure on government funded research to increase its contribution to innovation, economic performance and the fulfillment of social needs. As a consequence, there has been a move to measure in quantifiable ways the outcomes and impacts of such research institutions and programs (1, 2, 6, 7, 8, 10, 12, 17, 19, 24, 25, 26, 27, 28, 30, 31, 32) The concern with the efficacy of research councils in UK has been specifically commented on in (3).

Several publicly funded organizations have developed frameworks for measuring the same. Increasingly, performance management in R&D is considered a fundamental aspect of quality (11, 31). For example, performance assessment at the National Science Foundation (NSF) in the USA is guided by the Government Performance and Results Act of 1993 (GPRA), the Office of Management and Budget's Program Assessment Rating Tool (PART), and by the Foundation's FY 2006-2011 Strategic Plan, which describes four strategic outcome goals of Discovery, Learning, Research Infrastructure, and Stewardship. The Advisory Committee on GPRA Performance Assessment assesses performance of NSF. Appendix 1 provides the Framework and Guidelines for NSF Assessment Process.

The pressure on publicly funded R&D organizations to be more accountable in terms of specific and measurable outcomes has also created pressures on measuring individual scientist's productivity.

Drivers for PRP in R&D

The challenge of performance management and attracting young scientists to the field are exacerbated in the context of relatively poor salaries and hierarchical systems in the public sector. In this scenario, PRP/PRI is seen as an attractive proposition. In the USA, a Pay for Performance system exists in several government departments under the enabling GPRA that requires federal agencies to develop a strategic plan, establish annual performance goals, and report annually on the progress made toward achieving these goals (Appendix 2). A critical component of such an assessment is a Performance Management culture that includes development of metrics, norms/standards and an evaluation plan that is communicated to the employees through a variety of mechanisms (web sites, handbooks, seminars etc). Individual PRP is an integral component of such a plan. However, an NSF specific PRP plan was not available in the public domain.

An example from a developing country context is that of Pakistan's annual performance evaluation system for its Agricultural Research Councils (1). This included an annual performance evaluation system (though not linked directly to pay) that measured performance based on the category of employees such as Active Researchers, Researchers cum Managers, Research Managers Research Facilitators and Extension Scientists. This classification was based on their profile of activities and association with particular institutes under the Agricultural Research Councils.

Issues in Performance Management Systems for R&D Organizations

Evaluating scientific outcomes is recognized as a complex problem in almost all scientific organizations the world over. The backdrop in which scientists work requires them to "choose research questions that are solvable yet non trivial, must apply disciplined and creative efforts to intractable problems, must convince others that their results are valid and valuable and tolerate high levels of competition that may deprive them of their ultimate regard of recognition from the scientific community"…"they must schedule their own work and that of their assistants…Rarely subject to regular supervision, scientists also lack short term incentives that rewards for daily performance" (28). Many scientists have non research obligations (teaching, administration) that do have deadlines and thus, can divert them from their less structured research work (19, 28).

Classification of Scientific Output

Pappas and Remer (1989) have suggested classification of scientific output along the following dimensions: basic scientific research, technology and innovation, research applied to product and process improvements, and social impacts of R&D for measurement.

Kim and Oh (14) formulated output indicators for Korean research organizations in the following areas: basic scientific research, technology and innovation, research applied to product and process improvements, and social impacts of R &D.

Metrics for Measurement

Despite the issues in measuring scientific output, several metrics have evolved both in public and private sector. These are largely based on bibliometrics (4, 5, 9, 12, 13, 15, 16, 17, 18, 21, 22, 23, 28, 29, 31, 32) that analyze research outputs accepted internationally. Journal lists, bibliometric indicators and rankings produced by the Institute for Scientific Information (ISI) have received wide support. Newer tools include other indexes such Scholar.google.com (17).

For example, citation analyses and impact factors are regarded as powerful drivers of scientific quality (9, 21). Citation rates are a major component in the British Research Assessment Exercise as well as in the Performance Based Research Fund in New Zealand (6). Although these have not been part of the current and past university funding models in Australia, they are likely to be given a heavy weighting in the proposed Research Quality Framework (8, 19).

The Pakistani report (1) suggests "Accomplishments relative to assignments, Publications, Knowledge seeking, Devotion to duty, Response to time limit assignments, Leadership and team work, Initiative and drive" as metrics for "active" researchers. The metrics consists of both scientific and behavioral components. But neither type of measure is defined in an objective way and would therefore, create problems in assessment. For example, publications or project proposals do not embed any quality assessment explicitly. Similarly, it would be difficult to quantify "knowledge seeking" behavior.

Another perspective that is shaping the debate is the increasing focus on commercialization of scientific output. However, few studies cite this as a metric.

Due to the uncertainties in research outputs/outcomes, and possibly their intangible impact, it is necessary to use a multidimensional perspective for evaluation. Several of the indicators such as number of publications, citations per paper, number of highly cited papers and peer evaluation were found to give consistent results for assessing contributions to scientific knowledge. Moreover, these were found as a good basis for comparison of performance (8, 18).

Issues in R&D Performance Management Metrics

Acceptance of Measures: The very act of measurement is thought to thwart creativity and reduce motivation among highly educated technical people (22). However, this may be overcome by having scientists involved in the design of the metrics.

Target Setting: Related to the issues of selection of metrics is the issue of setting norms, as by their very nature R&D projects are unique. This is more applicable to basic than applied science or product development processes. Setting norms for the department in which the research is carried would also be problematic. However this problem could be partly addressed by developing databases and competitive benchmarks vis-à-vis similar organizations (13).

Bibliometrics: Despite it's seemingly more objective orientation, bibliometric data must be used with caution. Application of measurement techniques such as citation indices must not focus on narrow domains that exclude topics that are not easily categorized. It also means that the process must be fully transparent (with the opportunity for appeal against judgments that are felt to be unfair). High-quality work may be initially resisted or neglected, perhaps because it is "ahead of its time". Poor quality paper may be frequently cited, because they are either controversial or "mistaken". A factor influencing the relationship between numbers of citations and quality is the effect of self-citation, the incidence of which may be partly related to the size or the state of development of the specialty. The use of citation counts is complicated by the "halo effect" – the fact that, when there is a choice of publications to cite, people prefer to cite those scientists who are well known (9, 12, 18, 20).

Time Lags: The difficulty in implementing a performance management system is the inherent time lag between scientific output and possible commercial gains. The difficulty is more for basic research than applied research (13). Pappas and Remer (1985) have reported time lag of 7-19 years for basic research projects. At the time basic or applied science results become available, it may not be clear as to which product/process these would become applicable (13). The Australian Research Quality Framework (8) addresses this issue by attributing the research outputs and body of work listed by an academic during the assessment as attributable to the institution at which the researcher was employed at the time of the evaluation rather than attribute it to the one based on the affiliation on the date of publication.

Publication Impediments: Research that has an important social impact may not make it into the top scientific journals because of a lack of purely scientific novelty. A reward system that is based largely on publication in such journals will fail to give adequate recognition to research that seeks to solve important problems, not just to advance knowledge (9).

Non English speakers face significant challenges in getting publications in Western based international journals due to the different way they express themselves as compared to their English speaking counter parts (9).

The lack of library resources for many scientists is a hurdle as they are unable to keep abreast of the latest publications, a necessary requirement for publications (9, 21).

Local and regional efforts to enhance citation performance should be encouraged. The organization BIREME in Brazil is already exploring some possibilities in this field (for example, using local-language electronic publishing to boost the 'impact factors' of Latin American journals). Similar efforts are being made in Africa through, such as the scheme African Journals On-Line (9).

The literature provides a variety of measures and measurement systems. However, there is a lack of general framework that defines what concepts should be used in specific contexts. For example, issues such as should different measures be used for diagnostic versus incentive purposes remain unaddressed. Little work is available in the context of specific PRP metrics for R&D organizations, especially in publicly funded R&D organizations.

Evaluation Criteria and Processes

Evaluation has generally been based on a variety of bibliometric data. The Australian Research Quality Framework (8) has devised a five point assessment scale for both quality and impact against a five-point rating scale for each. In order to accommodate longer-term impact, the work judged for impact must achieve a threshold quality rating of 2. Impact may be related to original research conducted in the preceding six years provided the research can be shown to have a direct relationship with the research being assessed for quality.

