

# **Council of Scientific & Industrial Research New Millennium Indian Technology Leadership Initiative (NMITLI)**

## **Preamble**

The New Millennium Indian Technology Leadership Initiative (NMITLI) is the largest public-private-partnership effort within the R&D domain in the country. It looks beyond today's technology and thus seeks to build, capture and retain for India a leadership position by synergising the best competencies of publicly funded R&D institutions, academia and private industry. The Government finances and plays a catalytic role. It is based on the premise of consciously and deliberately identifying, selecting and supporting potential winners. NMITLI has carved out a unique niche in the innovation space and enjoys an excellent reputation. NMITLI has so far evolved 57 largely networked projects in diverse areas viz. Agriculture & Plant Biotechnology, General Biotechnology, Bioinformatics, Drugs & Pharmaceuticals, Chemicals, Materials, Information and Communication Technology and Energy. These projects involve 80 industry partners & 270 R&D groups from different institutions. Approximately 1700 researchers are engaged in these projects. These 57 projects cumulatively have had an outlay of approximately Rs. 500 crore.

## **Objective**

NMITLI seeks to catalyze innovation centered scientific and technological developments as a vehicle to attain for Indian industry a global leadership position, in selected niche areas in a true 'Team India' spirit, by synergising the best competencies of publicly funded R&D institutions, academia and private industry.

## **Distinctive Features of the Programme**

The strategy adopted for NMITLI is to obtain an inverse risk-investment profile i.e. low investment - high-risk technology areas (with global leadership potential) with investments increasing as developments take place and the projects move up on the innovation curve with reduction in risks. Therefore, the programme has been positioned differently with certain distinctive features. These features have been evolved based on large scale national consultation and due diligence. Some of these are briefly highlighted below:

1. **A proactive programme** - Instead of funding a project based on

requests/applications, the programme identifies the areas for development based on national consultation and invites best partners from institutions, academia and private sector to play a role in the development;

2. **Types of Projects:** Both 'push' and 'pull' type of projects are evolved under NMITLI, which are appropriately named as (i) Nationally Evolved Projects (NEP) and (ii) Industry Originated Projects (IOP);

3. **PPP mode** - Almost all projects are built in a public-private partnership mode;

4. **Emphasis on identifying and building the projects** - Greater emphasis is laid on identifying the niche areas and building the projects with the help of best brains in the country. A specially constituted project wise expert group builds the project by interacting with a large number of researchers and stake holders with focus on technology development;

5. **S&T inputs** - High quality technical inputs are provided at both project development as well as at implementation stage;

6. **Monitoring & review system** - A two-tier tight monitoring system is introduced to ensure realization of the objectives and deliverables. At the first level is an internal Steering Committee comprising PIs (meets once in 3 months) and at the second level an external independent Monitoring Committee comprising recognized peers (meets at least once in six months). The later committee is entrusted with the responsibilities to recommend: (i) foreclosure or modification of the project or sub component; (ii) inclusion of additional institutional / industrial partners wherever necessary; and (iii) revising the funding support to any / or all implementing partners;

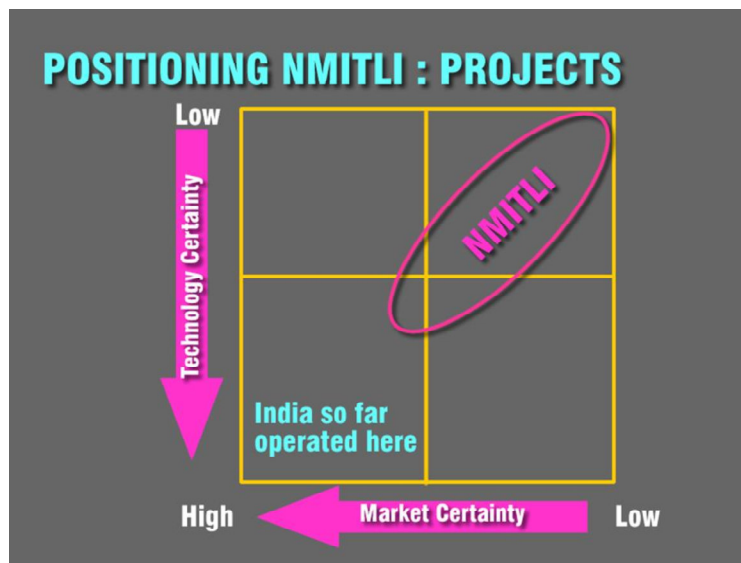
7. **IP mapping** - The programme provides for continuous mapping of the IP scenario for each project and in licensing of IP with a view to building of a portfolio and achieving the leadership position;

8. **Foreclosure of projects** - the programme also provides for foreclosure of the non-performing or non-achievable project components; and

9. **Financial support** – An innovative feature of the programme is that it provides financial support to all players in the project. The support is in the form of grant-in-aid to the institutional partners in public domain and as a soft loan (@3% interest) to the industrial

partners.

