Volume -3

Study

On

Developing Indicators for Measuring Success of Research Projects

Supported & Catalyzed by:

GOVERNMENT OF INDIA
Ministry of Science & Technology
Department of Science & Technology
National Science & Technology Management Information System (NSTMIS)

Conducted by:

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PREFACE

This volume includes overall summary of response profiles from 1:1 meetings with experts and Brain Storming Sessions (BSSs) alongwith various record notes of the discussions.

Various indicators for identifying and measuring efforts put in by PI and S&T out put have been derived from the summary of response profiles. In addition, secondary literatures of existing national / international schemes / guidelines / mechanisms ***(given in Volume -4)*** were also studied while designing & developing the indicators and various formats.

As a part of this study, NAFEN held 1:1 meetings with 40 leading experts in the country, drawn from various disciplines having specialized expertise in R&D activities from different organizations like Public / Private / Government departments / R&D labs / Academic institutes etc. Similarly, 5 Brain Storming Sessions (BSSs) were organized, wherein experts from various disciplines were invited to participate and give their considered views on the subject. 164 experts participated in these BSSs comprised Government Officials, Project PIs and experts from disciplines like Management, Finance, Industry & Academia.

Based on these meetings, overall summary of response profiles is given in ***Table -A*** covering various stages of research project life cycle viz., Proposal Submission; Project Implementation and Project Completion . Summary also includes parameters identified by the experts in various meetings for measurement of research out come and lastly suggestions given in these meetings for the consideration of Funding Agency.

Dr. P K GUPTA
Project Investigator

New Delhi
20th March, 2005

VOLUME -3

OVERALL SUMMARY RESPONSE PROFILES EMERGING FROM1:1 MEETING WITH EXPERTS & BRAIN STORMING SESSIONS (BSSs)

RECORD NOTES OF:

1:1 MEETINGS

BRAIN STORMING SESSIONS

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Volume – 3

RECORD NOTES OF BRAIN STORMING SESSIONS (BSSs)

TABEL -- A OVERALL SUMMARY OF RESPONSE PROFILES FROM 1:1 MEETINGS & BSSs (Annexure - 2 & 3)

		1:1 Meeting		BSS in Bangalore				BSS in Delhi				Overall	
		R	%ag	B1 (R)	%ag	B2 (R)	%ag	D1 (R)	%ag	D2 (R)	%ag	Responses	% of (R)
A.	**PRPOSAL SUBMISSION**												
1	Industry participation/Identification of end user/ Marking & Commericalization potential	24	60.0%	15	57.7%	15	88.2%	19	61.3%	3	12.5%	76	55.1%
2	Past track record of Institute/ PI/ CO-PI	30	75.0%	7	26.9%	5	29.4%	26	83.9%	6	25.0%	74	53.6%
3	Peer review of proposal/ critical and in-depth evaluation of proposal	28	70.0%	11	42.3%	4	23.5%	8	25.8%	2	8.3%	53	38.4%
4	Objectives -- clear, well-defined, target oriented in terms of deliverables	20	50.0%	5	19.2%	2	11.8%	15	48.4%	6	25.0%	48	34.8%
5	Milestones identification/ Monitoring by PERT/ CPM	21	52.5%	4	15.4%	2	11.8%	3	9.7%	10	41.7%	40	29.0%
6	Risk/ uncertainties to be identified at each stage	6	15.0%	6	23.1%	1	5.9%	1	3.2%	2	8.3%	16	11.6%
7	Grading of proposal	10	25.0%	1	3.8%	1	5.9%	1	3.2%	1	4.2%	14	10.1%
8	Funds for offer preparation/ Two stage proposal/	0	0.0%	6	23.1%	0	0.0%	2	6.5%	5	20.8%	13	9.4%
9	IPR issues to be well protected	6	15.0%	4	15.4%	1	5.9%	0	0.0%	0	0.0%	11	8.0%
10	PI Motivation	4	10.0%	0	0.0%	0	0.0%	5	16.1%	0	0.0%	9	6.5%
B.	**PROJECT IMPLEMENTATION**												
1	Periodic Monitoring by experts	28	70.0%	10	38.5%	10	58.8%	18	58.1%	9	37.5%	75	54.3%
2	Alternative plan of action with course correction/ Deviations to be brought out	16	40.0%	2	7.7%	0	0.0%	4	12.9%	4	16.7%	26	18.8%
3	Log Books of activities to be maintained	18	45.0%	3	11.5%	1	5.9%	1	3.2%	1	4.2%	24	17.4%
4	In house Monitoring System	12	30.0%	0	0.0%	1	5.9%	6	19.4%	3	12.5%	22	15.9%
5	Institute Head to be fully responsible	8	20.0%	1	3.8%	1	5.9%	8	25.8%	1	4.2%	19	13.8%
6	Procedure, if PI leave the Institute	3	7.5%	0	0.0%	3	17.6%	1	3.2%	0	0.0%	7	5.1%
C.	**PROJECT COMPLETION**												
1	Self assessment by PI	10	25.0%	2	7.7%	4	23.5%	15	48.4%	5	20.8%	36	26.1%
2	Detailed project completion report	6	15.0%	2	7.7%	4	23.5%	2	6.5%	3	12.5%	17	12.3%
3	Grading of final outcome	12	30.0%	1	3.8%	1	5.9%	1	3.2%	1	4.2%	16	11.6%
4	Detailed examination by experts of the research outcome	11	27.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	11	8.0%
5	Comments of the expert committee to be conveyed to PI	0	0.0%	3	11.5%	2	11.8%	1	3.2%	2	8.3%	8	5.8%

R-- Responses from 1:1 Meetings, B1 (R) & B2 (R) -- Responses from Bangalore BSSs -- 1st & 2nd Day D1 (R) & D2 (R) -- Responses from Delhi BSSs - 1st & 2nd Day

a.	1: 1 Meetings total Participants = 40 Nos.
b.	BSSs at Bangalore -- 1st day Total Participants 29 Nos. including Dr. Laxman Prasad, Dr. P.K. Gupta & Mr. Gopal Singh. Therefore the actual Participants for Responses = 26 2nd day Total Participants 20 Nos. including Dr. Laxman Prasad, Dr. P.K. Gupta & Mr. Gopal Singh. Therefore the actual Participants for Responses = 17
c.	BSSs at Delhi -- 1st day Total Participants 36 Nos. including Dr. Laxman Prasad, Dr. P.K. Gupta, Mr. Parveen Arora, Dr. A.N. Rai, Ms. Namita Gupta, Mr. Gopal Singh & Sunil Sharma Therefore the actual Participants for Responses = 31 2nd day Total Participants 30 Nos. including Dr. Laxman Prasad, Dr. P.K. Gupta, Mr. Parveen Arora, Dr. A.N. Rai, Mr. Gopal Singh & Sunil Sharma Therefore the actual Participants for Responses = 24
d.	**Overall Total Responses = 40 + 26 + 17 + 31 + 24 = 138**

Tabkle - A Contd

		1:1 Meeting		BSS in Bangalore				BSS in Delhi				Overall	
		R	%ag	B1 (R)	%ag	B2 (R)	%ag	D1 (R)	%ag	D2 (R)	%ag	Responses	% of (R)
D.	**MEASUREMENT OF RESEARCH OUTCOME**												
	Objective(s) fully met – Success. Not met or patially met ---Indicators of Measurement/Conceptual Drivers of Success ---- Tangibles/ In-Tangibles												
1	Industrial tip-up/ Commercial & Marketing potential	14	35.0%	5	19.2%	8	47.1%	24	77.4%	1	4.2%	52	37.7%
2	Publications in Journals/ Citations/ Technical Reports --Indian/ International	20	50.0%	1	3.8%	5	29.4%	4	12.9%	3	12.5%	33	23.9%
3	Patents - Indian/ International — Applied/ Obtained	16	40.0%	1	3.8%	1	5.9%	6	19.4%	2	8.3%	26	18.8%
4	Societal/ Socio Economic benefits and linkages with any National priorities	10	25.0%	0	0.0%	4	23.5%	4	12.9%	4	16.7%	22	15.9%
5	Expereiences gained which can be used in other projects	7	17.5%	7	26.9%	2	11.8%	3	9.7%	2	8.3%	21	15.2%
6	Technology Development (New)	8	20.0%	1	3.8%	1	5.9%	2	6.5%	3	12.5%	15	10.9%
7	Process Development (New)	8	20.0%	2	7.7%	0	0.0%	2	6.5%	0	0.0%	12	8.7%
8	Infrastructural Development reg. Lab, Libarary etc.	8	20.0%	1	3.8%	0	0.0%	1	3.2%	1	4.2%	11	8.0%
9	Product Development (New)	7	17.5%	1	3.8%	0	0.0%	2	6.5%	0	0.0%	10	7.2%
10	Ph.D qualified under the guidance of PI	4	10.0%	0	0.0%	2	11.8%	2	6.5%	1	4.2%	9	6.5%
11	Teching methods' development (New)	5	12.5%	0	0.0%	1	5.9%	1	3.2%	2	8.3%	9	6.5%
12	H R Development	4	10.0%	2	7.7%	1	5.9%	0	0.0%	1	4.2%	8	5.8%
13	Consultation with any experts/ agencies by PI to resolve the problems	5	12.5%	0	0.0%	0	0.0%	2	6.5%	0	0.0%	7	5.1%
14	Semiar/ Workshop/ Conference organized	5	12.5%	0	0.0%	0	0.0%	2	6.5%	0	0.0%	7	5.1%
15	Cost cutting	4	10.0%	0	0.0%	1	5.9%	0	0.0%	0	0.0%	5	3.6%
16	Technology Transfer	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3	12.5%	3	2.2%
17	Spin offs which has created technological impact	0	0.0%	0	0.0%	1	5.9%	1	3.2%	0	0.0%	2	1.4%
E.	**SUGGESTIONS FOR CONSIDERATION OF FUNDING AGENCY**												
1	Outcome to be displayed on the web site of the Funding Agency	5	12.5%	3	11.5%	0	0.0%	3	9.7%	4	16.7%	15	10.9%
2	Electronic submission of Proposals, Reviews, Progress Report and Final Report	4	10.0%	2	7.7%	3	17.6%	1	3.2%	3	12.5%	13	9.4%
3	Close the project if not progressing satisifactorily -- Debar	9	22.5%	1	3.8%	0	0.0%	1	3.2%	1	4.2%	12	8.7%
4	Payments to be made in time by Funding Agency	2	5.0%	2	7.7%	1	5.9%	2	6.5%	1	4.2%	8	5.8%
5	Finance representative to be a member of the Monitoring Committee	1	2.5%	0	0.0%	0	0.0%	3	9.7%	2	8.3%	6	4.3%
6	Visit expenses of Experts/ Referees to be build in as Administrative Over head by the Funding Agency	1	2.5%	2	7.7%	1	5.9%	0	0.0%	1	4.2%	5	3.6%
7	Honorarium to be paid to the experts at all stages	0	0.0%	0	0.0%	1	5.9%	3	9.7%	0	0.0%	4	2.9%
8	PI to be self controlling	4	10.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4	2.9%
9	Project should not be extended for more than 6 months that too with NO cost implications	2	5.0%	0	0.0%	1	5.9%	0	0.0%	1	4.2%	4	2.9%
10	Cost escalation to be provided in case payment is delayed	0	0.0%	0	0.0%	0	0.0%	1	3.2%	2	8.3%	3	2.2%
11	Funds should not be reduced arbitrarily at any stage by Funding Agency (FA)	0	0.0%	0	0.0%	2	11.8%	1	3.2%	0	0.0%	3	2.2%
12	Time bound approval of the proposal by FA	1	2.5%	1	3.8%	0	0.0%	0	0.0%	1	4.2%	3	2.2%
13	Carry forward of funds to be allowed for eqpt. procurement/hiring manpower	0	0.0%	0	0.0%	0	0.0%	1	3.2%	1	4.2%	2	1.4%
14	End user to be a member of the expert committee	2	5.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	1.4%
15	Reapportionment from one head to another to be allowed	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	8.3%	2	1.4%
16	Diversion of funds -- not allowed by Institute Head	1	2.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.7%

RECORD NOTES

1:1 MEETINGS

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. D V Singh**
Date	:	**7th April 2004**
Time	:	**3.30 P.M.**
Present	:	**Prof. D V Singh/ Shri Parveen Arora Dr.P.K.GUPTA/ Mr. R K Saxena**

GIST OF DISCUSSIONS

- Various fields should be identified like Live Sciences, Natural Sciences, and Engineering etc.---Select randomly
- In these fields we should study some project proposals and the completion reports available with SERC.
- This will reveal existing ground situation.
- Meet few PAC chairmen also
- Study guidelines of National Science Foundation (NSF)
- There has to be extensive project review / screening in the beginning itself. NSF takes about one year for review.
- Then they have final review at the end.
- No frequent reviews
- Also study guidelines of SIDA, Indo French Centre, International Foundation for Science (IFS) at Stockholm, INSA, TWAS Italy —what are their systems.
- Also study Project Proposal Performa of SERC—This needs critical review/ analysis
- Descriptive comments may be better against attribute.
- Also examine Peer review Performa of SERC
- Proposal must give national as well as international status.---present and future.
- Within PIs organization for each project there should be a Project Monitoring and Evaluation Group (PME)
- Periodic and annual reporting format to be reviewed and revised.
- PI should give a detailed monitoring scheme in the proposal.
- Electronic submission of proposals to be considered.
- Monitoring workshops to be considered.
- What will be the success or failure criteria's
- Study "ZOPP"—German version of Goal Oriented Project Planning
- In reviews the PI must highlights the impediments in achieving objectives
- Review should cover Technical, Financial and Time Span
- See TIFAC projects also
- TIFAC is now taking Bank Guarantees
- If it is clear that objectives cannot be met then close the project there and then

CONCLUSIONS

• There has to be extensive project review / screening in the beginning. i.e., At the proposal submission stage itself
• Descriptive comments may be better against each attribute
• Proposal must give national as well as international status. ---Present and future.
• Within PIs organization for each project there should be a Project Monitoring and Evaluation Group (PME)
• PI should give a detailed monitoring scheme in the proposal
• In reviews the PI must highlight the impediments in achieving the objectives with action plan to over come the impediments.
• Review should cover Technical, Financial and Time Span
• If it is clear that objectives cannot be met then close the project there and then
• If it is clear that objectives cannot be met then close the project there and then
• Periodic and annual reporting review formats to be developed and revised