Where the criteria of assessment is not objective, assessment panels have been created. For example the National Science Foundation in the USA uses two external review mechanisms -- Committees of Visitors (COVs) and Directorate and Office Advisory Committees (ACs), which conduct independent assessments of the quality and integrity of NSF's investments. With respect to broader issues, NSF often uses external third parties such as the National Academy of Sciences for outside review. NSF also convenes external panels of experts for special studies. Peer reviews mechanisms for funding science projects have also been recommended by the National Natural Science Foundation, China (27). The Australian government has also come out with a detailed peer review mechanism for science projects (25).

Possible implications of peer evaluation of colleagues may influence scientists to give different ratings than they otherwise would. This effect may be reduced by having external experts on the evaluation committee. There is inevitably a tendency for scientists to evaluate the worth of a scientific contribution in terms of their own research interests and activities (9).

The Australian Research Quality Framework (8) provided scales for assessment of performance. The Pakistani report (1) suggested two components for evaluation: an annual performance evaluation and the other to be used at the time of promotion and selection of the scientists to the higher grade. The annual performance evaluation system involved both the individual and the supervisor and indicated scales for different levels of performance.

Aggregation Level

The aggregation level at which the performance management system works has implications for the design of parameters, frequency of measurement, etc. For example, Roy, et al (29) suggest four levels- self assessment, head of the research unit, external scientific, and external administrative evaluators for peer review.

Vinkler (32) used scientometric methods for assessing performance of research institutes and argued that the following were important for a successful evaluation: objectives of the assessment must be specified, characteristics of the entities to be evaluated should be determined, appropriate criteria should be selected, relevant indicators should be elaborated, relevant data should be obtained and validity, reproducibility, and application limits of the data and the indicators should be given.

The Australian Research Quality Framework (8) has identified research groups as the unit of assessment while the Pakistani report (1) evaluates performance at the individual level.

Summary

Evaluating the efficacy and efficiency of outcomes for publicly funded science and technology departments and institutions is imperative, both at the organizational and the individual level. Since there are multiple perspectives and dimensions for evaluating the outputs/outcomes of scientific activities and programs, therefore, extreme care and thought needs to go in the development of metrics for performance.

Bibliometric data, ability to generate external funding, management of R&D processes, extent of commercialization, student research output etc., play an important role in performance assessment. While there are objective ways of measuring some of these metrics (bibliometric, research funds generated etc.,), some others (impact of a particular science program) may require peer evaluation and involvement of experts from a variety of fields (so that a multidisciplinary approach can be adopted). Moreover, the uncertainties associated with research outputs/outcomes would require a multi dimensional perspective for evaluation. Such processes need to be contextualized and worked out with care. Research output needs to be assessed at the individual and team level.

Chapter 4: Methodology

The project started with a meeting with the designated nodal officer (Dr Laxman Prasad, Adviser, Department of Science & Technology) on January 5, 2007. It was decided to pick a sample of various units of the Department.

In discussion with nodal officer, Dr Laxman Prasad, we identified the following:

- Directorate, Delhi
- Survey of India, Dehradun
- Indian Association for Cultivation of Science, Kolkata

Note: Later, in consultation with the nodal officer, we also selected Bose Institute, Kolkata. After visiting Survey of India, Dehradun, the study was extended to include two Geo-Spatial Data Centers: one in Chandigarh and the other in Uttarakhand.

Design of the Study: We decided to collect data at six levels of granularity.

1. The first level was the secondary data like existing job descriptions given by the Directorate to the Sixth Central Pay Commission, organizational structure, mandate, functioning, Annual Reports, current ACRs formats, etc. We also reviewed articles/reports related to PRI/PRP in different countries for similar organizations as highlighted in the section on International Review. On the basis of the secondary data we developed a questionnaire that covered the activities and the corresponding performance measures in the current structure (Appendix 3).

2. Interactive sessions with and presentations from focus groups at different levels of hierarchy covering different streams of scientific activity.

3. Direct interviews and questionnaire responses from individuals. The intent was to capture the inputs from those people who were engaged in specific activities.

4. Written/oral inputs from various collectives/associations.

5. A preliminary case study of a similar organization, outside DST (Central Leather Research Institute, Chennai) (Appendix 4).

6. A workshop was organized at Indian Institute of Management Ahmedabad on May 1, 2007 to focus on PRP Implementation Experiences in different organizations in the corporate sector (Appendix 5).

Scope: This study was spread over different entities of DST, including Directorate in Delhi, one of the scientific services, and two of the autonomous institutes. In each we included a variety of divisions/functional units/departments. We have primarily covered the scientific cadre because mechanisms for PRI for scientists will be unique and have typical challenges in comparison to the support/office staff. Nature of job will be different for scientists involved in research work and those involved in program/policy management. In addition, there are significant variations between scientists doing basic and applied research. Our sample was selected to include all these categories.

Sample: Table 1 gives the date, group/unit and location of meetings for the study.

Table 1: Date, Group/Unit and Location of Meetings for the Study

Date	Group/Unit	Location
January 5	Nodal Officer	Directorate, New Delhi
January 31	Secretary, Scientists and Nodal Officer at Directorate	Directorate, New Delhi
February 19	Secretary, Scientists and Nodal Officer at Directorate	Directorate, New Delhi
March 12-14	Director and scientists at CLRI	CLRI, Chennai
March 18	Nodal Officer	IIMA, Ahmedabad
April 12	Nodal Officer and Scientists at Directorate	Directorate, New Delhi
April 21-24	Surveyor General of India, and other senior functionaries at SOI, GDC, Uttarakhand, GDC, Chandigarh	Respective Organizations in Dehradun and Chandigarh
April 23-May 4	Director, Registrar, and Scientists at IACS and Bose Institute	Respective Institutes in Kolkata

Chapter 5: Measuring Performance for PRI

We looked at performance measures from various perspectives as discussed below. Before elaborating on the specific measures, following need to be kept in mind:

1. ***Variation in activity profile***: The scientists in our study are involved in the following categories of activities:
   a. Basic research
   b. Applied research
   c. Teaching
   d. Management of scientific institutions

   The performance measures for these activities are different and should reflect the activity profile of the individual.

   The study also covered people in the following groups:
   i. Science program/policy management
   ii. Product/ service development (Surveyors)

2. ***Measuring Outputs/Outcomes*:** PRI will be more effective when measures are output/outcome based, objective, and quantifiable. Sometimes when scientific output is difficult to measure, there is a tendency to focus on the input parameters. While parameters related to input/efforts such as work in progress could be incorporated, care should be taken to avoid measures like "number of meetings attended" because they do not reflect efficiency/effectiveness. Therefore, output/outcomes measures should be given significantly more weightage in comparison to any parameter related to effort. As mentioned earlier, assessment of performance should be based on multiple dimensions in the annual performance management report (discussed in the section on APMR).

3. ***Periodicity of Measurement for Assessment***: Given the nature of basic and applied research, success in the project may take longer than the annual assessment cycle. Therefore, it is required to identify annual intermediate steps for assessment in the project. Since success is not guaranteed, performance assessment should also incorporate measures for efforts. Also, any two research projects are not comparable in terms of intermediate steps as well as outputs.

   On the other hand, in activities like management of institutions, teaching, testing, surveying outcomes are certain and could be annually measured both quantitatively and qualitatively.

4. ***Individual and team based***: Since activities are interdependent for employees in science program/policy management and product/ service development, it is preferable to have a combination of both individual and team based PRI. Teams will be activity-based, for example, project team, functional unit, etc. Where

outputs/outcomes are measured for a group, the allocation should be distributed on a pro-rata basis.

Measures of Assessment

Measures of assessment have been designed taking in to account category of scientists, their activities and types of impact (Table 2).

Table 2: Measures of Assessment

Category of Scientists	Categories of Activities	Types of Impact	Examples of Measures
Group I: Scientists	Basic Research	Academic Impact	(1) Awards/Recognition a. International b. National (2) Editor of a high impact journal or member of editorial team of a high impact journal (3) Number of Publications a. Refereed Journals b. Trade Magazines (4) Impact factor of the Publication (5) Cross citation (6) Number of Conferences Presentations/Workshops a. Invited b. Presented Papers/ Conducted Workshop (7) Number of papers refereed for high impact journals (8) Publications being worked on
		Institutional Impact	(1) Project funds a. Industry b. External (like grant in-aid, funds from non-commercial organizations) c. Internal
		Laboratory Impact	(1) Number of projects initiated a. Industry funding b. External government c. Internal funding (2) Number of new models/ instruments developed (3) Reduction in laboratory costs
	Applied Research	Academic Impact	Similar to Basic Research
		Institutional Impact	Similar to Basic Research
		Laboratory Impact	Similar to Basic Research

Category of Scientists	Categories of Activities	Types of Impact	Examples of Measures
		Commercial Impact	(1) Profit generation (2) Marketable output (3) Project initiated (quantum of industry funding) (4) Patent filing/acquisition (5) Rating of peer review of proposals
		Social Impact	(1) Impact on user groups (evaluated by external experts/ peers/user groups) (2) Technology transferred to government/non-government research units (evaluated by external experts/peers/user groups) (3) Existing technology/work tailored for regional context (evaluated by external experts/peers)
	Teaching	Doctoral Level	(1) Number of theses guided (2) Number of courses taught of standardized duration
		Post Graduate/ M.Phil.	(1) Number of courses taught of standardized duration a. External (graded according to quality) (2) Feedback from students (3) Projects guided
	Management of Scientific Institutions	Organizational Impact[1]	(1) Number of organizations (academic/corporate) with whom collaboration has been established a. Signing of MOU b. Exchange visits c. Common fund (2) Number of publications in very high impact factor journals (3) Number of patents commercialized (4) Amount of funding generated from external sources
		Service Impact	(1) Feedback rating of services

[1] The measures for organizational impact need to be normalized for the budget allocated to the institute and the number of scientists and support staff at the institute.

Category of Scientists	Categories of Activities	Types of Impact	Examples of Measures
			(labs, library etc) provided (2) Faculty feedback surveys
Group II			
Science Program/ Policy Managers		Societal/National Impact	(1) Percentage of success criteria met for schemes/programmes (including focus on organizational mandate) (2) No. of social networks generated: a. International agreements signed b. Exchange visits organised c. Scholarships granted d. No. of national/ international workshops organised (4) No. of socially relevant technologies developed/ disseminated (to be evaluated by external experts/peers) (5) No. of location-specific problems identified requiring S&T intervention (to be evaluated by external experts/ peers)
		Planning and Policy Impact	(1) Evaluation on national S&T indicators (2) Percentage of budget allocation spent (percentage of success criteria met) (3) Inputs for ministerial/ inter ministerial policies

Category of Scientists	Categories of Activities	Types of Impact	Examples of Measures
		Scientific/ Technological Impact	(1) Refereed publications/Peer review of technology/sector/ program report (2) Percentage of success criteria met for research projects[2] (3) Percentage of research grants to new institutes/research groups (4) No. of patents/technologies commercialized (5) No. of proposals generated/ refereed (6) No. of invited memberships of "reputed" professional societies obtained
		Institutional/Academic Impact	(1) No. of Centres of excellence/ facilities established (percentage of success criteria met) (2) No. of training programmes organised/sponsored (3) No. of labs / organizations accredited for compliance of accreditation criteria
Product/ Service Developers (Surveyors)		Financial Impact	(1) Value of commercial products/ services (2) Value/Percentage of repeat orders/services (3) Percentage of revenue from new products and services
		Customer Impact	(1) Number of new customers (2) Orders completed on time a. By value b. By number (3) Feedback from customers (regarding customization, delays etc)
		Internal Processes Impact	(1) Productivity (Number of maps/ person hour) (2) Reduction in cost over base values

[2] Before sanction of the project, the success criteria of the project need to be established. These criteria need to be as objective as possible (say 50% -70%). The remaining ones that are subjective should be assessed by external experts/peers.

Category of Scientists	Categories of Activities	Types of Impact	Examples of Measures
			(3) Achievement of targets (scientifically set)
		Learning and Growth Impact	(1) Number of people trained in new technologies (2) Level of digitalization brought in

Notes:

a. ***Lag Effect of Scientific Output:*** There is a lag effect in terms of the impact made by scientific outputs such as publications, patents and products (like maps). The impact factor if considered only for the publication year may not reflect the long term influence.

b. ***Citation***: Self citation is not included in this parameter. Cross Citation parameter refers to earlier publications of a scientist in refereed journals. Citation Indexes are available from a variety of well established sources such as ISI's Web of Science, NASA's Astrophysics Data System, eprints.org, and the NEC Research Institute's ResearchIndex. It is recommended that a variety of indexes are used for evaluation, including newer tools such as Scholar.google.com. However, care should be taken that the weights of these indexes are standard across different institutions.

Annual Performance Management Report (APMR): This is a much modified system of Annual Confidential Report (ACR). ACRs have been used for promotion. We suggest replacing them with APMR stage wise. This will require awareness, consultation, and training for evolving the APMR and implementing the new assessment system based on it. The APMR should include data on the various dimensions identified in Table 2. For example scientists would provide information on the Amount of research funding from different sources, publication details, citation analysis etc.

a. The information on the objective dimensions can be verified by some administrative mechanisms. For example, impact factor of journals, amount of research funding from different sources, is being used to allocate funds to various departments in CLRI. This exercise is centrally carried out (Appendix 4).

b. In case of materials provided for evaluation on subjective dimensions, expert/peer assessment has to be carried out at the institutional level.

An individual’s performance report has to be a combination of both verified objective data as well as the subjective expert/peer review.

Chapter 6: Linking Incentives to Performance

Key points for our Framework of PRI

1. PRI is to reward output/outcomes that are significantly better than those expected as routine in a particular job. In the current system, honorarium is provided to a limited number of people for good performance. We recommend that such a system should be removed and replaced by PRI. The current system rewards only a limited number of employees, is subjective, and is not based on quantifiable objective measures.

2. The amount of PRI will be given in steps up to a maximum specified percentage in Table 3. While setting the targets, first the basic targets that need to be exceeded to qualify for PRI should be established and then stretch targets should be instituted in a step wise manner. The quantum of incentives associated with these steps is then based on these pre specified targets.

3. While all scientists are eligible for PRI, in practice, the number of scientists qualifying for PRI and quantum of PRI will be determined by their performance and pre specified targets. Care should be taken that PRI should not get viewed as "entitlements" in future. Proper check mechanisms such as Review Committees (elaborated later), need to be instituted to ensure that targets are meaningful and challenging.

4. Since linking incentives to performance will be a significant change for the government, this should be implemented in stages. We have identified Stage 0 to Stage 3 for implementation. It is expected that efforts will be made to improve the enabling conditions (discussed in the next section) stage-wise progressively. The proportion of incentives increases progressively from Stage 1 to Stage 3.

Stage 0 (Consultation and Frame-Work Setting): The relative weightage of performance measures in PRI will vary according to the activity profile of the individual. Also, research output may not be easily comparable across different disciplines of science and categories of scientific research (basic/applied). Therefore, it is necessary that concerned scientist and administrators should work together to evolve a framework for assessing performance. This will involve:

1. Shifting from ACR to APMR.

2. Finalizing the measures and criteria (representative examples are provided in Table 2) based on the framework specified in the previous section.

3. Categorizing the outputs into subjective and objective dimensions.

4. Evolving the relative weightages for the various types of measures suggested here.

This should be done through collaborative workshops, expert interventions, etc. Building employee trust and acceptability of PRI will be essential for implementation of Stage 1. Efforts will need to be made to ensure that Stage 0 is completed within 6 months to a year of accepting the recommendations.

Since the measures are also not well-developed for science program/policy managers and surveyors, the above steps need to be followed for them.

DST needs to evolve mechanism for scientific target setting. Since most of such targets do not currently exist, this will involve internal benchmarking based on past performance and external benchmarking based on performance norms in similar organizations.

Stage 1: It is envisaged that Stage 1 will be implemented based on the framework developed in Stage 0. Efforts will need to be made to ensure that Stage 1 is implemented within 6 months to a year of Stage 0. Delays in Stage 1 will be very detrimental to the subsequent implementation and may jeopardize the entire efforts.