IMMEDIATE ACTION TO BE TAKEN

- Various fields should be identified like Live Sciences, Natural Sciences, and Engineering etc.---Select randomly
- In these fields we should study some project proposals and the completion reports available with SERC.
- This will reveal existing ground situation.
- Meet few PAC chairmen also
- Study guidelines of National Science Foundation (NSF)
- Also study guidelines of SIDA, Indo French Centre, International Foundation for Science (IFS) at Stockholm, INSA, TWAS Italy —what are their systems.
- Also study Project Proposal Performa of SERC—This needs critical review/ analysis
- Study "ZOPP"—German version of Goal Oriented Project Planning

1:1 Meetings—Guidelines Study

Meeting with : **Dr. W Selvamurthy, Chief Controller (R&D), DRDO, New Delhi.**
Date : **13/04/2004**
Time : **11 a.m.**
Present : **WS/ Dr. Maja—Director {Life Sciences, DRDO}, PKG/ RKS**

GIST OF DISCUSSIONS

- Objectives should be clearly and well defined in the proposal
- Various milestones should be clearly identified and defined with time period in the proposal
- Critical Path to be identified in the proposal.
- Analysis for the similar research work being done in the PIs organization, National and International level to be highlighted in the proposal.
- Similarly competency analysis should be given in the proposal re: competency with in the organization (other than PI and Co PI), at national level and international level for research work being proposed.
- It should be brought out in the proposal as to which industries will us the research outcome.
- Review and monitoring committees should have prominent experts having full knowledge of the particular R&D field.
- Failure should be taken as a learning process.
- In case of failure, accountability and responsibility of the PI and his organization should be clearly mentioned in the proposal.
- PI should anticipate failures and propose parallel actions/ solutions in the proposal
- PI must mention in the proposal his action plan with time re: experiments to be conducted, visits/ discussions to be undertaken with in the organization and outside.
- Proper logbooks to be maintained for this.
- PI must give in the proposal the details of equipment procurement with specifications and prices and delivery periods.
- PI must also give Man recruitment plan

CONCLUSIONS

The main emphasis of the talk was on mentioning all the parameters and details in the research proposal.

ACTION TO BE TAKEN

All the above points can be suitably taken care by NAFEN in the final guidelines

MEETING NO. 03

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. R S Sirohi**
Date	:	**15th April 2004**
Time	:	**3.30 p.m.**
Present	:	**RSS/ PA/ANR/PKG/RKS**

GIST OF DISCUSSIONS

Prof. Sirohi mentioned at the outset that guidelines will vary from project to project. However he gave certain general views as follows: -

PI and Co. P I competences should be measure in terms of achievements in

- Human Resource Development
- Guiding Ph.D.
- Publications in foreign Journals
- Keynote addresses in International Conferences

(The above will reveal competence of the PI and Co-P I)

Other indicators of success can be:-

- Industry related outcome
- IPR related issues
- Patents
- Can lead to entrepreneurship
- Does it improve his academic capabilities by bringing in new knowledge?

- There should be well-designed monitoring system for the project
- Experts can visit from time to time to see the progress
- Goals and objectives must well defined in the proposal
- Action plan with hold points with time frame to be laid down
- Specific plans of action to attack the problems with solutions
- Cost effective solutions to be found out immediately and implemented seriously
- If failure then debar / black list the organization/ PI and Co.P. I
- Criticalities must be identified.

CONCLUSIONS

Emphasis was on: -----

- Qualification of the PI, Co.P. I and the organization to which they belong
- Close monitoring by visit of exerts regularly

ACTION TO BE TAKEN

Following can be taken care in the final Guidelines by NAFEN

PI and Co. P I competences should be measured in terms of achievements in the following areas: -

- Human Resource Development
- Guiding Ph.D
- Publications in Foreign Journals
- Keynote addresses in International Conferences

Other **indicators of success** for research outcome can be: _

- Industry related outcome
- IPR related issues
- Patents
- Can lead to entrepreneurship
- Does it improve his academic capabilities by bringing in new knowledge?

Other Areas for Monitoring

- Experts can visit from time to time to see the progress
- Goals and objectives must be well defined in the proposal
- Action plan with hold points with time frame to be laid down in the proposal
- Specific plans of action to attack the problems with solutions
- Cost effective solutions to be found out immediately and implemented seriously
- If failure then **debar / black list** the organization/ PI and Co-PI
- Criticalities must be identified.

MEETING NO. 04

1:1 Meetings—Guidelines Study

Meeting with	:	**Mr. P G S Mony, IF R&D Centre**
Date	:	**16th April. 2004**
Time	:	**11.00 A M**
Present	:	**PGSM/PKG/RKS**

GIST OF DISCUSSIONS

The normal duration of their projects is three years. One hard copy with CD is submitted of the proposal.

3 tier monitoring: -

- 6 monthly progress reports
- 18 months mid term very detailed report; PI has to come for presentation One hard copy + CD
- Reviewers visit the work place periodically to review the progress
- Final detailed report at the end.

- They have Scientific Council (SC) having 8 members, 4 from India and 4 from France. They are subject specialists in various research areas.
- Reports are sent At least four weeks in advance to SC members
- SC members assess whether the project is going as per schedule or not.
- After the final report, SC makes grading of the project ranging from Excellent to Satisfactory. Satisfactory actually means "POOR"
- Unless the project receives "Excellent", the PI/ Organization cannot submit another proposal for at least three years.
- The Reviewers are not permanent. They are appointed for project-to-project basis
- PI can submit the name of reviewers to SC.
- PI to give detailed Budget month/ year wise.

SUCCESS CRITERIA

Resulting from the research outcome, the following is important: _

- Number and Quality of Publications in International selective Journals relevant to the research field.
- How many International/ national Patents have come out.

Other points: -

- In case PI is moved to another organization then following is followed subject to SC approval:-
- New Institute should agree for the transfer
- Original Institute should agree for the change and transfer the funds to the new one.
- SC will examine if the CO PI is competent enough to take over in the old institute. Normally young Co PIs are appointed.
- In the proposal itself the organization should give an undertaking that the PI would be allowed to continue.
- CV of PI and CO PI must give least of not more than 10 relevant publications in the last five years.

- PI should also give the names of five persons who could be reviewers and also names of five persons who should not be contacted due to clash of interests.
- From time to time specific workshops/ seminars are held. Invitees are by invitation only and the SC approves not more than 20-25.The list of invitees.

In addition outsiders undertake from time to time scientific audit for the project. And they submit audit report.

CONCLUSIONS

Emphasis is on close monitoring and stage-by-stage involvement of the Scientific Council (SC)

ACTION TO BE TAKEN

- Proposal and reports be submitted in one hard copy with CD
- PI must submit: ---
  - 6 monthly progress report
  - 18 months mid term very detailed report; PI has to come for presentation
  - Reviewers visit the work place periodically to review the progress
  - Final detailed report at the end.
- Reports be sent at least four weeks in advance to department
- After the final report, grading of the project is done ranging from Excellent to Satisfactory. Satisfactory should mean **"POOR"**
- Unless the project receives "Excellent", the PI / Organization should not be allowed to submit another proposal for at least three years.
- PI to give detailed Budget month/ year wise.
- Resulting from the research outcome, the following is important: _
  - Number and Quality of Publications in International selective Journals relevant to the research field.
  - How many International/ national Patents have come out.
- In case PI is moved to another organization then following is followed subject to the approval of the department: -
  - New Institute should agree for the transfer
  - Original Institute should agree for the change and transfer the funds to the new one
  - SC will examine if the CO PI is competent enough to take over in the old institute. Normally young Co PIs are appointed.
  - In the proposal itself the organization should give an undertaking that the PI would be allowed to continue.

- CV of PI and CO PI must give least of not more than 10 relevant publications in the last five years.
- PI should also give the names of five persons who could be reviewers and also names of five persons who should not be contacted due to clash of interests.
- From time-to-time specific workshops/ seminars are held. Participation is by invitation only and the department must approve not more than 20-25.
- In addition some outside professional agency must undertake from time to time-scientific audit for the project and submit audit report.

MEETING NO. 05

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. P. B. Sharma**
Date	:	**21st April. 2004**
Time	:	**5 P M**
Present	:	**PBS/PKG/RKS**

GIST OF DISCUSSIONS

Concept, Scope of Work and Objectives should be clear and well defined

PI's motivation and what has prompted him to take up this project PI must give a detailed note in the proposal why he wants to do this project

Department must critical analyse capabilities of: ----(Track Record of Success)

- PI and Co Pi's
- Institutions

PI must highlight in the proposal similar work carried out by him, Co P I and the institution.

PI must give his SWOT analysis related with the proposed project.

Are the objectives inline with the Country's Technology Missions?

Has PI / Co PI undergone any special training in R&D management?

Peer Reviews should be very critical on the proposal

Outcome of the study must be hosted on the web. Create "Web Club"

FAILURES

Failure could be following type: (Various Stages)

- Non-Utilization of Funds
- PI moving to another organization
- Poor project Proposal
- Project failed to take off
- Abundant in between
- Results are not proper (Quality of out put)
- Results totally unacceptable and therefore infractuous

In each of the above situations if it occurs, first the PI/Co PI and the institution must give the reasons and then the department should carry out critical review.

PI must submit detailed methodology of the study with plan of action and major mile stones (MMS)

The periodic reports must be given in the following format: _

1. Mile stones to be achieved—What was proposed to be achieved?
2. What has been actually achieved?
3. Deviations between 1 and 2
4. Reasons for the deviations—Justifiable reasons
5. Revised action plan with mile stones
6. Whether deviations permitted or not

In addition to the P I the organization of his employment also must give their comments and views.

The organization must carry out **R&D work audit** and submit to the Department (NSTMIS)

CONCLUSIONS

Emphasis is on detailed proposal, reporting and periodic reporting.

ACTION TO BE TAKEN

PI's motivation and what has prompted him to take up this project PI must give a detailed note in the proposal why he wants to do this project

Department must critical analyse capabilities of: ----(Track Record of Success)

- PI and Co Pi's
- Institutions

PI must highlight in the proposal similar work carried out by him, Co P I and the institution.

PI must give his **SWOT analysis** related with the proposed project.

Are the objectives inline with the Country's Technology Missions?

Has PI / Co PI undergone any special **training in R&D management**?

Outcome of the study must be hosted on the web. Create **"Web Club"**

The periodic reports must be given in the following **format in tabular form**: _

- Mile stones to be achieved—What was proposed to be achieved?
- What has been actually achieved?
- Deviations between 1 and 2
- Reasons for the deviations—Justifiable reasons
- Revised action plan with mile stones
- Whether deviations permitted or not

In addition to the P I the organization of his employment also must give their comments and views.

The organization must carry out *R&D work audit* and submit to the department (NSTMIS)

FAILURES

Failure could be following type: (Various Stages)

- Non-Utilization of Funds
- PI moving to another organization
- Poor project Proposal
- Project failed to take off
- Abundant in between
- Results are not proper (Quality of out put)
- Results totally unacceptable and therefore infractuous

In each of the above situations if it occurs, first the PI/Co PI and the institution must give the reasons and then the department should carry out critical review.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. R.S. Gupta, Prof. Deptt. Of Electronics, DU**
Date	:	**26/4/2004**
Time	:	**2 p.m.**
Present	:	**RSG/RKS**

GIST OF DISCUSSIONS

Objectives, Area of Research, Finance and Manpower requirements should be clearly defined in the proposal. Objectives and outcome of the research should be industry related.

Proposal should be evaluated not only by DST but an expert committee, having members from the related research areas.

PI should be called for presentation after the proposal has been examined in depth by he expert committee.

At least six monthly review of the progress of work.

Man Power to be employed by P I should be properly scrutinized for their qualifications and experience. This should be vetted by the Deptt.

It should be clearly mentioned in the proposal as to what type of technical and administrative support the Institution of the PI will provide.

CONCLUSIONS

Emphasis is mainly on sound proposal, critical review before award and periodic monitoring.

ACTION TO BE TAKEN

- Objectives, Area of Research, Finance and Manpower requirements should be clearly defined in the proposal.
- Objectives and outcome of the research should be industry related.
- Proposal should be evaluated not only by DST but by an expert committee, having members from the related research areas.
- It should be clearly mentioned in the proposal as to what type of technical and administrative support the Institution of the PI will provide.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. A K Verma, Deptt. Of Electronics, DU**
Date	:	**26/4/2004**
Time	:	**3.15 P.M.**
Present	:	**AKV/RKS**

GIST OF DISCUSSIONS

Objectives should be well defined.

PIs strength in terms of his publications in leading / international journals must be mentioned his C V

Aspect of the failure should be anticipated from the project proposal stage itself and PI must identify action plan for such an eventuality.

Deptt. Must examine some past project proposals where failures have occurred

Project proposals should be in line with the national priorities.

For monitoring the projects, funding Deptt. May consider to outsource to an outside agency like Lloyds in industry.

It must be considered whether the research outcome has any marketing/ commercial potential.

Depending upon the project period monitoring should be every quarter.

CONCLUSIONS

Projects should be objective/ result oriented with alternate action plan in case of failures

ACTION TO BE TAKEN

- PIs strength in terms of his publications in leading / international journals must be mentioned his C V
- Aspect of the failure should be anticipated from the project proposal stage itself and PI must identify action plan for such an eventuality.
- Deptt. Must examine some past project proposals where failures have occurred
- Project proposals should be in line with the national priorities.
- For monitoring the projects, funding Deptt. May consider to outsource to an outside agency like Lloyds in industry.
- It must be considered whether the research outcome has any marketing/ commercial potential.

1:1 Meetings—Guidelines Study

Meeting with : **Dr. K. Lall, NPL**
Date : **27/04/2004**
Time : **18.30**
Present : **KL/PKG/RKS**

GIST OF DISCUSSIONS

Objectives and Goals of the proposal must be well targeted and realistic

Deliverables to be clearly specified.

Intent should be very clear from the beginning.

Is it new or repetitive work?

Research Design and Methodology must be very clear and sharp.

Institute or PI should not be allowed to use funds for any other purpose then the particular research project.

Funding Agency must have expert groups to do monitoring.

FAILURES

Failure is a part of the process. PI must clearly indicate in his proposal what he proposes to do to achieve the results.