For scientists, Stage 1 will include measures for which processes already exist or can be quickly developed.

For example,

a. For scientists, most of the measures related to academic, institutional and laboratory impact can be implemented in this stage. On the other hand, some measures of social and service impact may need proper processes in place and should be implemented in Stage 2.

b. For science programs/policy managers, most of the measures related to scientific/technological and institutional/academic can be implemented in this stage. On the other hand, some measures of societal/national and planning and policy impact may need proper processes in place and should be implemented in Stage 2.

c. For surveyors, measures related to internal processes and learning and growth impact and some measures of customer impact can be implemented in this stage. On the other hand, developing commercial-orientation may take longer so measures of financial impact and other measures of customer impact should be implemented in Stage 2.

Stage 2 is envisaged to be implemented only after two years of Stage 1 implementation. A full year of Stage 1 implementation should be reviewed. We expect that the review to take 3-6 months and recommendations to be developed in another 3-6 months. Stage 2 should incorporate the recommendations/suggestions for improvement.

For Stage 2, processes for Stage 2 measures (referred to above) need to be put in place. The work for developing these processes should start in Stage 0 and not await the completion of Stage 1.

Stage 3 should be implemented at least two years after Stage 2 implementation. Stage 2 should be reviewed after one year of its implementation. Stage 3 should incorporate the recommendations/suggestions for improvement after Stage 2.

Table 3 gives the group of employees, categories of activities, types of measures and stage wise weightages of impacts for linking incentives to performance.

Table 3: Linking Incentives to Performance

Group I	**Categories of Activities**	**Types of Impact**	**Stage 1**	**Stage 2**	**Stage 3**
Scientists			***Maximum of (10% of basic/fixed pay)***	***Maximum of (20% of basic/fixed pay)***	***Maximum of (30% of basic/fixed pay)***
	Basic Research	Academic Impact	The order for weightages for the impacts is Academic, Institutional, and Laboratory.		
		Institutional Impact			
		Laboratory Impact			
	Applied Research	Academic Impact Institutional Impact and Laboratory Impact	The order for weightages for the impacts is Academic, Commercial, Social, Institutional, and Laboratory.		
		Commercial Impact			
		Social Impact			
	Teaching	Doctoral Level	The order for weightages for the impacts is doctoral and post graduate level		
		Post Graduate/M.Phil. Level			
	Management of Scientific Institutions	Organizational Impact	The order for weightages for the impacts is organizational and services.		
		Services Impact			
Group II	**Categories of Activities**	**Types of Measures**	**Stage 1**	**Stage 2**	**Stage 3**
Science program/ policy manager			***Maximum of (10% of basic/fixed pay)***	***Maximum of (20% of basic/fixed pay)***	***Maximum of (30% of basic/fixed pay)***
		Societal/ National Impact	The order for weightages for the impacts is Societal/National Impact, Planning and Policy Impact, Scientific/ Technological Impact, and Institutional/ Academic Impact		
		Planning and Policy Impact			
		Scientific/ Technological Impact			

Group I	Categories of Activities	Types of Impact	Stage 1	Stage 2	Stage 3
		Institutional/Academic Impact			
Product/ Service Developer (Surveyors)		Financial Impact	The order for weightages of impacts is internal processes, customer, and learning and growth	The order for weightages of impacts is financial, customer, internal processes, and learning and growth	
		Customer Impact			
		Internal Processes Impact			
		Learning and Growth Impact			

Note: In Stage 1 care should be taken to balance the number of measures along each dimension with the weightage for that dimension, particularly for Applied Research and Group II. As we go from Stage1 to Stage 2, new measures get added as we expect organizations to have incorporated the additional dimensions mentioned above.

Chapter 7: Enabling Conditions

PRI is a strategic change in the government. Therefore, the level and extent of changes in the organizational structure, processes and systems will be significant. This transformation will need to take into account the changes in the external environment and more importantly, the perspective of employees.

The role of government supported science and technology programs in the overall national development is critical. Given the limited level of industry supported foundations and grants available for developmental projects in developing countries, this role is even more significant. In India, there is a large base of educated people with a background in science subjects as well as a positive value associated with pursuit of careers in Science. In this context, the role of the government and those administering science programs becomes the vital link to leverage these assets.

Impact of External Environment on Performance Measures: Emerging fields/discipline (for example, management) and the liberalization of the economy have led to the talent being drawn away from the field of science, particularly organizations under the aegis of the government. In such a situation, challenges in terms of attracting, developing and retaining talented employees need to be effectively addressed by DST. Involvement of DST in this context is at two levels: (1) employees under DST and (2) scientists/ technologists supported by various programs of DST. At both levels it has become important that good work be recognized and performance be tracked. This will only be possible if appropriate performance measures are developed and linked to rewards, both monetary and non-monetary.

Further, the rate of change of technological, social and economic environment will have bearing in the future role of DST and those in its sphere of influence. Performance measures need to incorporate these changes. For example, digital technology has changed the map-making processes but appropriate performance parameters related to this are yet to emerge.

Availability of Proper Infrastructure: Scientists involved in research and product/service development activities need to have adequate infrastructure facilities like laboratories, library, databases, computers etc. It is also important that such facilities are up to date and are accessible to those who need them.

Often such resources are a part of projects associated with a small group. Proper institutional processes need to be developed so that accessibility of such resources is increased. There should also be a mechanism to ensure continued care and maintenance of such resources.

Review of Existing Promotion Processes: Implementation of PRI will mean that promotional policies in organizations should be suitably modified. Organizations should work towards a formal mechanism for promotion based on PRI. We would like to point out that the existing schemes like Flexible Complementing Scheme (FCS), Modified

FCS, and Assured Career Progression Scheme (ACPS) are contrary to the basic tenets of proposed model for PRI. In addition, their implementation has not been effective and failed to achieve the basic objective of motivating scientists.

The processes related to these schemes are not transparent. The linkage between performance and promotion is often perceived to be unclear. There is sometimes disagreement about relevant parameters of assessment between the assessee and assessor/organization. The future promotion scheme should be based on the parameters identified for PRI. Care should be taken to see that good performers under PRI are considered for promotion.

Improvement in Funding Processes: Scientists in autonomous institutes felt that if their performance parameters are to be linked to their output, then systems need to be in place to ensure that funding processes are streamlined and administrative delays are to be avoided. Such delays in funding processes may be as long as up to eight months or more, which is almost co terminus with their proposed assessment cycle.

Information Systems for Monitoring Projects: Since most of the work done by scientists is done in a project mode with support from a variety of funding agencies, appropriate information systems for monitoring the status are necessary. The monitoring should begin with the project proposal stage itself. Effective measures for each stage need to be designed and implemented. In projects that have a commercialization potential, there should be mechanisms to assess the extent to which such a goal was achieved. Such a system can also be a useful tool for planning purposes for senior managers.

Support for Peer Networking: Though most of the scientists work individually or in small teams, it is important that they share their successes and even failures with others working in similar field. The first step will be to hold regular seminars within the institute or across DST institutes. Funding support for national and international conferences and seminars where the scientists can contribute through papers, workshops etc should be provided. Collegiate culture needs to be created within the Institute so that peers can assess the individual work and suggest future directions.

Role of Training and Development: While scientists need to be provided with resources to update them on latest developments in their fields, there is a need to focus on other areas of training and development as well. This is because success in many scientific projects critically depends on team work, communication and effective project management. Since there is an increasing emphasis on commercialization, scientists also need to be trained in areas such as business development and entrepreneurship.

Due to the global focus and potential of India as a R&D hub, dissemination of information on good lab practices should be provided. Networking of labs to share this information through a variety of modes will make this easier.

Target Setting Processes: Targets need to be scientifically set for Group II. In map-making process, weather and environment plays an important role. The difficulty level of the work is affected by these conditions. Hence these factors need to be incorporated while setting targets.

The superior-subordinate meetings for individual goal setting in the APMR process needs to be consultative in nature where inputs from the subordinate are given proper consideration. Final targets should be agreed upon by both parties.