Deptt. Must examine as to what he was supposed to do and what has been actually done i.e. has he tried sufficiently e.g. say commerlization of the output. In such a case we must see the following (Has he done every thing what he was supposed to do): -

- Whom all he has met?
- How many letters, phones, faxes, emails, and visit he has undertaken?
- Has he involved any industry either in the beginning or in the end?
- Has he organized any workshops/ seminars?
- How many experiments conducted
- How good is his documentation
- Must maintain **logbook** of all the activities in a chronological order.
- In case failure occurs, what alternative plan has he in mind?
- In case failure occurs then the PI/ Co PI and institute should be debarred for at least Two years to submit another proposal and he must demonstrate as to what new competencies he has acquired to submit another proposal.

CONCLUSIONS

Emphasis on monitoring by expert groups, sharp methodology and failure quantification parameters

ACTION TO BE TAKEN

Deliverables to be clearly specified.

Intent should be very clear from the beginning.

Is it new or repetitive work?

FAILURES

Failure is a part of the process. PI must clearly indicate in his proposal what he proposes to do to achieve the results. He must also indicate that in case failure occurs what will be the alternative plan of action

Deptt. Must examine as to what he was supposed to do and what he has actually done i.e. has he tried sufficiently e.g. say commerlization of the output. In such a case we must see the following (Has he done every thing what he was supposed to do): -

- Whom all he has met?
- How many letters, phones, faxes, emails, and visit he has undertaken?
- Has he involved any industry either in the beginning or in the end?
- Has he organized any workshops/ seminars?
- How many experiments conducted
- How good is his documentation
- Must maintain **logbook** of all the activities in a chronological order.
- In case failure occurs, what alternative plan has he in mind?
- In case failure occurs then the PI/ Co PI and institute should be debarred for at least Two years to submit another proposal and he must demonstrate as to what new competencies he has acquired to submit another proposal.

MEETING NO. 09

1:1 Meetings—Guidelines Study

Meeting with : **Dr. Ram Ji Rai, Director (ERD), BHEL, Corporate Office, ND**
Date : **28/4/2004**
Time : **11 A M**
Present : **RR/ Alok Mathur/ S D Yadav/ RKS**

GIST OF DISCUSSIONS

Focus in the proposal is on Marketability

Mostly undertaking Indigenization of products and items

Even in subcontracting the work they are fully involved

They evaluate financial and technical benefits

Interdisciplinary and Multi Disciplinary committee examines the proposals. The committees also include experts from Finance Deptt.

Monitoring is through PERT network

Monthly Progress Reporting on the network

Whenever they find that the results are not of acceptable even after course correction they close the project.

CONCLUSIONS

Emphasis is on PERT network and on Marketability of the outcome

ACTION TO BE TAKEN

Focus in the proposal is on Marketability of the end result

They evaluate financial and technical benefits

Interdisciplinary and Multi Disciplinary committees examine the proposals. The committees also include experts from Finance Deptt.

Monitoring is through PERT network and monthly reporting on the same

MEETING NO10

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr.R Mukherjee, Director (R&D), Dabur Research Foundation**
Date	:	**28/4/2004**
Time	:	**4.30 P M**
Present	:	**RM/PA/PKG/RKS**

GIST OF DISCUSSIONS

Research Design i.e. Objectives, Methodology etc. must be very clear and target Oriented

Network of activities with milestones be prepared and given in the proposal itself. Activities must match with the targets to be achieved.

Through review should be undertaken at the proposal stage re: the competencies of the PI, Co.P I, Organization and the manpower they wish to use for the project.

In India researchers do not venture to undertake research in new areas due to uncertainties.

In Pharmaceuticals and Health care Research, Discovery Stage is Basic Research and Preclinical and Clinical stage is applied research.

There should be close interaction between Industry, Research organization and Academics. Preferably they should sign MOUs for each project in order to have active participation of Industry.

In some cases the originally planned research output may not have been achieved. In such cases we must examine the following:-

- Has it resulted in Technology Development?
- Has it resulted in infrastructure development?
- Has it resulted in Man Power Development?
- Has it resulted in some new technology development?
- Has it resulted in Patents?
- Has it resulted in Publications?

Detailed log book/ documentation of activities must be maintained. Blank formats obtained. There should be periodic internal scientific audit by Quality Assurance Groups—QAG with in the organization and also external audit.

CONCLUSIONS

Emphasis on internal audit and maintaining detailed logbooks of activities.

ACTION TO BE TAKEN

Through review should be undertaken at the proposal stage re: the competencies of the PI, Co.P I, Organization and the manpower they wish to use for the project.

There should be close interaction between Industry, Research organization and Academics. Preferably they should sign MOUs for each project in order to have active participation of Industry.

In some cases the originally planned research output may not have been achieved. In such cases we must examine the following:-

- Has it resulted in Technology Development?
- Has it resulted in infrastructure development?
- Has it resulted in Man Power Development?
- Has it resulted in some new technology development?
- Has it resulted in Patents?
- Has it resulted in Publications?

Detailed logbooks / documentation of activities must be maintained. **Blank formats obtained.** There should be periodic **internal scientific audit by Quality Assurance Groups—QAG with in the organization and also external audit.**

MEETING NO. 11

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. H R Bhojwani, Advisor, CSIR**
Date	:	**30/04/2004**
Time	:	**11 A M**
Present	:	**HRB/PKG/RKS**

GIST OF DISCUSSIONS

Monitoring should be cost effective

PI must give progress reports in structured formats at least every quarter

There should be activity wise network related to physical activities over the project period and critical path must be identified on the network.

Deviations must be recorded with reasons and what steps PI proposes to take to overcome the deviations

Dr. Bhojwani suggested that we meet Dr. R Luthra who is Head, extramural of Research division at Pusa Complex.

CONCLUSIONS

Monitoring by PERT

Monitoring should be cost effective with CPM

ACTION TO BE TAKEN

Monitoring by PERT

To meet Dr. Luthra

1:1 Meetings—Guidelines Study

Meeting with : **Dr. A K Roy, Director, NSC, Delhi**
Date : **30/4/2004**
Time : **3 P M**
Present : **AKR/ PKG/ RKS**

GIST OF DISCUSSIONS

Targets should be realistic, achievable and time bound

For evaluating Success one must see Publications in Leading Journals, Patents, Commerlization aspects.

Industry participation must--Partnership

Regional Committees can be formed for monitoring

Log Books to be maintained.

Periodic reports indicating: ----

- What was planned?
- What has been achieved?
- Reasons for shortfall
- Alternative Plan of action to meet the shortfalls

Monitoring with the help of PERT and CPM.

In case of failure strict action to be taken.

CONCLUSIONS

Emphasis on PERT, CPM and commerlization

ACTION TO BE TAKEN

Targets should be realistic, achievable and time bound

For evaluating Success one must see Publications in Leading Journals, Patents, Commerlization aspects.

Industry participation must--Partnership

Regional Committees can be formed for monitoring

Log Books to be maintained.

Periodic reports indicating: ----

- What was planned?
- What has been achieved?
- Reasons for shortfall
- Alternative Plan of action to meet the shortfalls

In case of failure strict action to be taken.

√ He will send forms for monitoring for Lab. Activities, for machine usage and contracts

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. C E Veni Madhavan, Chairman, Center for Sponsored Schemes and Projects, IISc, Bangalore, Chairman PAC for Mathematical Science Committee of MoST and also Chairman, I T Committee of MoIT**
Date	:	**3/5/2004**
Time	:	**10.45 a.m.**
Present	:	**CEVM/PKG**

GIST OF DISCUSSIONS

Proposal must be examined in details by at least three to four referees.

Objectives outlined in the proposal must be realistic, time bound and target oriented.

There should be face to face mid term reviews at least every 6 monthly

Success can be measure as follows: -

- Publications
- Patents
- Thesis produced by the students on the research
- Industry acceptance
- HR development by way of courses
- Infrastructure development

How the P I has utilized the travel and equipment grants.

Log books to be maintained.

Project closure report should be very detailed.

PI should give his own assessment of the project in the end.

In case of deviations PI must give alternative plan of action

There should be independent Third Party inspection from time to time.

In case success parameters are not met then no new project for the next 2-3 years.

PAC can hold area wise periodic reviews on the running projects.

CONCLUSIONS

Emphasis on periodic monitoring

ACTION TO BE TAKEN

Proposal must be examined in details by at least three to four referees.

Objectives outlined in the proposal must be realistic, time bound and target oriented.

There should be face to face mid term reviews at least every 6 monthly

Success can be measure as follows: -

- Publications
- Patents
- Thesis produced by the students on the research

- Industry acceptance
- HR development by way of courses
- Infrastructure development

How the P I has utilized the travel and equipment grants.

Log books to be maintained.

Project closure report should be very detailed.

PI should give his own assessment of the project in the end.

PAC can hold area wise periodic reviews on the running projects.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. Roddam Narasimha, Chairman, Centre for Atmospheric and Oceanic sciences, IISc, Bangalore**
Date	:	**3/5/2004**
Time	:	**16.30**
Present	:	**RN/PKG**

GIST OF DISCUSSIONS

Track record of PI, Co PI and the Institute must be examined.

The PAC should grade proposal

Will the Research Output also lead to H R development and will the students be benefited, will it improve the quality of teaching? Will the students be trained in something new?

Objectives should be very clear and well defined.

In the end again the project should be evaluated i.e., the mile stone achievements.

Project should be again graded in the end.

For success following should be examined:-

- Potential for linkages with the national objectives
- Has it built up some new capabilities in the lab?
- Published papers in leading national and international journals.
- Patents
- Technical reports—Has it generated?
- Has he organized any seminars, conferences, and workshops on the subject?
- Has it resulted in any new product/ process/ concept etc?
- Is any industry willing to be associated?
- PI must give detailed work plan with milestones in the proposal.
- Visit the PIs lab. Periodically.
- Expenses for monitoring to be part of the grant.
- Experts can be on regional basis.
- Proposal and reporting to be by electronic mail only.
- 3rd party monitoring as audit is must.

CONCLUSIONS

Regular monitoring is a must

ACTION TO BE TAKEN

- Track record of PI, Co PI and the Institute must be examined.
- The PAC should grade proposal
- Objectives should be very clear and well defined.
- In the end again the project should be evaluated wrt the mile stone achievements.
- Project should be again graded in the end.

For success following should be examined:-

- Potential for linkages with the national objectives
- Has it built up some new capabilities in the lab?
- Published papers in leading national and international journals.
- Patents
- Technical reports—Has it generated?
- Has he organized any seminars, conferences, and workshops on the subject?
- Has it resulted in any new product/ process/ concept etc?
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- PI must give detailed work plan with milestones in the proposal.
- Visit the PIs lab. Periodically.
- Expenses for monitoring to be part of the grant.
- Experts can be on regional basis.
- Proposal and reporting to be by electronic mail only.
- 3rd party monitoring as audit is must.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. S Mohan, CEO, Society for Innovation and Devpt. , IISc and Chairman, Instrumentation PAC of MoST**
Date	:	**4/5/2004**
Time	:	**4 p.m.**
Present	:	**SM/PKG**

GIST OF DISCUSSIONS

Capability of the PI

Monitoring every 6 months by visits

Interaction with industry from time to time

Can research out put be put to any use by the industry?

PAC should have some industry experts as members.

There should be interactive "web" where PIs results are displayed.

We must encourage "mission mode" projects

PI must do his SWOT analysis in the proposal and that of Co PI and institute.

In case of failure an expert committee should go into the root cause and suggest remedial measures.

CONCLUSIONS

Monitoring every 6 months.

ACTION TO BE TAKEN

- Capability of the PI
- Can research out put be put to any use by the industry?
- PAC should have some industry experts as members.
- There should be interactive "web" where PIs results are displayed.
- We must encourage "mission mode" projects
- PI must do his SWOT analysis in the proposal and that of Co PI and Institute.
- In case of failure an expert committee should go into the root cause and suggest remedial measures.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. Raja Ramana, Director (Emeritus), NIAS, Bangalore**
Date	:	**5/5/2004**
Time	:	**9.45 a.m.**
Present	:	**RR/PKG**

GIST OF DISCUSSIONS

What is the background of PI/ Co PI/Institute with reference to the project?

What type of work they done in the past and what was their track record?

Is his work force well qualified to undertake this project?

In case of problems who will guide him (PI)

Every 6 months a team must visit for review.

Institute also to be held responsible

In case of failure PI must give alternative plan of action.

Institute head must also review the progress of the project from time to time and submit independent reports.

CONCLUSIONS

Emphasis on Institutes heads' role

ACTION TO BE TAKEN

- What is the background of PI/ Co PI/Institute with reference to the project?
- What type of work they done in the past and what was their track record?
- Is his work force well qualified to undertake this project?
- In case of problems who will guide him (PI)
- Every 6 months a team must visit for review.
- In case of failure PI must give alternative plan of action.
- Institute head must also review the progress of the project from time to time and submit independent reports.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr.P.S.Goel, Director, ISRO Satellite Centre, Bangalore**
Date	:	**5/5/2004**
Time	:	**11 a.m.**
Present	:	**PSG/L M Gangrene, Group Manager, ISRO**

GIST OF DISCUSSIONS

Competence of the PI must be examined

A committee of experts should examine proposal

If progress not acceptable then terminate the contract.

Proposal must be examined from technical and financial angle, both.

In case of failures it must be examined why it has occurred, what were the impediments and PI must submit alternate action plan.

If results not in order still do not give any new project for 3 years.

CONCLUSIONS

Very close scrutiny of the proposal

ACTION TO BE TAKEN

- Competence of the PI must be examined
- A committee of experts should examine proposal
- If progress not acceptable then terminate the contract.
- Proposal must be examined from technical and financial angle, both.
- In case of failures it must be examined why it has occurred, what were the impediments and PI must submit alternate action plan.
- If results not in order still do not give any new project for 3 years.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. V Jayraman, Director (Earth Observation) and Mr. Madhusudan, Director (BEA), ISRO**
Date	:	**5/5/2004**
Time	:	**3 p.m.**
Present	:	**VJ/MS/PKG**

GIST OF DISCUSSIONS

ISRO has 9 monitoring centers all over India

In the proposal following must be examined:-

- Background of the PI and Institute
- Knowledge base in the institute
- Facilities in the institute
- Does it have linkages with any national priorities?
- Proposal is evaluated on the basis of Grading
- Experts should be mutli disciplinary
- Milestones on the network must be identified and critical path with progress hold points.

Reviews on the progress every six months.

Detailed review every year

The experts again examine detailed project closure report and results are graded.

Detailed control over Manpower and equipment procurement.

Institute also to be responsible.

PI must indicate in the proposal as to what he is looking for from the results.

CONCLUSIONS

Very detailed monitoring and network.

ACTION TO BE TAKEN

In the proposal following must be examined:-

- Background of the PI and Institute
- Knowledge base in the institute
- Facilities in the institute
- Does it have linkages with any national priorities?
- Proposal is evaluated on the basis of Grading
- Experts should be mutli disciplinary
- Milestones on the network must be identified and critical path with progress hold points.
- PI must indicate in the proposal as to what he is looking for from the results.

Reviews on the progress every six months.

Detailed review every year

The experts again examine detailed project closure report and results are graded.

Detailed control over Manpower and equipment procurement.

Institute also to be responsible.

MEETING NO. 19

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. A Murty, Head, Mech.Engg.Deptt. JSS Academy, Bangalore**
Date	:	**6/5/2004**
Time	:	**11 a.m.**
Present	:	**ANNM/ D R Swamy/PKG**

GIST OF DISCUSSIONS

PI in the proposal must give literature review—both national and international. Also indicate futuristic trends.

Referees must examine the proposal

PI should write in the proposal as to why his proposal should be approved.

PI should also give his SWOT in the proposal.

Referees must examine the competences of the PI/ CO PI/ Institute in details. The comments should be in descriptive fashion.

PI must identify the weakest links in his proposal.

CONCLUSIONS

Emphasis of PI on his self-assessment

ACTION TO BE TAKEN

- PI in the proposal must give literature review—both national and international. Also indicate futuristic trends.
- Referees must examine the proposal
- PI should write in the proposal as to why his proposal should be approved.
- PI should also give his SWOT in the proposal
- Referees must examine the competences of the PI/ CO PI/ Institute in details. The comments should be in descriptive fashion
- PI must identify the weakest links in his proposal

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. G Padmanaban, Chairman, Deptt. Of Bio Chemistry**
Date	:	**6/5/2004**
Time	:	**3 p.m.**
Present	:	**GP/PKG**

GIST OF DISCUSSIONS

Mid term review has to be done very carefully

Group of experts to review the progress

Proposal to be graded

Closure report to be very exhaustive

Final report to be again reviewed by experts and graded.

Track record of the PI must be examined.

PI should be called for periodic presentations.

Proper records of the work done to be maintained.

PI has to be fully accountable.

There should be different task forces to examine the proposals and results.

CONCLUSIONS

Reviews by experts and grading

ACTION TO BE TAKEN

- Mid term review has to be done very carefully
- Group of experts to review the progress
- Proposal to be graded
- Closure report to be very exhaustive
- Final report to be again reviewed by experts and graded.
- Track record of the PI must be examined.
- PI should be called for periodic presentations.
- Proper records of the work done to be maintained
- PI has to be fully accountable.
- There should be different task forces to examine the proposals and results.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. R S Shiva Kumar, Advisor (R&D), CPRI and Mr. Kamlakarnath, Bangalore**
Date	:	**7/5/2004**
Time	:	**11 a.m.**
Present	:	**RSSK/KN/PKG**

GIST OF DISCUSSIONS

There are three tier review committees

- Proposal review
- Progress review
- Closure review

Monitoring every month by the institute head.

Monitoring every quarter by the Project Monitoring Committee.

Monitoring every year by the review committee.

Examine the track record of the PI in details like number of papers published and patents obtained. 40% of the papers must be in International Journals of repute and balance 60% in the national journals of repute.

Committee also examines whether the equipment procured can be utilized for some other work also.

Mission mode projects to be encouraged.

CONCLUSIONS

Emphasis on detailed reviews

ACTION TO BE TAKEN

- Monitoring every month by the institute head.
- Monitoring every quarter by the Project Monitoring Committee.
- Monitoring every year by the review committee.
- Examine the track record of the PI in details like number of papers published and patents obtained. 40% of the papers must be in International Journals of repute and balance 60% in the national journals of repute.
- Committee also examines whether the equipment procured can be utilized for some other work also.
- Mission mode projects to be encouraged.

1:1 Meetings—Guide[illegible]es Study

Meeting with : **Dr. K. Kasturi Rangan, Director, NIAS**
Date : **7/5/2004**
Time : **2 p.m.**
Present : **KKR/PKG**

GIST OF DISCUSSIONS

Proposal must be examined very critically and carefully. Including the methodology

What are the capabilities of the PI/Co PI and the institute?

What are their resources? See what is lacking and that has to be watched carefully.

Does the PI adequate give the time frame? He must give milestones yeas wise

There has to be mid term evaluation—detailed one by experts.

Experts must do **Value Judgment** at each stage.

Institute head should review from time to time the progress

Is failure leading top something new, is it a stepping stone for something else, has it improved the research methodology, does it lead to some futuristic development.

How many papers have been published and where

Is it leading to any improvements in Products/ Processes/ Concepts?

Does it generate some new knowledge?

What are the deviations and why they have occurred? Experts must examine

CONCLUSIONS

Emphasis on reviews and critical evaluation of the resources of the PI etc.

ACTION TO BE TAKEN

Proposal must be examined very critically and carefully. Including the methodology

- What are the capabilities of the PI/Co PI and the institute?
- What are their resources? See what is lacking and that has to be watched carefully.
- Does the PI adequate give the time frame? He must give milestones year wise
- There has to be mid term evaluation—detailed one by experts.
- Experts must do **Value Judgment** at each stage
- Institute head should review from time to time the progress.
- Is failure leading top something new, is it a stepping stone for something else, has it improved the research methodology, does it lead to some futuristic development
- How many papers have been published and where
- Is it leading to any improvements in Products/ Processes/ Concepts?
- Does it generate some new knowledge?
- What are the deviations and why they have occurred? Experts must examine.

MEETING NO. 23

1:1 Meetings—Guidelines Study

Meeting with : **Prof. U R Rao, Former Chairman, ISRO, Bangalore**
Date : **7/5/2004**
Time : **3 p.m.**
Present : **URR/PKG**

GIST OF DISCUSSIONS

Facilities with the PI, Man Power available and Lab. Equipment must be examined in details.

Proposal must be examined by min. two experts independently and graded.

Periodic reviews.

Reviews must include equipment utilization and manpower utilization

PI must maintain logbooks of activities as per the network and milestones.

Progress to be compared with the detailed PERT and CPM.

How many experiments he had to do and he has actually done.

Review teams must go deeper.

Has the research yielded any new results?

In the end again Presentation by the PI before the committee.

Grade the proposal and the results on a 5-point scale like OS/VG/G/Fair/Poor

CONCLUSIONS

Review and monitoring regularly.

ACTION TO BE TAKEN

- Facilities with the PI, Man Power available and Lab. Equipment must be examined in details.
- Proposal must be examined by min. two experts independently and graded.
- Periodic reviews.
- Reviews must include equipment utilization and manpower utilization
- PI must maintain logbooks of activities as per the network and milestones.
- Progress to be compared with the detailed PERT and CPM.
- How many experiments he had to do and he has actually done.
- Review teams must go deeper.
- Has the research yielded any new results?
- In the end again Presentation by the PI before the committee
- Grade the proposal and the results on a 5-point scale like OS/VG/G/Fair/Poor

1:1 Meetings—Guidelines Study

MEETING WITH	:	DR. N S TIWANA, E D. PB.STATRE COUNCIL FOR S&T, CHANDIGARH
Date	:	11/5/2004
Time	:	4.15 p.m.
Present	:	NST/Dr. Jitender Kaur Arora, Jt. Dir. (Bio Tech.)/ RKS

GIST OF DISCUSSIONS

Targets and Objectives should quantifiable and clear.

Milestones should be defined in the proposal

Project proposal must have commitment of commerlization

6 monthly review meetings by an expert Committee

PI Should submit progress reports quarterly

Failure many times occurs due to movement of PI to another institute

Publication of the research outcome in leading journals is a measure of success

Project should be closed after giving reasonable time to the PI to reach the results—max. With in 6 months but no extra cost.

Grants should be released in time by the Funding Agency

CONCLUSIONS

Close monitoring and commerlization is the key to success

ACTION TO BE TAKEN

- Targets and Objectives should quantifiable and clear
- Milestones should be defined in the proposal
- Project proposal must have **commitment of commerlization**
- 6 monthly review meetings by an expert Committee
- PI Should submit progress reports quarterly
- Failure many times occurs due to movement of PI to another institute
- Publication of the research outcome in leading journals is a measure of success
- Project should be closed after giving reasonable time to the PI to reach the results—max. With in 6 months but no extra cost. Grants should be released in time by the Funding Agency

1:1 Meetings—Guidelines Study

Meeting with	:	**Mr. S J Raina, D G, NCCBM, Ballabgrah**
Date	:	**12/05/2004**
Time	:	**11.30 a.m.**
Present	:	**SJR/ Dr. N L Murthy, Joint Director/Dr.K.Mohan, Addl. Director/ Mr. S C Rastogi, G M / RKS**

GIST OF DISCUSSIONS

An internal expert committee should examine the project proposal in details.

After their O.K. then an external expert committee should examine including the internal experts—They create an open forum. It is critically discussed.

Research Advisory Committee (RAC) like PAC of DST gives final approval

RAC members are replaced every year.

6 monthly progress reviews

Mid term critical review in depth. If required then the PI is asked to do course correction.

Industry oriented projects/ sponsored projects are preferred.

If the project is not making satisfactory targeted progress at the time of mid term review then the project should be closed. However knowledge if gained any is utilized for H R development.

Network based monitoring.

Patent and Publications are the major criteria's of success.

CONCLUSIONS

Projects should be industry based/linked / sponsored.

ACTION TO BE TAKEN

- An internal expert committee should examine the project proposal in details.
- After their O.K. then an external expert committee should examine including the internal experts—They create an open forum. It is critically discussed.
- Research Advisory Committee (RAC) like PAC of DST gives final approval
- RAC members are replaced every year.
- 6 monthly progress reviews
- Mid term critical review in depth. If required then the PI is asked to do course correction.
- Industry oriented projects/ sponsored projects are preferred.
- If the project is not making satisfactory targeted progress at the time of mid term review then the project should be closed. However knowledge if gained any is utilized for H R development.
- Network based monitoring.
- Patent and Publications are the major criteria's of success.
- For F A

1:1 Meetings—Guid es S dy

Meeting with	:	**Dr.R P Vajpayee, Director,** CSIO, Chandiga
Date	:	**17/5/2004**
Time	:	**11.00 a.m.**
Present	:	**RPV/Dr.S K Taneja, Sc.'G',** CSIO/PKG/RKS

GIST OF DISCUSSIONS

Which Thrust Area the PI wants to operate should be very clear?

Who is going to use the outcome—Should be clearly defined in the proposal.

Proposals dully supported by some industry should be given first prefe nce.

Is the research proposed –an extension/ continuation of some alread done research or it is altogether new area. Full justification should be given in the proposal

Close monitoring every three months by visiting by an expert committee

Track record of the PI, co P I and the institute should be very carefully examined.

Will the outcome result in: -

- Papers
- Patents
- Concept
- New Area
- Technology
- Academic Advancement
- How many experiments conducted?
- How many visits undertaken
- May be some intermediate product or technology developed.

All the above are success parameters.

- A system should be developed by which the institute should not be able to divert the funds for some other purpose. If the institute head does this then he should be taken to task by the Funding Agency.
- In many cases it is seen that the PI is not given freedom to operate. The purchase procedures of the institute come in the way of speedy work. Some system of check and balances be developed by which PI is able to operate with freedom
- The entire outcome should be put on "Web" by the Funding Agency.
- Many times it is seen that the Peers just go by the name of PI or the Institute. It is suggested that for Peer reviews the name of the PI/ Co PI and institute should be blocked.

PI must give in the proposal a network with milestone of activities, on which periodic monitoring (every 3 months) should be undertaken.

No extension more than three months is given.

CONCLUSIONS

Peer review on Face Value. Periodic monitoring to be undertaken by a committee of experts.

ACTION TO BE TAKEN

- Who is going to use the outcome—Should be clearly defined in the proposal.
- Proposals dully supported by some industry should be given first preference
- Is the research proposed –an extension/ continuation of some already done research or it is altogether new area. Full justification should be given in the proposal
- Close monitoring every three months by visiting by an expert committee
- Track record of the PI, co P I and the institute should be very carefully examined
- Will the outcome result in: -
    - Papers
    - Patents
    - Concept
    - New Area
    - Technology
    - Academic Advancement
    - How many experiments conducted
    - How many visits undertaken
    - May be some intermediate product or technology developed.

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MEETING NO. 27

1:1 Meetings—Guidelines Study

Meeting with	:	Dr. C L Kaul, Director, NIPER, Chandigarh
Date	:	17/5/2004
Time	:	14.00
Present	:	CLK/PKG/RKS

GIST OF DISCUSSIONS

Is it a new thing or extension of some existing research?

Has industry been consulted?

Is industry putting in some money?

Track record of the PI and Institute must be examined in depth.

Review committee should be multidisciplinary.

Committee must use Value Judgment

Has the Research Outcome resulted in some other process or technology development?

Has some faculty been developed?

Have some students at Ph.D level developed.

CONCLUSIONS

They are mainly developing HR for the Pharma industry at various levels

They are doing basic research/ exploratory research in Pharma drug development.

ACTION TO BE TAKEN

- Is it a new thing or extension of some existing research?
- Has industry been consulted?
- Is industry putting in some money?
- Track record of the PI and Institute must be examined in depth.
- Review committee should be multidisciplinary.
- Committee must use Value Judgment
- Has the Research Outcome resulted in some other process or technology development?
- Has some faculty been developed?
- Have some students at Ph.D level developed.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. Ms. Veronica Rodriguez, Director, TIFR & Chairperson, Deptt. of Biological Sciences**
Date	:	**23/5/2004 (Sunday)**
Time	:	**3 p.m.**
Present	:	**VR/PKG**

GIST OF DISCUSSIONS

Success criteria can be:-

- Publications
- Has he trained people at PhD and or M.Tech? Level and where are they placed now in Industry or Academics and in what position?
- Patents
- Number of experiments conducted.