Establishing Work Norms: PRI's linkages with work norms will raise a number of issues related to the mechanism of establishing these norms. These mechanisms need to be scientific, transparent and consultative. Since managers will have a performance parameter for reduction in cost per employee, it will act as a balancing mechanism against possible relaxed work norms proposed by the employees.

Definite Tenures at Higher Managerial Levels: Ownership of any new strategic initiatives by a "core" group at the top level is vital for its success. This requires two major conditions. One is that the concerned managers should hold the position for a reasonable time (neither too short nor too long), preferably based on project targets. Secondly, ensuring proper succession planning including transparent processes for selection and proper induction is critical.

There should be a requirement for institutionalizing new initiatives rather than they being individual based, as these tend to change focus in case of transfers. A consultative process, to some extent, would ensure institutionalization.

PRI in Traditionally "Non-Revenue Earning" Organizations: Justifying PRI to external stake holders in "non-revenue earning" organizations may be difficult. Such organizations should explore ways of earning revenues through some of their activities at least. For example, Autonomous Institutions should encourage industry collaborations and SOI should promote commercialization of products/ services. Despite going towards a more market-oriented model some types of research and scientific programs could be involved in fulfilling important social and developmental mandates and therefore their performance measures should include social and scientific impact rather than financial gains.

Governance Structure for Patent Processing: Institute needs to establish processes and support systems to encourage patents and their commercialization. For example, support systems and appropriate information systems will particularly be helpful in dealing with paper work related to patent application and in interfacing with industry for commercializing the patent.

Modifying Existing Job Descriptions to Incorporate Business Orientation: Most of the existing job descriptions have been written from an operational point of view and do not incorporate flexibility or directions to proactively respond to science, technology, and market changes. Even for senior positions, job descriptions do not have adequate focus for business development. In order to incorporate business-orientation parameters in PRI, job descriptions need to be updated first.

Autonomy: Autonomy is a very vital aspect of PRI. One of the key enabling conditions will be proper delegation of decision-making related to work for all employees. Another aspect of autonomy is the freedom to choose the team members/people for tasks/projects. It will be unfair to link incentives to performance of the employees who has very little opportunity to be a part of a good and efficient team.

Review of Current ACR Processes: Currently ACRs are used for promotions and there is no incentive linked to ACRs. However, linking performance to reward will need review of the current ACR process. Like target setting, even the achievement of targets should be a consultative process, involving peers and external experts as is the practice in developed countries.

The current process is confidential, where only adverse comments are shared with the assessee. In order to increase the accountability of the assessors in the process, the performance assessment should be shared with the assessee.

Objective and Relevant Measures: A successful implementation of PRI is contingent upon identifying measures that are objective. A majority of people we interacted with were more concerned about the objectivity of measures rather than the linking of measures to incentives. For example, incorporation of advanced technology in SOI has led to revisions in work norms. However, there has been little review of underlying business processes and the consequent changes in performance measures.

Measures need to be relevant to the goals of the organization and reflect the changing mandate.

Systems for Collecting Individual Performance: Since the assessment process will be annual, there is a possibility of recency bias in the evaluation. To bring in objectivity, individual performance needs to be tracked and compiled more frequently and systematically. For example, clear-cut deliverables related to various steps in the project need to be identified and assessed.

Role of Technology in PRI Implementation: Appropriate design of a computer based MIS is critical for collecting and verifying performance data not only for the team but also for individuals. For example, in SOI important statistics (average, maximum, minimum and standard deviation) regarding performance can be provided in a very timely and exhaustive (covering various levels, departments and geographically dispersed units) manner. While tracking of individual performance could increase the work load at all levels, a properly designed computerized system could facilitate this task.

Assessment by Peers/Team Members: In order to track individual performance in team activities, there is need for having a formal mechanism for incorporating performance assessment by peers/team members.

Chapter 8: Implementation Plan

Staged Implementation: Since linking incentives to performance will be a significant change for the government, PRI should be implemented in stages. We have identified Stage 0 to Stage 3 for implementation. It is expected that efforts will be made to improve the enabling conditions stage-wise progressively.

Pilot Implementation: In order to accelerate the implementation of PRI, it is suggested that a pilot be implemented in selected locations (identified in consultation with the concerned organization), while activities related to Stage 0 are implemented in the entire organization.

Organizational Mechanisms: DST needs to form two committees for effective implementation of PRI. These are ***PRI Steering Committee*** and ***PRI Planning and Implementation Committee.***

PRI Steering Committee: The objective of this committee is to set the overall goals and targets for the organization in terms of PRI implementation. This will have both external experts and top management of the concerned organization with majority been external experts. External experts in the Steering Committee should include academicians and also practitioners from private sector. The membership should reflect a broad cross-section of talent, expertise and experiences. This Committee should provide short and long term strategy and principles to the PRI Planning and Implementation Committee and review the progress annually. The critical function of PRI Steering Committee is to ensure that challenging targets are set and PRI effectiveness is not compromised.

Internal members of PRI Steering Committee will include Secretary, DST, Joint Secretary and Financial Advisor (Integrated Finance Division),and up to three members, one each representing the various Autonomous Institutions, Scientific Services, and Scientific Groups and Technology Development Boards. The last three should be field scientists. The three members may be rotated across different Autonomous Institutes, Scientific Services, and Scientific Groups and Technology Boards. The PRI Steering Committee should evolve mechanisms to ensure that any employee grievances or representation resulting out of the PRI implementation can be resolved in a fair and transparent way.

PRI Planning and Implementation Committee: The objective of this committee is to take organizational level decisions regarding design and implementation of PRI-related systems. Reviews of the PRI related systems at each stage will be the responsibility of this committee. This Committee will be an internal committee that should include at least one internal member from the PRI Steering Committee to ensure that the PRI Planning and Implementation Committee follow the mandate of the PRI Steering Committee. It should include the Joint Secretary and Financial Advisor and at least three members who are Scientists.

Implementation Roadmap: Table 5 gives the implementation roadmap in terms of the stages, objectives, key tasks, and people/committees.

Table5: Implementation Roadmap

Stage	Stage 0/Pilot	Stage 1	Stage 2	Stage 3
Time Period	Up to 6 months from the acceptance of the recommendations	1. Within 6 months to a year of Stage 0. 2. Delays in Stage 1 will be very detrimental to the subsequent implementation and may jeopardize the entire efforts. 3. Time period: Two years	1. After two years of Stage 1 implementation. 2. A full year of Stage 1 implementation should be reviewed. 3. The review would take 3-6 months and recommendations should be developed in another 3-6 months. 4. Time period: Maximum one year	1. At least two years after Stage 2 implementation. Stage 2 should be reviewed after one year of its implementation. 2. Maximum one year
Objectives	Stage 0: (Consultation and Frame-Work Setting)	1. Develop and implement the initial PRI framework. 2. Review and incorporate learning from Stage 0.	1. Complete the implementation of PRI framework. 2. Review and incorporate learning from Stage 1.	1. Review and incorporate learning from Stage 2. 2. Comprehensive implementation review
Tasks	1. Building scientists' trust and acceptability of PRI. 2. Awareness building through e-communication, newsletters, pamphlets, workshops, road shows, direct interactions of top management with employees/associations. 3. Evolve a framework for assessing performance.	1. Disseminate the formats and reports to all concerned regarding the measures to be used for assessing performance on measures identified in Stage 0. 2. Put processes in place for implementing	1. Introduce additional measures as identified in Stage 1. Disseminate the formats and reports to all concerned regarding the measures to be used for assessing	1. Review the PRI implementation 2. Monitor progress towards achievement of "enabling conditions". 3. Prepare comprehensive report for review by the PRI Steering Committee.