There should be Peer review in the beginning and end. Both times it should rated. 5 peers and he must get at least three excellent/ outstanding.

Monitoring committee must visit every six months the place of work

Only time extension to be given and no cost escalation.

If progress not satisfactory, close it there and then.

Peer Review Reports should be descriptive and not only objective if excellent peers must state the reason.

There should be industry experts on the Pac

Many times the financing agency delays the release of payments

In many universities the cumbersome purchase procedures act as a source of delays

CONCLUSIONS

Emphasis on Peer reviews

ACTION TO BE TAKEN

- Publications
- Has he trained people at PhD and or M.Tech. Level and where are they placed now in Industry or Academics and in what position?
- Patents
- Number of experiments conducted.
- There should be Peer review in the beginning and end. Both times it should rated. 5 peers and he must get at least three excellent/ outstanding.
- Monitoring committee must visit every six months the place of work
- If progress not satisfactory, close it there and then.
- Peer review reports should be descriptive and not only objective if excellent peers must state the reason.
- Many times the Financing Agency delays the release of payments
- In many universities the cumbersome purchase procedures act as a source of delays
- There should be industry experts on the PAC

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. S Banerjee, Director, BARC, Dr. A M Patankar, Head, TT&CD, Dr. A K Suri, Head, MPD and Dr. Sunil Teheran, Program Officer**
Date	:	**24/5/2004**
Time	:	**11.30 a.m.**
Present	:	**SB/AMP/AKS/ST/PKG**

GIST OF DISCUSSIONS

Objectives of the project must be in terms of deliverables, target oriented and quantifiable

Close monitoring during then execution of the project

Initial proposal should be graded by the Peers and also at the end

Full documentation is maintained of what is being done by the PI from time to time

Some end user should be identified in the beginning itself in the proposal. He should be involved at all stages of the project. Industry linkage is a must.

IPR issues should be taken care particularly in up scaling research. Concept some body else might have developed and the present PI is developing a system as up scaling. So all IPR related issues PI must take care

*Min. 5 peers must examine the proposal and at least 3 excellent must be obtained for the proposal to be funded.

From time to time PI must make presentations before the PAC during the progress of the project.

PI/Co PI must be on the regular role of the institute.

SUCCESS PARAMETERS

Committed output is achieved. If not then following should be examined:-

Has he set up some new lab? Which can be used by others in future?

Has he established some running system which can be used by the institute by others in future?

Has it lead to some code development.

Has it led to some new packaged

Has it resulted in some new pilot plant?

Has some key information generated which is useful to designers in future?

Has it improved some Energy consumption in the system?

Has it improved the ecological conditions?

Has it reduced the down time of the system?

Has it validated some new design data?

Has it reduced material consumption?

Has it reduced some water and or power consumption in the system?

Has it improved some time schedules?

Has it improved material specifications?

Has it enhanced the life of the materials?

CONCLUSIONS

Emphasis on PEER reviews and closes monitoring during the execution.

ACTION TO BE TAKEN

- Objectives of the project must be in terms of deliverables, target oriented and quantifiable
- Close monitoring during then execution of the project
- Initial proposal should be graded by the Peers and also at the end
- Full documentation is maintained of what is being done by the PI from time to time
- Some end user should be identified in the beginning itself in the proposal. He should be involved at all stages of the project. Industry linkage is a must.
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- PI/Co PI must be on the regular role of the institute.

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- Has he established some running system which can be used by the institute by others in future?
- Has it lead to some code development.
- Has it led to some new packaged
- Has it resulted in some new pilot plant?
- Has some key information generated which is useful to designers in future?
- Has it improved some Energy consumption in the system?
- Has it improved the ecological conditions?
- Has it reduced the down time of the system?
- Has it validated some new design data?
- Has it reduced material consumption?
- Has it reduced some water and or power consumption in the system?
- Has it improved some time schedules?
- Has it improved material specifications?
- Has it enhanced the life of the materials?

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. U C Chandra E D and Mr. A K Chandra, AD**
Date	:	**24/5/2004**
Time	:	**3 p.m.**
Present	:	**PKG/UCC/AKC**

GIST OF DISCUSSIONS

They are doing all internal R&D and not getting any R&D from external sources. Their R&D is for two systems, Electronics and Nuclear. They generate computer based documents like systems, engineering etc. Procedures are defined, steps to be taken are designed, documents issues with mile stones. Documents are planning and design.

Milestones are monitored. Next stage documents are issued once one particular mile stone is achieved. Technical specifications have to be fully met and no deviations are allowed. They control time and cost by monthly meetings of the internal expert groups.

CONCLUSIONS

Emphasis on close internal monitoring.

ACTION TO BE TAKEN

- Milestones are monitored
- Next stage documents are issued once one particular mile stone is achieved. Technical specifications have to be fully met and no deviations are allowed. They control time and cost by monthly meetings of the internal expert groups.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. Dr. Kartic C Khilar, Dean (R&D), IIT, Mumbai and Prof. of Chemical Engg.**
Date	:	**25/5/2004**
Time	:	**3 p.m.**
Present	:	**KCK/PKG**

GIST OF DISCUSSIONS

Utility of the research outcome must be clearly specified in the proposal.

Is it useful to some Industry?

Will it lead to patents?

Will it lead to publications in leading national and international journals?

Will some technology be developed? Will it be transferred to some industry?

Is any start up company willing to buy the research outcome?

Following ratings be given:-

o Technology developed but no industry is willing to take	Average
o Gone to industry	Very Good
o Industry is using it	Excellent
o Being used all over country and abroad	Out
standing	

FAILURE

What are the reasons for the failure. PI / Co Pi/ Instt. Head must explain

Was the objective faulty?

Incompetence of the working team

PI had not enough foresight

Mid term reviews by visit of the experts is must.

All results / reviews must be put on "Web" This will bring in transparency in the system

CONCLUSIONS

Emphasis on Industry usage and close reviews.

ACTION TO BE TAKEN

- Utility of the research outcome must be clearly specified in the proposal.
- Is it useful to some Industry?
- Will it lead to patents?
- Will it lead to publications in leading national and international journals?
- Will some technology be developed? Will it be transferred to some industry?
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Following ratings be given:-

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FAILURE

- What are the reasons for the failure. PI / Co PI/ Instt. Head must explain
- Was the objective faulty
- Incompetence of the working team
- PI and his team did not have enough foresight

Mid term reviews by visit of the experts is must.

All results / reviews must be put on "Web" This will bring in transparency in the system.

1:1 Meetings-Guidelines Study

Meeting with : **Mr. A.V.Ray, Chief Engineer, National Institute of Immunology, New Delhi**
Date : **27/05/2004 (Thursday)**
Time : **11 a.m.**
Present : **AVR/RKS**

GIST OF DISCUSSIONS

R & D projects should have following main features:

Target should be very clear, specific and real.

Laboratory & other facilities should be very well equipped.

Support services (like well maintained office, AC, water, Electricity, Administrative Staff etc.) for the project should be adequate.

Methodology should be well defined.

Proposal should clearly specify with justification if there is any need for any type of foreign Collaboration/Support or Import of Equipment.

Department should have an in-house Expert committee to review projects from proposal stage as well as for Project Progress review till the end.

Outside experts should be invited to join in-house committees from the relevant Research Project field.

Quarterly Progress review should be held.

Patent and Publication is the success criteria.

CONCLUSION

Stress on Smooth Funding, Support services and Well equipped Lab facilities

ACTION TO BE TAKEN

- R & D projects should have following main features.
- Target should be very clear, specific and real.
- Laboratory & other facilities should be very well equipped.
- Support services (like well maintained office, AC, water, Electricity, Administrative Staff etc.) for the project should be adequate.
- Methodology should be well defined.
- Department should have an in-house Expert committee to review projects from proposal stage as well as for Project Progress review till the end.
- Quarterly Progress review should be held.
- Patent and Publication is the success criteria.

MEETING NO. 33

1:1 Meetings-Guidelines Study

Meeting with	:	**Dr. V.K.Gupta, Director, NISCIR**
Date	:	**28/05/2004 (Friday)**
Time	:	**3 P.M.**
Present	:	**VKG/RKS**

GIST OF DISCUSSIONS

Targeted outcome should be very clear as well as quantifiable

Monitoring should be milestone based & milestone should be defined by PI in the proposal.

Project proposal should be reviewed by expert committee.

PI's credential should be critically scrutinized before awarding the project.

Publication & Patent is the criteria for success or failure of a project.

The quality of publication should be considered by its publication in leading domestic / international journals.

CONCLUSION

Stress on clear and quantifiable targeted outcome, strong networking and milestone based monitoring.

ACTION TO BE TAKEN

- Targeted outcome should be very clear as well as quantifiable
- Monitoring should be milestone based & milestone should be defined by PI in the proposal.
- Project proposal should be reviewed by expert committee.
- PI's credential should be critically scrutinized before awarding the project.
- Publication & Patent is the criteria for success or failure of a project.

1:1 Meetings—Guidelines Study

Meeting with : **Prof. V S Chauhan, Director, ICGEB, Delhi**
Date : **31/05/2004**
Time : **3 p.m.**
Present : **VSC/PA/PKG/RKS**

GIST OF DISCUSSIONS

Research proposal in the beginning before award and the research come in the end must be examined in depth by a tem of experts.

PI should be fully competent to undertake the work. His track rec must be examined in details. His team should be fully competent and trained.

Very close monitoring by experts every three months. They must se hat he was supposed to do and what he is actually doing.

Grey areas should be identified and course correction applied.

IPR issues should be well protected.

Industry should be involved from the beginning itself.

Detailed minutes of activities should be maintained with mile stoles.

It must be seen what new information/ knowledge the research will generate.

PI should have freedom to operate.

Institute should be fully involved.

CONCLUSIONS

Review by experts in the beginning and end and close monitoring

ACTION TO BE TAKEN

- Research proposal in the beginning before award and the research outcome in the end must be examined in depth by a tem of experts.
- PI should be fully competent to undertake the work. His track record must be examined in details. His team should be fully competent and trained.
- Very close monitoring by experts every three months. They must see what he was supposed to do and what he is actually doing.
- Grey areas should be identified and course correction applied.
- IPR issues should be well protected.
- Industry should be involved from the beginning itself.
- Detailed minutes of activities should be maintained with mile stoles.
- It must be seen what new information/ knowledge the research will generate.
- PI should have freedom to operate.
- Institute should be fully involved.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. S K Sikka, Scientific Secretary, GOI & Dr. R P Gupta, Sc.E**
Date	:	**1/6/2004**
Time	:	**3 p.m.**
Present	:	**SKS/RPG/PKG/RKS**

GIST OF DISCUSSIONS

Objectives should be in terms of deliverables
Original Proposal and Final Research out come must be critically examined by at least 5 peers.
Very close monitoring on milestones every three moths by a team of experts. Experts should be domain experts.
If progress not satisfactory close the project there and then

SUCCESS PARAMETERS

- Count of publications
- Count of citations
- Count of new products and processes/services
- Count of improvements in products/processes/services
- Count of Patents
- Cost savings and reductions in production, design, maintenance etc
- Any improvements in Education and training
- Intellectual challenges
- Any materials developed
- Any new technical bench marking and standards deve ed
- Any improvement in quality
- Any cost savings
- Any new methods/ and techniques developed.

CONCLUSIONS

Emphasis on deliverables, close monitoring with mile stones and peer reviews in the beginning and end.

ACTION TO BE TAKEN

Objectives should be in terms of deliverables

Original Proposal and Final Research out come must be critically examined by at least 5 peers.

Very close monitoring on milestones every three moths by a team of experts. Experts should be domain experts.

If progress not satisfactory close the project there and then

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- Count of publications
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- Any improvements in Education and training
- Intellectual challenges
- Any materials developed
- Any new technical bench marking and standards developed
- Any improvement in quality
- Any cost savings
- Any new methods/ and techniques developed.

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. N K Sharma, CMD, NRDC, Delhi**
Date	:	**2/6/2004**
Time	:	**2.45 p.m.**
Present	:	**NKS/PA/PKG/RKS**

GIST OF DISCUSSIONS

Objectives should be well defined.

It should be clear and mentioned in the proposal as to who will be the users/ beneficiaries.

Proposal should be vetted by a team of experts. It is preferable that the expert team which vet the proposal also constitute the monitoring/ review team.

Size of the review team can be decided depending upon the value of the research proposal.

Monitoring with the help of PERT and milestone based.

Project should be again reviewed and assessed by the committee in the end.

IPR related issues should be well taken care of.

Experts should be sectoring specific based.

Proposal should clearly mention if there is any collaborating agency vith full details.

Similarly proposal should clearly mention the testing/ certification ac ncy.

If the research proposal is in phases then it should be clear in the oposal as to who will be responsible for the subsequent stages.

If there are any identified users in the proposal then the user feed back must be enclosed in the end report.

In case PI leaves the institute then it should be clear who will be responsible to carry forward the project.

Institute should be fully involved.

Release of funds has to be milestone based.

CONCLUSIONS

Emphasis on initial and final assessment and milestone based monitoring.

ACTION TO BE TAKEN

- Objectives should be well defined.
- It should be clear and mentioned in the proposal as to who will be the users/ beneficiaries.
- Proposal should be vetted by a team of experts. It is preferable that the expert teams which vet the proposal also constitute the monitoring/ review team.
- Size of the review team can be decided depending upon the value of the research proposal.
- Monitoring with the help of PERT and milestone based.

- Project should be again reviewed and assessed by the committee in the end.
- IPR related issues should be well taken care of.
- Experts should be sectoring specific based.
- Proposal should clearly mention if there is any **collaborating agency** with full details.
- Similarly proposal should clearly mention the **testing/ certification** agency.
- If the research proposal is in phases then it should be clear in the proposal as to who will be responsible for the subsequent stages.
- If there are any identified users in the proposal then the user feed back must be enclosed in the end report.
- In case PI leaves the institute then it should be clear who will be responsible to carry forward the project.
- Institute should be fully involved.
- Release of funds has to be milestone based.