Stage	Stage 0/Pilot	Stage 1	Stage 2	Stage 3
	• Shifting from ACR to APMR. • Putting in place the processes for developing measures and criteria. • Finalizing the measures and criteria based on the framework. (Table 2). ▪ Identifying measures for which processes already exist or can be quickly developed[1]. ▪ Categorize the outputs into subjective and objective dimensions. ▪ Evolve the relative weightages for the various types of measures. • Developing MIS implementation plan (introduction/incorporation of appropriate technological changes) 4. Identify the priorities and plan for implementing "enabling conditions"	"remaining" measures (For example, form a task force to work out the remaining measures, seek feedback, and specify targets) [2]. 3. Review progress of "enabling conditions" 4. 4.Collect data for review and feedback on measures, processes and MIS implementation	performance on these measures. 2. Collect data for review and feedback on measures, processes and MIS implementation. 3. Review progress of "enabling conditions"	
People/Committees	1. PRI Steering Committee 2. PRI Planning and Implementation Committee	1. PRI Steering Committee 2. PRI Planning and Implementation Committee	1.PRI Steering Committee 2. PRI Planning and Implementation Committee	1. PRI Steering Committee 2. PRI Planning and Implementation Committee

[1] Representative examples are provided in Table 2.

- For scientists, most of the measures related to academic, institutional and laboratory impact can be designed in this stage.
- For science programs/policy managers, most of the measures related to scientific/technological and institutional/academic can be designed in this stage.
- For surveyors, measures related to internal processes and learning and growth impact and some measures of customer impact can be designed.

[2] Some examples are given below:

- For scientists some measures of social and service impact.
- For science programs/policy managers, some measures of societal/national and planning and policy impact.
- For surveyors: measures of financial impact and other measures of customer impact.

Chapter 9: Financial Modeling

Tables 6 give an estimate of the maximum payouts for the PRI in each stage at the current level of salaries for all employees in SOI and the proportion of such payouts as a percentage of the annual budget for the SOI. In order to calculate the maximum payouts (worst case scenario), we have assumed that all employees will get the ceiling specified for their designation and all sanctioned posts are filled. Another assumption is that the similar levels of payouts are provided for Category B, C, and D employees and all employees get the maximum amount of qualifying amount. In practice, not all qualifying employees will get the PRI at the maximum level specified in Table 3. The percentages are likely to be lower.

Although Stages 1-3 are spread out over the next 5 years, Tables 6 assumes that the budget across the years remains the same. In practice, at least inflation adjustments will be made to the budget and to salaries as well.

Table 6: Estimated Annual Payouts for Survey of India

Total Budget (Revised Estimates 2005-06) *(Rs Crores)*				136
		Annual Payouts		*Rs Crores*
Category of Employees	**Number of Employees**	Stage 1 *(10%)**	Stage 2 *(20%)**	Stage 3 *(30%)**
(1)	(2)	(3)	(4)	(5)
A	391	0.65	1.30	1.94
B	631	0.64	1.28	1.93
C	6702	4.83	9.66	12.58
D	5645	2.20	4.41	6.61
Total	**13369**	**8.32**	**16.64**	**23.06**
Percentage of Total Budget		***6.29***	***12.58***	***17.43***

Notes: i) * indicates percentages of payouts as suggested in the framework in Table 3.
ii) In a more realistic scenario, not all employees will qualify for PRI and further, even among those who qualify, the qualifying percentage is not likely to be at the highest level for all, as specified in Table 3.
iii) The amounts referred above are with respect to the sanctioned posts. These need to be related to the actual number of posts.

It can be seen that maximum percentage pay out will be to Category C employees. The ***additional pay outs should only be compensated by additional revenue from a more commercial orientation of SOI.*** The framework above can be used to set the targets of performance measures.

Table 7 shows the total overtime, bonus, and honorarium for the years 2002-03, 2003-04, and 2004-05. This data was provided by the Department of Expenditure under Ministry of Finance to the Sixth Central Pay Commission on July 27, 2007.

Table 7: Overtime, Bonus, and Honorarium *(Rs Lakhs)*

	2002-03	2003-04	2004-05
Overtime	222.08	284.87	252.16
Bonus	460.42	406.65	323.77
Honorarium	44.70	79.60	64.52
Total	727.2	771.12	640.45
Percentage of Total Budget	0.72	0.65	0.50

Based on a proportional allocation with respect to the total budget of DST vis-à-vis SOI, the amount of Overtime, Bonus and Honorarium to SOI for 2005-06 comes to nearly 68 lakhs. (The total overtime for DST as a whole is 0.5 per cent of the total budget). This amount is about 8 per cent of the PRI pay outs. Therefore, to maintain "budget neutrality", any additional PRI amounts must come about through improved performance indicators, including commercial ones.

While "budget neutrality" is an important concern for the government, the following needs to be kept in mind while implementing PRI for DST and the associated institutes:

1. DST is of strategic importance for socio-economic development and attracting and retaining top quality talent to this organization is important. Without PRI, there may not be adequate incentives for scientists, especially given the alternative choices of jobs available in the market. ("Performance Measurement and Field Experience Definitions for S&T Staff in Public funded Bodies", T Ramasami, Secretary, DST)

2. The "additional" payouts consequent to PRI need to be compared against additional funding generated by DST/institutes, cost savings in laboratory equipment and processes, and increased commercialization of various services (for example, SOI has the potential to commercialize a number of products and services). The implementation of PRI should lead to greater commercial orientation and improved service delivery.

3. The improvements in S&T indicators at national level should be linked to allocation of budgets (including PRI component) for DST, as most of its activities are not revenue generating.

   Such an approach will lead to the review of its existing programs and policies. This will allow for focusing on those programs which are more cost effectively being deployed and possibly channelizing of additional funds in such programs. For other programs, it will lead to design of more efficient and effective processes or review of the program portfolio.

4. PRI payouts should be linked to improvements in PRI related parameters with respect to past performance. Further, these should be linked to individual/organizational performances across similar organizations.

Chapter 10: Conclusions

The study examined the feasibility of performance related incentives (PRI) in the Department of Science and Technology and the associated institutes: Bose Institute, Indian Association for Cultivation of Science, and Survey of India. There is clear need for PRI in all these organizations. Scientists in these organizations are eager to participate in developing mechanisms for PRI implementation. Hence, we recommend PRI implementation. Organizations need to ensure that objective metrics are evolved and assessment is transparent.

Implementing PRI is a strategic change for the organizations and will require greater decentralization and autonomy. For these changes to be successful, top management support, proper technological infrastructure, and training for PRI processes are required.

Framework for Implementing PRI

We have classified employees of DST into two groups: Group I are the scientists working in autonomous institutes and Group II are the science program/policy managers in Directorate and Surveyors of SOI. Scientists in autonomous institutes are involved in four types of activities: basic research, applied research, teaching, and management of their institute. For each type of activity we have given multiple dimensions of impact on which the measures have been based.

Basic Research

1. Academic Impact
2. Institutional Impact
3. Laboratory Impact

Applied Research

1. Academic Impact
2. Institutional Impact
3. Laboratory Impact
4. Commercial Impact
5. Social Impact

Teaching

1. Doctoral Level
2. Post Graduate/M.Phil.

Management of Scientific Institutions

1. Organizational Impact
2. Service Impact

In case of Group II employees, the following dimensions of impacts are considered:

Science program/ policy manager

1. Societal/ National Impact
2. Planning and Policy Impact
3. Scientific/ Technological Impact
4. Institutional/Academic Impact

Product/ service developer (Surveyors)
1. Financial Impact
2. Customer Impact
3. Internal Processes Impact
4. Learning and Growth Impact

For each dimension we have given some examples of measures in the relevant section. The basic goal is to evolve as objective and quantifiable measure as possible. In case where subjective measures are used, external expert/peer review mechanisms for assessment of performance need to be clearly developed and periodically reviewed. In scientific community external expert/peer review method is an internationally accepted best practice.

PRI is to reward output/outcomes that are significantly better than those expected as routine in a particular job.

Since PRI involves a fundamental change in the organization, it needs to be evolved in stages. In Stage 0, the basic framework and measures need to be worked out through consultative processes. ***Stage 0 is the most critical stage for the successful implementation of PRI that includes building employee trust and acceptability of PRI and developing the framework for subsequent implementation.*** Over the Stage 1 to 3, the framework should be improved upon on the basis of internal and external benchmarking.

The amount of PRI will be given in steps up to a maximum specified percentage. While setting the targets, first the basic targets that need to be exceeded to qualify for PRI should be established and then stretch targets should be instituted in a step wise manner. The quantum of incentives associated with these steps is then based on these pre specified targets.