1:1 Meetings—Guidelines Study

Meeting with	:	**Prof. M S Valiathan, President, INSA**
Date	:	**3.6.2004**
Time	:	**11 a.m.**
Present	:	**MSV/PKG/RKS**

GIST OF DISCUSSIONS

Detailed examination of the proposal by Peers and Grading

Detailed examination of the end results by the Peer Committee and Grading

Mile stone based Monitoring and Payments to be released accordingly

Separate procurement chart to be given in the proposal and monitored closely.

IMPACT FACTORS FOR SUCCESS

- Patents
- Publications in Journals of national and international repute in relevant field.
- Has new product developed?
- Is some new technology developed?
- Has it been accepted by the industry?
- Has some new piece of knowledge developed which improves the quality of life?

CONCLUSIONS

Emphasis on review in the beginning and end by Peers and mile stone based monitoring.

ACTION TO BE TAKEN

Separate procurement chart to be given in the proposal and monitored closely.

IMPACT FACTORS FOR SUCCESS

- Patents
- Publications in Journals of national and international repute in relevant field.
- Has new product developed?
- Is some new technology developed?
- Has it been accepted by the industry?
- Has some new piece of knowledge developed which improves the quality of life?

1:1 Meetings—Guidelines Study

Meeting with	:	**Dr. Rajesh Luthra, Head Extra Mural Research Division**
Date	:	**3.6.2004**
Time	:	**03 P.M.**
Present	:	**Dr. Rajesh Luthra / RKS**

GIST OF DISCUSSIONS

Extensive Research Proposal scrutiny, first by area specific referee, then by 5 peer team (2 referred by PI only from Research area & 3 by CSIR).

Final project award by High Powered (H.P.) Committee after due consideration.

Extensive credential scrutiny of PI, what work he did in the past in terms of Publication, Patent, Process Development etc.).

Yearly progress report submission, which is vetted by H.P. Committee.

H.P. Committee meeting every six months.

Next installment of grant only after submission and vetting of yearly report.

In case of non-submission of yearly report due to unforeseen and genuine reasons next installment can be released but PI has to submit yearly progress report in the next six monthly meeting without fail.

If it is observed that PI doesn't submit report successively then project is closed.

Mid term Project progress presentation by PI.

Final Report reviewed by area specific referee (only one referee)

Success or failure of Project assessed & approved by H.P. committee based on referee's comments.

Project success criteria's:- publication, process developed, patent filed and knowledge generated, training imparted.

Publication only considered in "High End" National or International Journals and how many times it has been referred by area specific Scientists.

CONCLUSIONS

Emphasis on Critical Project Proposal scrutiny and yearly monitoring and PI's credentials.

ACTION TO BE TAKEN

- Extensive Research Proposal scrutiny.
- Extensive credential scrutiny of PI, what work he did in past in terms of publication, Patent, Process Development).
- Yearly progress report submission.
- Next installment of grant only after submission and vetting of report.
- Mid term project progress presentation by PI.
- Final Report reviewed by area specific referees.
- Publication only in "High End" National or International Journals and how many times it has been referred by area specific Scientists.

1:1 Meetings—Guidelines Study

Meeting with:	**Mr. Girish Sethi, Senior Fellow, TERI**
Date:	**9th July 2004**
Time:	**3.30 P.M.**
Present:	**Mr. G.S. / Mr. R K Saxena**

GIST OF DISCUSSIONS

Objective should be clear with identified deliverables.

Project is thoroughly vetted by internal monitoring & review committee of TERI before submission. to any funding agency.

Methodology should be clearly mentioned in the proposal.

Actual work plan should be developed based on methodology with identified deliverables at different point of time as milestones.

PI is the head and should be given free hand for the complete project from beginning to end.

Mid term peer reviews to be carried out.

At the end of the project another peer review is also carried out.

Joint Project monitoring and review mechanism involving funding agency, outside expert groups is recommended.

Normally six monthly project reviews is carried out.

Course correction, if required, is considered after six months of project commencement.

Success criteria for a project are patent, publication in 'high end' journals and knowledge based development for community use.

In order to ensure success of projects funds release should be linked with achievement of milestone based deliverables.

CONCLUSIONS

Emphasis on taking up projects only with achievable, realistic deliverables and efficient monitoring and review mechanism.

ACTION TO BE TAKEN

- Objective should be clear and deliverables identified
- Monitoring and review of projects at project proposal stage, mid term and at conclusion stage.
- PI should be given operational freedom for all activities of project.
- Industries tie up is best for the success of project
- Success criteria patent, publication in high end journals and knowledge based web development.
- Mid term course correction should be considered based on project progress
- Funds release should be linked with milestone based deliverable achievements
- Joint project monitoring and review involving outside expert groups should be adopted for efficient implementation of projects

1:1 Meetings – Guidelines Study

Meeting with	:	Dr. A K Chawla, Dir. (R&D), Panacea and Ms. Jaya, Sc. Officer
Date	:	18/8/2004
Time	:	10 a.m.
Present	:	AKC/J/PA/PKG

GIST OF DISCUSSIONS

Objectives must be linked to Results, Measurable, Achievable, in terms of deliverables and realistic.

They have developed electronic bio tracking system for monitoring. It shows at any point of time what the plans were of the researcher, what he is actually doing, what he has done so far, what are the deviations with reasons, why and what is the course correction

- Strong supervision is required
- Pressure must be maintained
- Monitoring to be very strong

Success can be measured in terms of: ----

- Patenting Potential
- Publications in Journals of repute
- Industry tie up is very essential. If possible industry should contribute funding also say 10% of the total value of the project.
- Industry can be monitoring partner
- Industry people must be associated in initial evaluation of the proposal and in the end also

Maintain log books of all activities like Experiments, Raw Material Consumed, Man Power Usage. Ultimately it should e log books. It must be signed by at least two persons i.e. the researcher and the supervisor

CONCLUSIONS

Emphasis on strong monitoring and log books

ACTION TO BE TAKEN

Objectives must be linked to Results, Measurable, Achievable, in terms of deliverables and realistic.

They have developed **electronic bio tracking system** for monitoring. It shows at any point of time what the plans were of the researcher, what he is actually doing, what he has done so far, what are the deviations with reasons, why and what is the course correction

Success can be measured in terms of: ----

- Patenting Potential
- Publications in Journals of repute
- Industry tie up is very essential. If possible industry should contribute funding also say 10% of the total value of the project.
- Industry can be monitoring partner
- Industry people must be associated in initial evaluation of the proposal and in the end also

Maintain log books of all activities like Experiments, Raw Material Consumed, Man Power Usage. Ultimately it should e log books. It must be signed by at least two persons i.e. the researcher and the supervisor.

RECORD NOTES

BRAIN STROMING SESSIONS

Annexure – 2: Bangalore BSSs

Annexure – 3: Delhi BSSs

Annexure – 4: Delhi Final BSSs

Annexure - 2

RECORD NOTES OF DISCUSSIONS OF THE BRAIN STORMING SESSIONS (BSSS) HELD AT BANGALORE ON 9TH AND 10TH SEPT 2004 RE: R&D STUDY ON DEVELOPING INDICATORS FOR MEASURING SUCCESS OF RESEARCH PROJECTS

List of Participants enclosed.

Dr. P.K.Gupta, Project Investigator welcomed the participants and also made a brief presentation on the study. In his presentation Dr. Gupta gave a brief outline of the R&D Funding scenario by the scientific ministries of Govt. of India for the year 2001-2002. He also listed various points which emerged from the 1:1 meetings with experts from allover the country in various disciplines of R&D. These points made the basis of discussions in the meeting.

Dr. Laxman Prasad, Advisor and Head, NSTMIS chaired the meetings on both the days. Dr. Prasad at the outset in his opening remarks outlined *as to what he is looking for in these meetings from the participants.* He highlighted that the main purpose of this study is:-

- *How do we measure the efforts put in by the PI?*
- *Whether the efforts put in by the p I were adequate and in the right direction?*
- *How do we quantify and measure the above?*

After this brief introduction, members were requested to give their views one by one. Following are the main points which emerged from the discussions held on 9th and 10th Sept 2004: -

/ / below Indicates Agency Responsible

A. RESEARCH PROPOSAL SUBMISSION (S)

1. Objectives should be defined clearly. They should be measurable, achievable and realistic, in terms of deliverables and time bound.

[P I]

2. PI must indicate in the proposal what his interest in submitting this proposal and why his proposal should be accepted?

[P I]

3. Each stage *(Mile Stones/ Hold Points)* in the action plan given in the research proposal should be in terms of deliverables. Deliverables and milestones must be well defined.

[P I]

4. Industry focus is a must. Collaborative R&D with industry. End user must be identified. Financial participation by the end user will be an added advantage. Marketing and Commerlization aspects of the research outcome must be highlighted in the proposal.

[P I]

5. PI should also do *self assessment of risk level* of his proposal. PI must also mention in the proposal whether this research is being done for the first time in India / Abroad.

[P I]

6. Details of all activities like requirement of consumables / raw materials, equipment to be used, man power to be utilized, tests and experiments to be *conducted* must be given in the proposal.

[P I]

7. Each stage (Mile stones) will be given marks/ weightage. In the end all the marks/ Weightage added up. In case the total is more than 60%, it can be deemed as success

[Funding Agency]

8. Peer review of the research proposal must indicate the level of *uncertainty / risk* in the proposal like *High/ Medium/ Low*. This should be done for each stage of the action plan.

[Funding Agency]

B. IMPLEMENTATION OF THE PROJECT (1)

1, Progress of work must be periodically reviewed and closely monitored by a team of experts by visiting the place of work, against the commitments given in the research proposal,

[Funding Agency]

2. Corrective measures suggested by the experts during review should be implemented by the P I immediately and action taken reflected clearly in the next project progress report. PI also must indicate what steps/ action he took to meet the objectives like:-

    - Consultations-which experts he consulted nationally/ internationally?
    - Other agencies he consulted
    - Did he organize some seminars/ workshops to solve the problems?

    In short what new action / (s) PI took to resolve the problems.

[P I]

These will be some of the important measures to assess the efforts put in by P I.

[P I]

3. Log book of all activities like use of consumables / raw materials, equipment used, man power utilized, tests and experiments *conducted* to be maintained.

[P I]

4. In case P I leave the institute in between, a procedure is to be worked out for his replacement. Is Co.P.1 I competent to take over.

[Funding Agency/ Institute Head]

C. COMPLETION OF THE PROJECT (C)

1. There should be a clear mention in the final expert committee report as *to what extent the objectives have been met.*

[Funding Agency]

2. Meeting the committed objectives is the *sole criteria of success.* If the objectives are *partially met,* p I should clearly indicate in the progress reports the reasons for not meeting the objectives. Further he must also indicate his revised plan of action to meet the objectives as committed in the research proposal

[P I]

3. If the *objectives are not at all met,* then we have to examine the following: -

    - P I must critically examine the reasons for failure and give details in the final Project closure report.
    - What we have learnt?
    - How this experience will be useful in future? Can this be useful somewhere else?
    - How the equipment! Manpower was utilized by the PI?

Some of the other *conceptual drivers* of success which can be considered in the end to evaluate the extent success are:-

- Papers Published in leading Indian / Foreign Journals. Where published? What impact the publications have created-*Spin offs.*
- Citations received H R development
- Infrastructure development
- Patenting potential-National / International

- Has it created some new technological base?
- Has it developed some special new expertise?
- Is it leading to cost cutting?
- Is it leading to import substitution?
- Is it giving some societal benefits like energy conservation, pollution control etc.?
- Ph. D degrees awarded under his guidance during the period of the project.
- Patents-Applied/ Obtained-National/ International
- Has some manpower developed?
- Is any new processes developed?

  ➢ *Each of the above factors can be ranked and weight-ages given*

[Funding Agency]

4. Final project report submitted by the p I must be critically reviewed and examined by the experts.

[Funding Agency]

5. Experts' comments and results must be communicated to the P I

[Funding Agency]

D. <u>MISCELLANEOUS</u>

1. Final results of each project must be put on the web site of the Funding Agency
2. Funding Agency must release all payments in time.
3. Close the project if it is not progressing satisfactorily
4. Proposals must be processed in a time bound program
5. Expenses of the visit of Experts/ Referees to be built in as Administrative Over Heads
6. There should be also a provision for giving suitable honorarium *[say Rs.* 2000/- *per day]* to the experts/ referees for utilizing their services for evaluation, review and monitoring, in addition to the traveling cost.
7. Project should not be extended for more than six months without any cost implications
8. Final audit should be both technical and financial 9. Funds should not be reduced arbitrarily.
10. With in the approved Budget, P I must be given freedom to operate. He can be deemed to be *self controlling.*

[Funding Agency]

LIST OF PARTICIPANTS WHO ATTENDED BSS ON 9TH SEPTEMBER, 2004 AT BANGALORE

Sno.	Name	Organisation/ Institute Name
1	Dr. Laxman Prasad, Adviser & Head	NSTMIS, DST, Ministry of S&T, Govt. of India
2	Mr. V.S. Bharadwaj, General Manager	Bharat Earth Movers Limited (BEML)
3	Mr. R. Jagannathan, Advisor (D&E)	Bharat Electronics Limited (BEL)
4	Dr. Ajit T. Kalghatgi, Principal Scientist	Bharat Electronics Limited (BEL)
5	Mr. Prosanta Dutta, Manager (Finance)	Bharat Electronics Limited (BEL)
6	Dr. M. Arunachalam, Add. G.M.	BHEL, Electronics Division
7	Mr. C.S. R. Murthy, Manager (Finance)	Central Power Research Institute
8	Mr. B.H. Narayana, Addl. Director	Central Power Research Institute
9	Mr. C.S. Ramasesha, Regional Director	Central Ground Water Board, Min. of Water Resources
10	Mr. H.V. Srinivasa Rao, Sc. "G", Director	Defence Avionics Research Establishment (DARE)
11	Mr. M.K. Vyawahare, Jt. Director	Defence Bio-Engg & Electromedical Lab (DEBEL)
12	Mr. M Kagali, DGM (Finance)	Govt. Tool Room & Training Centre, Finance Division
13	Mr. M Rajendra, Manager (Projects)	Govt. Tool Room & Training Centre, Projects Division
14	Mr. Raj Gopalan, Dy. Finance Controller	IISC, Centre for Ecological Sciences
15	Dr. Parameshwar P. Iyer	IISC, Centre for Scientific Industrial Consultancy (CSIC)
16	Prof. E. Arunan	IISC, Deptt. of Inorganic & Physical Chemistry
17	Prof. S. Sampath	IISC, Deptt. of Inorganic & Physical Chemistry
18	Prof. M.H. Balasubramanian	IISc, Deptt. of Management Studies
19	Dr. G. Rangarajan	IISc, Deptt. of Maths
20	Prof. Vasant Natrajan	IISC, Deptt. of Physics
21	Prof. T.R.N. Kutty	IISC, Material Research Department
22	Prof. Rishikesha T. Krishnan	Indian Institute of Management
23	Shri R.V. Perumal, VSSC, Trivandrum	ISRO
24	Mr. N. Aravindra Kumar, Head Satellite Tech. Cell	ISRO Satellite Centre
25	Prof. A.N.N. Murthy, Principal	JSS Academy of Engineering & Technology
26	Prof. D.R. Swamy,	JSS Academy of Engineering & Technology
27	Dr. B.D. Malhotra, Scientist-in-Charge	National Physical Laboratory
28	Dr. P.K. Gupta, Secretary General	NAFEN
29	Mr. Gopal Singh, Project Coordinator	NAFEN