The targets should be set so as to maintain "budget neutrality", to the extent possible. This can be done, by focusing on increasing commercialization of technology, reducing laboratory and other costs. Where such explicit measures can not be implemented (for example, in some aspects of basic research), improvements in scientifically set targets should be incorporated for qualifying for PRI.

We have recommended incentives linked to fixed/basic pay and not annual increments. Incentives are the payments made without affecting the basic pay where as increments lead to increase in basic pay. In case pay-outs are in terms of increments, then there will be future gains from current performance, for which we feel there is little justification in the current context[3]. As per current practice, the annual increment is not generally linked to performance. Continuing this practice is only justifiable for inflation-adjustment. If an alternative method is evolved for inflation-adjustment in the salary structure, then there are the following two options:

1. Have only one base pay for that position and not a band. Or
2. Link the increment to minimal level of desired efforts and outcomes and then have incentives for significantly better outcomes.

Effective implementation of PRI will require a review of promotional policies, including existing schemes like Flexible Complementing Scheme (FCS), Modified FCS, and Assured Career Progression Scheme (ACPS). These are contrary to the basic tenets of proposed model for PRI. Future promotion scheme should be based on the parameters identified for PRI. Care should be taken to see that good performers under PRI are considered for promotion.

While all scientists are eligible for PRI, in practice, the number of scientists qualifying for PRI and quantum of PRI will be determined by their performance and pre specified targets. Care should be taken that PRI should not get viewed as “entitlements” in future. Proper check mechanisms such as Steering Committees need to be instituted to ensure that targets are meaningful and challenging.

Support Needed for Effective Implementation

The rate of change of technological, social and economic environment will have bearing in the future role of DST and those in its sphere of influence. Performance measures need to incorporate these changes.

For effective implementation of PRI, government’s role in providing good working conditions is important. These conditions include: availability of adequate infrastructure facilities (like laboratories, library, databases, computers etc.), streamlined funding processes, information systems for monitoring projects, support for peer networking, support for self development, networking of labs, appropriate governance structures for patents, etc.

It is also important that facilities are up to date and are accessible to those who need them. Information systems for monitoring projects are to be used as a tool for planning purposes for senior managers.

An important aspect of implementing PRI is setting targets for the forthcoming performance cycle. In case of scientists in Group I there is a greater focus on individual work. On the other hand, more focus is on unit-level scientifically set targets for Group II. Target setting should be a consultative process with clear two-way communication.

[3] The current salary structure is in the form of a band like A-I-B, where A is the starting basic salary for that designation and B is the ceiling. I is the increment given annually till the ceiling B is reached for that position.

In order to track individual performance in team activities, there is need for having proper technological support and formal mechanisms for review by external experts/peers/team members. ACRs should be replaced by APMRs, bringing in a transparent process and proper autonomy should be given to do the job.

As mentioned earlier, PRI is a major strategic initiative by itself and it triggers other strategic initiative. Ownership of any new strategic initiatives by a “core” group at the top level though a definite phase of its implementation is vital for its success.

A successful implementation of PRI is contingent upon identifying measures that are objective. A majority of people we interacted with were more concerned about the objectivity of measures rather than the linking of measures to incentives. Measures need to be relevant to the goals of the organization and reflect the changing mandate. The measures should encourage greater business orientation and adaptation of new technology.

In addition to PRI, organizations can also evolve other mechanisms to reward performance. For example, organization may create research funds based on individual/department performance.

Measuring Effectiveness

There should be mechanisms to assess the effectiveness of PRI related processes. Such mechanisms need to be designed right from the inception of PRI. These mechanisms will be evaluating the PRI related processes at the completion of each of the stages. This evaluation should be an ongoing process and institutionalized. The structure, mandate, and working principles of a designated committee to oversee this evaluation process should be established.

The evaluation should look at the following four aspects[4]:

> *Commitment*: The extent to which PRI is able to build and maintain employees' commitment towards work and organization.
> *Competencies*: The extent to which PRI is able to attract, develop, and retain the relevant competencies and good talent.
> *Cost-Effectiveness*: The extent of savings generated through PRI; financial and social returns for the pay-outs made in terms of incentives; etc.
> *Congruence*: PRI should encourage better alignment of individual/team objectives with organizational strategic goals; PRI should improve and not adversely affect the superior-subordinate relationship and team dynamics; etc.

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Appendix 1: Framework and Guidelines for NSF Assessment (excerpted from www.nsf.gov accessed on June 25th, 2006)

The National Science Foundation has a long-standing practice of conducting a wide range of assessment activities. NSF's leadership in advancing the frontiers of science and engineering research and education is demonstrated, in part, through internal and external performance assessments. The results of our performance assessment process provide our stakeholders and the American taxpayer with vital information about the return on our investment.

Government Performance Results Act, 1993 (GPRA) requires federal agencies to develop a strategic plan, establish annual performance goals, and report annually on the progress made toward achieving these goals. Since NSF funds long-term science and education research, it is often not possible to link outcomes to annual investments because results from investments in basic research and education can be unpredictable. Science and engineering research projects can generate discoveries in an unrelated area, and it can take years to recognize discoveries and their impact. Assessing the impact of advances in science and engineering is inherently retrospective and is best performed using the qualitative judgment of experts. The use of external experts to review results and outcomes is a common, longstanding practice of the academic research and education community. NSF's use of such panels, such as COVs and ACs, predates GPRA and is recognized as a valid quality assessment mechanism.

NSF goals are divided into two broad areas: overarching strategic outcome goals and annual performance goals. The long-term goals focus on and concern the practical, concrete, long-term results of NSF grants and programs. Annual goals relate to the effectiveness of NSF activities and focus on procedures used to make awards, fund and manage capital projects, and otherwise provide services to customers.

Long-Term Strategic Outcome Goals

The Advisory Committee on GPRA Performance Assessment (AC/GPA) assesses performance across the Foundation. Chartered in 2002, the committee consists of members from academia, industry, and government. The AC/GPA's responsibilities focus on the four strategic outcome goals. For each outcome goal, NSF judges itself successful when, in the aggregate, results reported demonstrate significant achievement. A significant component of the AC/GPA's assessment is based on performance highlights written by NSF program officers. These highlights describe major results achieved and represent outstanding accomplishments from NSF awards. The AC/GPA may also review COV reports, award abstracts, and principal investigator project reports. The Committee meets annually and submits a report to the Director that is incorporated into the Foundation's annual *Performance and Accountability Report* (PAR).

Annual Performance Goals

The Foundation has adopted eight Foundation-wide goals under the Stewardship strategic outcome goal. One of those goals is a long-standing efficiency goal: For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within six months of deadline or target date or receipt date, whichever is later. The other goals relate to improving the quality and transparency of the merit review process, improving customer service, broadening participation, management of large facilities, post-award monitoring, E-Government, and IT security.

Program Assessment Rating Tool (PART)

In 2002, the Office of Management and Budget (OMB) developed the PART, the Program Assessment Rating Tool, a systematic method for assessing the performance of program activities across the federal government. Each year, about 20 percent of an agency's programs must undergo PART review. NSF has completed all of its PART-evaluations addressing questions on program purpose and design, strategic planning, program management, and program results and accountability. All of NSF's PARTs received the highest rating of Effective. NSF's PART results are available at: www.whitehouse.gov/omb/part and http://www.whitehouse.gov/omb/expectmore/.

R&D Investment Criteria

For NSF and other Federal agencies with significant R&D portfolios, assessment activities are required to draw heavily upon the Research and Development Investment Criteria established by OMB and the Office of Science and Technology Policy (OSTP) and outlined in the President's Management Agenda (PMA). The PMA directs agencies to use the R&D investment criteria to improve investment decisions for and management of their R&D programs. The three criteria are:

- **Relevance:** R&D programs must be able to articulate *why* this investment is important, relevant, and appropriate.
- **Quality:** R&D programs must justify *how* funds will be allocated to ensure quality R&D.
- **Performance:** R&D programs must be able to monitor and document *how well* the investment is performing.

The President's Management Agenda (PMA)

The PMA focuses on five Government-wide initiatives and 10 program-specific initiatives that apply to a subset of Federal agencies. The five Government-wide initiatives are: (1) Strategic Management of Human Capital, (2) Competitive Sourcing, (3) Improving Financial Performance, (4) Expanded Electronic Government, and (5) Budget and Performance Integration. Each quarter, agencies are rated on the status in achieving the goal and their progress in implementing action plans, using a “scorecard” with a grading system of red, yellow, and green.

Appendix 2: Outcome Metrics for Result Oriented Performance Culture System (excerpted from www.nsf.gov accessed on 25th June, 2007).

Agencies are required to use the following outcome metrics for the Results-Oriented Performance Culture system.

Required Metric	**Description**	**Purpose**
Organization Metric: SES Performance/Organizational Performance Relationship	Relationship between SES performance ratings and accomplishment of the agency's strategic goals	To determine the extent to which SES appraisals and awards are appropriately based on achievement of organizational results
Organization Metric: Workforce Performance Appraisals Aligned to Mission, Goals and Outcomes	Degree of linkage between all employees' performance appraisal plans and agency mission, goals, and outcomes	To determine whether all employees have performance appraisal plans that effectively link to the agency's mission, goals, and outcomes
Employee Perspective Metric: Results-Oriented Performance Culture Index	A score based on items from the government wide Annual Employee Survey	To determine the extent to which employees believe their organizational culture promotes improvement in processes, products and services, and organizational outcomes
Merit System Metric: Merit-Based Execution of the Results-Oriented Performance Culture system	An assessment, conducted by OPM or by agencies with OPM oversight, of compliance with merit system principles and related laws, rules, and regulations governing the Results-Oriented Performance Culture system	To determine that decisions, policies, processes, and practices executed under the Results-Oriented Performance Culture system comply with the merit system principles and related laws, rules, and regulations

Standard

The agency has a diverse, results-oriented, high-performing workforce and a performance management system that differentiates between high and low levels of performance and links individual/team/unit performance to organizational goals and desired results effectively.

Critical Success Factors

The Results-Oriented Performance Culture system is comprised of the following critical success factors that work together to create a diverse, results-oriented, high performance workforce:

- Communication
- Performance Appraisal
- Awards
- Pay-for-Performance
- Diversity Management
- Labor/Management Relations.

Each critical success factor has several key elements that indicate effectiveness and are linked to suggested indicators that identify how well the agency is doing relative to key elements.

Results-Oriented Performance Culture System

Pay for Performance	
Key Elements	**Suggested Performance Indicators**
When authorized, the agency has a pay-for performance system that:	
• Makes pay distinctions based on performance • Includes a transparent process for making pay adjustments • Requires clear and frequent communications about the pay system and how it operates.	**<u>Effectiveness Indicators</u>** • An understandable pay pool structure (e.g., roles and responsibilities) and process for making timely pay determinations have been communicated across the agency using a variety of methods (e.g., Web sites, handbooks, policies, announcements). • Managers, supervisors, and employees are oriented and/or trained at the beginning of the performance cycle on the relationship between their performance and salary adjustments and awards at the end of the cycle. • Data on pay pool determinations/discussions indicate: − The budget is effectively managed. − Top performers are getting the highest pay increases and/or awards. − Employees perceive the process to be fair and credible. − Pay adjustments correlate with performance ratings. **<u>Compliance Indicators</u>** • For senior employees, individual pay rates and pay adjustments reflect meaningful distinctions based on relative

	contribution to agency performance in accordance with the Executive Performance and Accountability Interim Rule (5 CFR 430 or applicable agency directives and 1330). • Pay-for-performance systems, authorized by OPM as part of Demonstration Projects, are evaluated periodically to determine compliance with the Project Plan in accordance with 5 CFR 470.317.

Appendix 3: Questionnaire Used in the Study

Designation: ___________________
Group/Dept._______________
Reporting Officer:_______________

Dear Sir/Madam,

Kindly follow the following steps.

STEP I: Make a list of your own activities.

STEP II:

(a) Kindly mention the percentage of time spent on each activity.
(b) Given a Point scale of 1 to 10, kindly grade the particular activity according to its importance to You.
(c) Given a Point scale of 1 to 10, kindly grade the particular activity according to its importance to the Organization.

STEP III:
Please suggest 2-3 measures/ways to assess each of your activities.
Please send these details to the following address:

Prof. Rekha Jain
Wing 3-B, Indian Institute of Management,
Vastrapur, Ahmedabad 380 015
Tel: (079)26324822

In case of any doubt/question, please call me at the given number or email me at rekha@iimahd.ernet.in
Thank you for your time.

Yours sincerely

Rekha Jain & Manjari Singh

No.	Activities	Percentage of time spent on each activity	Importance of the activity to the individual (Scale 1-10)	Importance of the activity to the organisation (Scale 1-10)	Measures/Ways to assess each activity
1.					1
					2
					3
2.					1
					2
					3
3.					1
					2
					3
4.					1
					2
					3
5.					1
					2
					3
6.					1
					2
					3
7.					1
					2
					3
8.					1
					2
					3
9					1

No.	Activities	Percentage of time spent on each activity	Importance of the activity to the individual (Scale 1-10)	Importance of the activity to the organisation (Scale 1-10)	Measures/Ways to assess each activity
					2
					3
10					1
					2
					3

Appendix 4: Learnings from CLRI Case Study

Dimensions on which assessment for departments were made were as follows:

- Knowledge product link
- Technology product link
- Economic product link
- Management product link
- Service product link
- Human Resource product link

Measures that were used to assess performance on those dimensions are as follows:

- Publications
- Patents
- External cash flow
- Internal cash saving
- Market reports/review reports/commercial activity facilitated
- Teaching and Training
- Testing, Engineering Servicing
- Societal Program Linkages
- Any other Service Function that enables R&D support function

Impact factors that were used to weight the assessment of measures were:

- Science Citation Index
- Stage of patent
- Level of cash flow/savings
- Type and quality of reports
- Minimum thresholds for each service
- Type and duration of programs

Learnings from the Experience

- It is necessary to evolve different weightage for different types of activities such as:
  - Basic Research
  - Applied Research
  - Science and Technology Support Services
  - Managerial Services (Planning, business development)

- Economic measures may not be proportional to effort and impact (Leather industry is a SME and some activities, even though not financially large may have strong impact)

- Mismatch between assessment and effective/measurable output periods
- Concerns regarding getting measurable outputs on all dimensions
- Limited implementation (eligibility for promotion and departmental budget)
- Records for individual level outputs need to be designed
- Assignment to a project (not a personal choice)
- Incentive mechanism for core/mandated activities needs to be strengthened

Appendix 5: Learnings from Workshop Organized at the Indian Institute of Management Ahmedabad on May 1, 2007

A workshop was organized at Indian Institute of Management Ahmedabad on May 1, 2007 to get deeper insights into the design and implementation of PRP. There were discussions based on presentations made by senior managers from organizations that already have PRP. The following are the key learnings from this workshop:

In order to have an effective PRP, organizations should get prepared for its implementation.

1. Performance oriented culture should be developed in the organization.
2. A climate of trust and commitment is a prerequisite for effective implementation of PRP.

Employees' perceptions regarding the processes related to PRP are very important.

3. Employees should perceive processes related to PRP as fair.
4. Awareness and education of the processes are important for the success of PRP.

Measures to assess performance need to be carefully identified.

5. The measures should be objective and quantifiable.
6. Measures should be directly linked to job outcomes and desired behaviors on the job.

Target setting process should be consultative, involving both – the assessee and the assessor.

7. Targets should be agreed upon in the beginning and reviewed periodically.
8. Performer should have clear understanding of the relation between his/her targets and business objectives
9. Expected results should come across as achievable, though not easy.
10. There must be measurable differences in individual/team performance.

The assessment process should be designed in such a way that biases and errors are minimized.

11. Criteria for good performance should be practical and well defined.
12. Managers must be trained to reduce performance biases and to provide constructive feedback.
13. PRP processes should bedesigned on the basis of long-term organisational goals as well as nature of work and workforce.
14. The performance evaluation process as well as the reward linked to it should be fair, accurate, consistent and transparent.

PRP is a form of signal to the employees as to what is desired of them. The rewards should achieve intended objectives of PRP.

15. Rewards should be provided contingent on taking an action or achieving a result.
16. Rewards should be timely to reinforce the desired behaviours that achieve results.

Rewards should be worth the effort to both performer and organisation.