LIST OF PARTICIPANTS WHO ATTENDEDIN BSS ON 10TH SEPTEMBER, 2004 AT BANGALORE

Sno.	Name	Organisation/ Institute Name
1	Dr. Laxman Prasad, Adviser & Head	NSTMIS, DST, Ministry of S&T, Govt. of India
2	Prof. R. Mohan Das, Dy. Registrar	IISc
3	Prof. Anjali A. Karande	IISc, Deptt. of Bio Chemistry
4	Prof. Rudra Pratap	IISc, Deptt. of Mech. Engg
5	Prof. T.R. Abhinandan	IISc, Deptt. of Met. Engg.
6	Mr. Deepandra Moitra, Associate V.P.	Infosys Technologies Limited
7	Dr. R.V. Rao, Head, Wood Properties	Institute of Wood Science & Technology
8	Mr. H N. Madhusudan, Director (BEA)	ISRO
9	Mr. R Thankaraj, Principal Scientist (R&D)	ITI Limited, Bangalore
10	Dr. T N Basavaraj, Sr. Scientist (R&D)	ITI Limited, Bangalore
11	Mr. S.K. Tikkoo, Dy. General Manager (Internal Audit)	ITI Limited, Bangalore
12	Dr. Y.J. Rao, Head, Deptt. of Biotechnology	MV.J. College of Engineering
13	Dr. P.K. Gupta, Secretary General	NAFEN
14	Mr. Gopal Singh, Project Coordinator	NAFEN
15	Dr. K.S. Rao, Dy. General Manager (R&D)	Rallis Research Centre
16	Mr. Prem Dutt, General Manager (Engg.)	Reva Electric Car Company Pvt. Ltd.
17	Mr. U.R. Madhyasta, Advisor (R&D)	Reva Electric Car Company Pvt. Ltd.
18	Dr. Gopinatha Gargesa, Director (R&D)	Sir M. Visvevaraya Institue of Technology
19	Dr. Purushottam, Head (R&D)	University of Agricultural Sciences, Bangalore
20	Mr. V. Gopal, Comptroller	University of Agricultural Sciences, Bangalore

ANNEXURE - 3

RECORD NOTES OF DISCUSSIONS OF THE BRAIN STORMING SESSIONS (BSSS) HELD AT DELHI ON 29TH AND 30TH SEPT 2004 RE: R&D STUDY ON DEVELOPING INDICATORS FOR MEASURING SUCCESS OF RESEARCH PROJECTS

List of Participants enclosed.

Dr. P.K.Gupta P I welcomed the participants and also made a brief presentation on the study. In his presentation Dr. Gupta gave a brief outline of the R&D Funding scenario by the scientific ministries of Govt. of India for the year 2001-2002. He also listed various points which emerged from the 1:1 meetings with experts from all over the country in various disciplines of R&D. These points made the basis of discussions in the meeting.

Dr. Laxman Prasad, Advisor and Head, NSTMIS chaired the meetings on both the days. Dr. Prasad at the outset in his opening remarks outlined *as to what he is looking for in these meetings from the participants*. He highlighted that the main purpose of this study is:-

- *How to avoid infractuous expenditure and waste of efforts?*
- *How do we measure the efforts put in by the P I?*
- *Whether the efforts put in by the PI were adequate and in the right direction?*
- *How do we quantify and measure the above?*
- *What useful findings have come out of the research work?*

After this brief introduction, members were requested to give their views one by one. Following are the main points which emerged from the discussions held on 9th and 10th Sept 2004: _

[ ] below Indicates Agency Responsible

A. RESEARCH PROPOSAL SUBMISSION (S)

Objectives to be clear, well defined and in terms of deliverables

[P I]

P I must give a detailed step by step action plan, in terms of deliverables *(Achievable Mile Stones)*, to meet the objectives. Action plan also to indicate cost and time for each stage of activity. Action plan to be in net work form also *[PERT/ CPM]*

[P I.]

P I must give the "In house monitoring"

[P I]

P I must indicate his motivation level for submitting the proposal.

[P I]

P I must indicate number of projects he handing at present and what *% of time*
He will spend on this project.

[P I]

Risk factor/ Uncertainties must be identified by the P I in the proposal.

[P I]

P I must identify in the proposal any end user/ industry partnership.

[P I]

Research proposal to be critically examined. Review to be descriptive.

[Funding Agency]

Past track record of the P I / Co.P.I I/ Institute must be examined in details.

[Funding Agency]

B. IMPLEMENTATION OF THE PROJECT (I)

Progress of work to be reviewed periodically by experts both at micro level and macro level including financial monitoring. Progress reports to be signed by CO P I and Institute Head also. Experts must visit place of work of the P I to verify the progress of work Corrective measures taken.

[P I]

All deviations from the stated objectives must be clearly brought out by PI and experts in all the reviews.

[P I]

P I must be given all powers to operate the project. For this project PI can be *self controlling*

[P I]

Log book of all activities to be maintained.

[P I]

C. COMPLETION OF THE PROJECT (C)

P I must explain in the project completion report the reasons with justifications for not meeting the objectives. P I must do *self assessment.*

[P I]

In case P I leaves the institute, a procedure to be developed so that the project does not suffer.

[P I]

A workshop to be organized to discuss the final outcome.

[P I]

Meeting the committed objectives is the *main indicator of success.* In case there is partial success or committed objectives are not met then some of the following *indicators (Tangibles/ Intangibles)* can be considered for evaluation of the research out come:----

- Commerlization/ Marketability Aspects
- Industry usefulness—to whom Useful
- Contribution to advancement of teaching
- Patents—Indian/ Foreign
- Any industrial linkage established—stake holders' involvement.
- Publications—Quality of the journals in which published can be assessed from the impact number of the journal—Indian/ International.
- Any technical reports generated?
- Can it be linked to national priorities—societal benefits—socio economic aspects.
- Is any new product/ process developed?
- Has it benefited any young scientists?
- PhDs generated.
- Participated in any exhibitions?
- Organized any seminars?
- Is it leading to any e-applications?
- Any interactions with other experts, R&D specialists, Labs etc.?
- Is any new technology developed?
- Has any technology transfer taken place?
- Is it leading to any other technical *spin offs*
- Has it led to any infrastructure advancement in labs?

[Funding Agency]

D. MISCELLANEOUS (M)

Funding agency to consider the following: _

Two stage offer system. First P I should give a 2-3 pages *Concept Paper,* which should be reviewed by the experts and if found in order, then P I can submit detailed proposal.

Giving funds for preparation of the offer and literature review.

In case due to any reasons P I is not able to buy the equipment /hire man power in the first year, then he should be allowed in the second year.

During the project work is in progress, number of technical and technological changes might be taking place. Is P I taking care and incorporating the same—*Genetic Algorithm*

A representative from the finance department of the funding agency may be nominated on the expert monitoring and review committee from the beginning itself.

In case funds are released late at any stage, then cost escalations may be considered.

Right from the proposal submission, proposal review by peers, monitoring and final evaluation to be made *On Line—a suitable e-tracking system to be developed.*

Results of the project to be displayed on the *web site* of the funding agency.

Review / Monitoring Committee members be paid suitable honorarium.

List of referees suggested by the P I only a guide. Funding Agency has the discretion to appoint any one

Institute head to be made responsible at all stages.

Project proposal and final outcome to be rated by experts.

Over Heads in the Budget can also cover following expenses to facilitate smooth functioning of the project: _

- Sundry Payments to casual workers/ supporting staff
- Other petty unforeseen expenses.

Identified end user to be involved at all stages of reviews/ monitoring.

[Funding Agency]

LIST OF PARTICIPANTS WHO ATTENDED BSS ON 29TH SEPTEMBER, 2004 AT DELHI

Sno.	Name	Organisation/ Institute Name
1	Dr. Laxman Prasad, Advisor & Head**	Ministry of Science & Technology, NSTMIS, DST, GOI
2	Dr. T.K.K. Reddy, Adviser (RID)	All India Council for Technical Education
3	Mr. K.D. Mehra, AGM	Bharat Heavy Electricals Limited
4	Dr. T.S. Reddy, Area Coordinator (T&TP)	Central Road Research Institute
5	Dr. V.K. Sood, Area Coordinator (PEM)	Central Road Research Institute
6	Dr. A.P. Kulshreshtha, Director**	CSTNAM, New Delhi
7	Dr. U.C. Bahri, Head Analytical Dept.**	Dabur Research Foundation, Ghaziabad
8	Mr. S. Vatsal, Director (EMR),	Defence Research & Development Organisation
9	Dr. N.L. Sachdeva, Former Principal	Delhi College of Engineering
10	Prof. P.B. Sharma, Principal**	Delhi College of Engineering
11	Mr. A.K. Vohra, AGM (R&D)	Engineering India Limited
12	Mr. Sheo Raj Singh, Sr. Manager (R&D)	Engineering India Limited
13	Mr. B.L. Jangira , Director (Finance)	Indian Council of Agriculutral Research
14	Dr. K. Satyanarayana, Dy.D.G.**	Indian Council of Medical Research
15	Dr. S. P. Agarwal, Head**	Indian Institute of Foreign Trade, Delhi
16	Prof. H.M. Chawla	Indian Institute of Technology, Deptt. of Chemistry, Delhi
17	Prof. T.K. Dutta	Indian Institute of Technology, Deptt. of Civil Engg., Delhi
18	Dr. V.S. Gautam,, Dalmia Chairman	Indian Institute of Technoloyg, Deptt. of Management Studies
19	Dr. P.G.S. Mony, Director**	Indo-French Centre for Promotion of Adv. Research
20	Dr. Tashi Wangdi, Jt. Director	Ministry of Environment & Forests, GOI
21	Dr. A.N. Rai, PSO**	Ministry of Science & Technology, NSTMIS, DST, GOI
22	Dr. G.J. Samathanam, Director	Ministry of Science & Technology, NSTMIS, DST, GOI
23	Mr. Parveen Arora, Director**	Ministry of Science & Technology, NSTMIS, DST, GOI

** LPAC Members.

Sno.	Name	Organisation/ Institute Name
24	Ms. N. Gupta	Ministry of Science & Technology, NSTMIS, DST, GOI
25	Dr. P.K. Gupta, Secretary General	National Foundation of Indian Engineers (NAFEN)
26	Mr. Gopal Singh, Coordinator (Projects)	National Foundation of Indian Engineers (NAFEN)
27	Mr. Sunil Sharma, Manager (Accounts)	National Foundation of Indian Engineers (NAFEN)
28	Dr. T.K. Mukherjee, Scientist "EII"	National Institute of Sc. Comm. and Info. Resources
29	Mrs. (Dr.) Sivakama Sundari, Scientist "F"	National Institute of Sc. Comm and Info. Resources
30	Mr. A. Pradhan	National Research Development Corporation (NRDC)
31	Dr. Ranjeet Singh, Director	Netaji Subhas Institute of Technology (NSIT)
32	Dr. V.K. Kapoor	Netaji Subhas Institute of Technology (NSIT)
33	Mr. M.P. Gupta, DFC	Netaji Subhas Institute of Technology (NSIT)
34	Dr. R.P. Gupta, Scientist 'E'	Office of the Principal Scientific Advisor, GOI
35	Mr. A K Chawla, Director (R&D)**	Panacea Biotech Ltd., Delhi
36	Dr. G.J. Santhaseelan, Reader	Thiagraja College, M.K. University, Mudari

** LPAC Members.

LIST OF PARTICIPANTS WHO ATTENDED BSS ON 30TH SEPTEMBER, 2004 AT DELHI

Sno.	Name	Organisation/ Institute Name
1	Dr. Laxman Prasad, Advisor & Head**	Ministry of Science & Technology, NSTMIS, DST, GOI
2	Mr. K.D. Mehra, AGM (R&D)	Bharat Heavy Electricals Limited
3	Mr. Y.B. Kaushik, Scientist "D"	Central Ground Water Board
4	Mr. K.J. Anandakumar, Scientist "B"	Central Ground Water Board
5	Dr. S.D. Sharma, Director	Indian Agricultural Statistics Research Institute
6	Prof. S.K. Koul	Indian Institute of Technology, CARE
7	Prof. B. Jayaram	Indian Institute of Technology, Deptt. of Chemistry
8	Dr. A.K. Shukla, Director	Indian Meteorological Department
9	Mr. D.C.S. Negi, (Finance Officer)	Indian Meteorological Department
10	Dr. S. Cgandrasekharan, Coordinator	Jawaharlal Nehru University
11	Prof. Rakesh Bhatnagar, Centre for Biotech	Jawaharlal Nehru University
12	Dr. Naseem Ahmad, Addl. Director	Ministry of Environment & Forests, GOI
13	Mr. Pankaj Sharma, Dy. CA.	Ministry of Science & Technology, Deptt. of S&T
14	Mr. Parveen Arora, Director**	Ministry of Science & Technology, NSTMIS, DST, GOI
15	Dr. A.N. Rai, PSO**	Ministry of Science & Technology, NSTMIS, DST, GOI
16	Mr. Deepak Bhatnagar, Advisor (Mission Reach)	Ministry of Science & Technology, TIFAC, DST
17	Dr. S.K. Ahuja, Under Secretary	Ministry of Science & Technology, DST, GoI
18	Dr. P.K. Gupta, Secretary General	National Foundation of Indian Engineers (NAFEN)
19	Mr. Gopal Singh, Coordinator (Projects)	National Foundation of Indian Engineers (NAFEN)
20	Mr. Sunil Sharma, Manager (Accounts)	National Foundation of Indian Engineers (NAFEN)
21	Ms. V.V. Lakshmi, Scientist "EII"	National Institute of Sc. Comm. And Info. Resources

Sno.	Name	Organisation/ Institute Name
22	Mr. S.K. Arora, Scientist "EII"	National Institute of Sc. Comm. And Info. Resources
23	Mr. S.P. Bammi, SO (Accounts)	National Institute of Sc. Comm. And Info. Resources
24	Mrs. (Dr.) S.A. Agnihotry, Scientist	National Physical laboratory (NPL)
25	Dr. S.S. Bawa, Scientist "G"	National Physical laboratory (NPL)
26	Mr. B.S. Rawat, Finance Deptt.	National Physical laboratory (NPL)
27	Dr. D.K. Avasthi	Nuclear Science Centre
28	Mr. Niranjan Roy, DGM	Prototype Development & Training Centre
29	Dr. R.K. Diwan, Sr. Scientist	Shriram Institute for Industrial Research
30	Dr. Amita Malik	Shriram Institute for Industrial Research

ANNEXURE - 4

RECORD NOTES OF DISCUSSIONS OF THE FINAL BRAIN STORMING SESSION (BSS) HELD AT DELHI ON 25TH JANUARY, 2005 RE: STUDY ON DEVELOPING INDICATORS FOR MEASURING SUCCESS OF RESEARCH PROJECTS.

List of Participants attached.

Dr. P.K. Gupta **PI** welcomed the participants and also made a presentation on the study. In his presentation, Dr. Gupta gave a brief outline of the study like objective, scope and methodology etc. He also gave outline of the various indicators which have been developed for measuring efforts put in by PI and Scientific & Technical (S&T) Qualitative & Quantitative output, which emerged as a result of the study of select literature, 1:1 meetings with experts and various brain storming sessions held during the course of the study.

Dr. Laxman Prasad, Advisor and Head, NSTMIS chaired the meeting (Secretary DST being occupied elsewhere) and explained the main focus of the study. He highlighted that the main purpose of the study was:-

- *Identifying various indicators for measuring efforts and S&T output.*
- *To what extent committed goals/ deliverables have been achieved?*
- *How to avoid infructuous expenditure and efforts?*
- *How do we measure the efforts put in by the PI?*
- *Whether the efforts put in by the PI were adequate and in the right direction?*
- *What useful findings have come out of the research work?*

Prof. V.S. Ramamurthy, Secretary, DST also graced the discussions. He mentioned that at the time of evaluating a new proposal, the performance report of the PI for the previous executed project(s) should be available to the funding agency experts. In addition he observed that the findings of this study will be a

great help to the funding agency and will supplement their normal reviews and monitoring systems which are being followed by various funding agencies.

After the brief introduction, members were requested to give their views. Following are the main points, which emerged from the discussions:-

a) Funding Agency Experts and PI should jointly decide as to which of the indicators are applicable for a particular project including weightage and priority to be given to each indicator. This should be decided in the beginning of the project.

b) While selecting the indicators and allocating the weightage and priority, the **Nature & Type** of the research project should be kept in mind.

c) Scoring scale should be sliding scale say **"between 0 to 10"** and the funding agency experts can give appropriate score / weightage to each identified indicator / impact factor / milestone achieved.

d) Period of review for measuring the efforts put in by the P I can **be mid term and at the completion of the project**. However, this can be again decided by the funding agency and their experts, as feasible to them.

e) In case of reviews undertaken by more than one expert, the average of % score given by each expert can be taken as the final score.

f) In case PI has to **undertake national / international patent search**, the cost of the same should be included in the project estimates.

g) Following changes were also agreed:-

NO.	***As before***	***After change***
	Measuring Research Efforts /Output	
2.	Meetings held with experts/ stakeholders	**Meetings / Consultations held with the Experts/ Stakeholders -- *National/ International***
7.	Consultations with experts — National/ International	

3	Experiments Set up	**Experiments / Tests Conducted**
4	Tests Conducted	
5.	-----	**Add "Any other Indicator(Pl. Specify)"**

h) The %age range for "each rating" can be modified by the funding agency, if desired.

i) This scheme of evaluating success of R&D projects may be reviewed after a period of two years from implementation on the basis of feed back received from the experts and funding agency.

j) Relevant pages incorporating the above suggestions are enclosed herewith

The meeting ended with a vote of thanks to the chair.

1.0 IDENTIFICATION OF INDICATORS OF MEASURING SUCCESS OF R&D PROJECTS

On the basis of study of select literature, 1:1 meetings with experts and Brain Storming Sessions (BSSs), process of identification of indicators of measuring success of R&D projects has been divided into *two steps,*

STEP -I

- Identify various indicators for measuring efforts put in by PI

STEP –I I

- Identify various output indicators / impact factors for measuring output of R&D Projects

I. INDICATORS FOR MEASURING EFFORTS PUT IN BY PI

- Display in Exhibitions
- Implementation of various suggestions given by the experts in their reviews.
- Meetings / Consultations held with experts / stakeholders—Nationally / Internationally
- New initiatives to resolve the problem(s)
- Seminars / Workshops Organized
- Tests / Experiments Conducted
- Visits for Data Collection
- Any other Indicator(s) (Pl. Specify)----------

II. SCIENTIFIC & TECHNICAL (S&T) OUTPUT INDICATORS

S&T Output indicators have been categorized as:

* Quantitative S&T Indicators
* Qualitative S&T Indicators

QUANTITATIVE S&T INDICATORS

a. Research Publications

- Citations
- International Refereed Journals
- National Refereed Journals
- Papers Presented in Conferences / Seminars
- Technical Reports

b. Technology

- Demonstrated / Awareness Created
- New Materials
- Processes
- Products
- Prototypes
- Scale of Development
- Transferred

c. Other Indicators

- Awards – National / International
- Capacity Building (Facilities)
- Commercial & Marketing Potential
- Cost Cutting / Savings achieved
- Experts Trained at International Level
- Experts Trained at National Level
- Import Substitution
- Industrial Queries Generated
- Industrial Tie-ups
- Any other Infrastructure Development which has relevance to R&D (Established / Upgraded)
- New e-applications
- New Teaching Methods Developed
- Patents—National / International ----Applied / Granted
- Ph.D. Awarded
- Any other Indicator(s) (Pl. Specify)---------- -

QUALITATIVE S&T INDICATORS

- Experience Gained useful for further R&D
- Linkages with National Priorities
- Socio-Economic & Societal Benefits
- Any other Indicator(s) (Pl. Specify)----------

2.0 MEASURING RESEARCH OUTPUT

Detailed procedure for measurement of research out put is outlined below:

I. Measuring Efforts put in by PI

Stage(s) of Review: Mid Term / Completion *(Tick ✓ appropriate)*

Period under Review ---------- *to* ----------

Note: - Funding Agency experts and P I should first jointly identify the following details keeping in view the nature and type of the research project under review:-

- *Stages of review like Quarterly / Mid Term / Annual / Completion etc.*
- *Applicable Impact factors / Indicators / Milestones / Activities.*
- *Weightage and Priority to be allocated to each selected indicator / impact factor / milestone / activity.*
- *Type (Fixed or Sliding) and Range of Scale to be used for giving score to each indicator / impact factor / milestone / activity.*

S.No.	Tick (✓) applicable Impact Factor / Indicator for the project under review	Weightage / Priority	Score given by Funding Agency Expert
(1)	(2)	(3)	(4)
1.	Visits for Data Collection		
2.	Meetings / Consultations held with experts/ stakeholders—Nationally / Internationally		
3.	Tests / Experiments Conducted		
4.	Implemented various suggestions given by the experts in their reviews.		
5.	New initiatives to resolve the problem(s)		
6.	Seminars / Workshop organized		
7.	Display in Exhibitions		
8.	Any other indicator(s) –PI. specify ----------		

(a) Total Score .....

(b) Score obtained by P I .....

(c) % Score obtained *{b/a}* .....

II. Scientific & Technical (S&T) Output Indicators

Stage of Review: *At the Completion of the Project*

Note: **- *Funding Agency Experts and PI should first jointly identify the following details in the beginning of the project keeping in view the nature and type of the research project under review:-***

- *Applicable Impact factors / Indicators / Milestones / Activities.*
- *Weightage and Priority to be allocated to each selected indicator / impact factor/ milestone /activity.*
- *Type (Fixed or Sliding) and Range of Scale to be used for giving score to each indicator / impact factor / milestone / activity*

S.No	Impact Factors (Research Output leading to:--------) Tick (✓) the applicable impact factor(s) for the project under review	Weightage / Priority	Score given by Funding Agency Expert
(1)	(2)	(3)	(4)
	I. QUANTITATIVE S&T INDICATORS		
A.	**RESEARCH PUBLICATIONS**		
	1 International Refereed Journals		
	2 National Refereed Journals		
	3 Citations		
	4 Technical Reports		
	5 Papers presented in Conferences/ Seminars		
B.	**TECHNOLOGY**		
	6 Scale of Development		
	7 New Materials		
	8 Products		
	9 Processes		
	10 Prototypes		
	11 Demonstrated/ Awareness Created		
	12 Transferred		

S.No (1)	Impact Factors (Research Output leading to:--------) Tick (✓) the applicable impact factor(s) for the project under review (2)	Weightage/ Priority (3)	Score given by Funding Agency Expert (4)
C.	**OTHER INDICTORS**		
	* **Patents**		
	a. Applied		
	13 National		
	14 International		
	b. Granted		
	15 National		
	16 International		
	* **Awards**		
	17 National		
	18 International		
	19 New Teaching Methods Developed		
	20 Industrial Tie-ups		
	21 Industrial Queries Generated		
	22 Any other Infrastructure Development which has relevance to R&D (Established/ Upgraded)		
	23 Ph.D. Awarded		
	24 Experts Trained at National Level		
	25 Experts Trained at International Level		
	26 Cost Cutting/ Savings achieved		
	27 Import Substitution		
	28 Commercial & Marketing Potential		
	29 New e-applications		
	30 Any other indicator(s) –Pl. specify ----------		

S.No (1)	Impact Factors (Research Output leading to:--------) Tick (✓) the applicable impact factor(s) for the project under review (2)	Weightage/ Priority (3)	Score given by Funding Agency Expert (4)
	II. QUALITATIVE S&T INDICATORS		
	31 Socio-Economic & Societal Benefits		
	32 Linkages with National Priorities		
	33 Experience Gained useful for further R&D		
	34 Any other indicator(s) –Pl. specify ----------		

(a) Total Score .....

(b) Score Obtained by P I .....

(c) % Score obtained *{b/c}* .....

In case review is undertaken by more than one expert, then the *average* of % score given by each expert can be taken as the final score both for efforts put in by P I or S&T output and judged as follows: --

SCORE (%)	RATING
0-40	Unsatisfactory
41-50	Fair
51-70	Good
71-80	Very Good
81-100	Excellent

If at the time of any review, the score is <41%, the project needs critical examination by the funding agency for continuation of the support. The %age range for "each rating" can be modified by the funding agency, if desired.

LIST OF PARTICIPANTS WHO ATTENDED BSS ON 25th JANUARY, 2005 AT DST, NEW DELHI

Sl. No.	Name	Designation	Organisation
1	Prof V S Ramamurthy	Secretary	Department of Science & Technology, Min. of S&T, GOI
2	Dr Laxman Prasad*	Adviser & Head	NSTMIS Divison, Deptt. of Science & Technology
3	Dr A P Kulshreshtha*	Director	Centre for S&T of Non-Aligned and
4	Dr U C Bahri*	Head Analytical Department	Dabur Research Foundation
5	Prof A K Trivedi	Dean, CE	Delhi College of Engineering
6	Dr N L Sachdeva	Former Principal	Delhi College of Engineering
7	Dr B S Das	Advisor	Department of Biotechnology, Min. of Science & Technology
8	Mr Deepak Bhatnagar	Adviser (TIFAC)	Department of Science & Technology
9	Prof. S.K. Tandon	Professor	Department of Geology
10	Ms J Khurana	Director	Deptt. of I.T., Ministry of Communication & I.T., GOI
11	Dr. M. Prithvi Raj	Director	Earth Science Division, Deptt. of Science & Technology
12	Mr P G S Mony*	Director	Indo-French Centre for the Promotion of Advanced Research (IFCPAR),
13	Mr S K Mukherjee	Consultant, Industry Relations	International Centre for Genetic - Engineering & Biotechnology (ICGEB)
14	Dr K J Mukherjee	Centre for Biotechnology	Jawahar Lal Nehru University
15	Dr S K Gupta*	Former Advisor	Links Consulting Associates
16	Dr Naseem Ahmad	Addl. Director	Ministry of Environment & Forests, GOI
17	Dr A R Shukla	Director	Ministry of Non Conventional Energy Sources, GoI
18	Mr Pankaj Sharma	Dy. Controller of Accounts	Ministry of Science & Technology
19	Dr Praveer Asthana	Scientist -F, SERC Division	Ministry of Science & Technology
20	Dr Ranjit Singh	Director	Netaji Subhash Institute of Technology
21	Dr N K Sharma*	Former CMD	National Research & Development Corporation
22	Mr Rakesh Chetal*	Director	NSTMIS Divison, Deptt. of Science & Technology
23	Dr Parveen Arora*	Director	NSTMIS Divison, Deptt. of Science & Technology
24	Dr A N Rai*	PSO	NSTMIS Divison, Deptt. of Science & Technology
25	Dr G J Samathanam	Director (D&P)	NSTMIS Divison, Deptt. of Science & Technology
26	Ms Namita Gupta	PSO	NSTMIS Divison, Deptt. of Science & Technology
27	Mr. C. Rajadurai	Scientist -B	NSTMIS Divison, Deptt. of Science & Technology
28	Dr P.K. Gupta	Secretary General	National Foundation of Indian Engineers
29	Mr J.K. Aggarwala	Sr. Advisor	National Foundation of Indian Engineers
30	Mr. Sunil Sharma	Accounts Manager	National Foundation of Indian Engineers
31	Mr. Gopal Singh	Project Coordinator	National Foundation of Indian Engineers

* LPAC Member