10. **Positioning of the project-** The positioning of the projects is shown in Figure 1. The constant endeavor of the programme was to position the projects in the upper right most quadrant where the technology and markets are less known. Consequently, the risks and rewards associated with the projects are very high. Thus the strategy adopted for NMITLI was to obtain an inverse risk-investment profile, i.e. low investment – high risk technology areas (with global leadership potential) with investments increasing as developments take place and the projects move up on the innovation curve with reduction in risks.



**Fig. 1: Positioning of NMITLI Projects**

### **Management structure**

A dynamic and vibrant management system has been put in place to manage the Programme and projects. At the hub of the management structure is the Technology Networking and Business Development Division (TNBD), which manages the entire programme. It interacts with PIs and the Monitoring Committee on one hand and the High Powered Committee, DG, CSIR and Governing Body of CSIR on the other.

### **Project Types**

There are two broad categories of projects supported under NMITLI viz. (i) nationally evolved projects; and (ii) industry originated projects.

## **Nationally Evolved Projects (NEP)**

The Nationally Evolved Projects follow a step-wise procedure. It begins with wide-ranging consultation to elicit ideas. The short listing of the ideas is done by a "Screening Committee" followed by selection of broad areas by the domain Expert Groups. The projectization of the areas is then carried out by "domain champions". The best players in the field are then approached and invited to participate in the project. Once the project is finalized it is reviewed and considered by the High Powered Committee (HPC). The HPC recommended projects are then considered for support by CSIR Governing Body.

## **Industry Originated Projects (IOP)**

For this category of projects the process begins by soliciting of proposals through press advertisement and personal letters from DG, CSIR. The screening of the conceptual proposals thus received is carried out by a "committee" followed by assessment and rating of short listed ideas by the domain experts. The development of top rated two ideas in each domain is undertaken with the assistance of NMITLI designated experts. The project thus finalized are considered and reviewed by the HPC and the recommendations of HPC are considered by CSIR Governing Body in order to decide on the projects to be supported in a given period. Last few years experience indicates that less than 5% of the projects get qualified for development under NMITLI.

The companies registered in India and having more than 50% of shareholding by Indians/non-resident Indians are eligible for support under this category. However, at any given time not more than two projects of any individual company are supported.

## **Financial Support**

The financial support to all the projects under NMITLI Scheme is in the form of grant-in-aid to the institutional partners in public domain and as soft loan (@ 3% interest) to the industrial partners.

## **Projects supported under the Programme**

The programme has developed so far 57 projects, which cover diverse areas. The projects supported under the programme are listed below and the spread of the projects are shown graphically.

1. Two orders of magnitude improved liquid crystals for flat panel display devices;
2. Defunctionalization of carbohydrates as a feed stock to manufacture well identified industrial chemicals;
3. New targets and markers for cancer using genomics and proteomics;
4. Stimuli sensitive polymeric nano-particle based advanced drug delivery systems for cancer, diabetes and anti-bacterials;
5. 5 & 25 KW decentralized power packs;
6. Latent *M. Tuberculosis*: new targets, drug delivery system, bio-enhancers and therapeutics;
7. Using functional genomics in tea, mentha, ashwagandha, plants for gene expression modulation;
8. Meso-scale modeling for monsoon predictions;
9. Nano-material catalysts and associated process technology for alkylation/ acylation/nitration of well identified industrial chemicals, pre-reforming of hydro-carbons and sulphur removal (<50 ppm) from petroleum fuels;
10. Versatile, portable PC based software for bioinformatics; and Development of Linux cluster version of Bio-suite;
11. Biodegradable plastics from agricultural wastes: cellulose esters based on bagasse;
12. Herbal based preparations for degenerative disorders: diabetes mellitus type II (NIDDM); osteoarthritis and rheumatoid arthritis; common hepatic disorders with emphasis on hepatocellular protection and herboprint;
13. Biotechnology for replacing chemical process in leather sector (phase I & II);
14. Enhanced productivity in cement manufacture through Improved granular processing and resource conservation;

15. Development of an oral herbal formulation for treatment of psoriasis a clinical and scientific challenge; and Clinical studies of an oral herbal formulation for treatment of psoriasis;
16. Development of novel biotech therapeutic molecule – Lysostaphin;
17. Microbiological conversion of erythromycin to clarithromycin and other novel biologically active molecules;
18. Environmentally secure rare earth based colorants for surface coatings;
19. Functionalization of alkanes;
20. Novel molecular diagnostics for eye diseases and low vision enhancement devices;
21. Nano-material coatings and advanced composites for tribological applications in automotive industry;
22. Value added polymeric materials from renewable resources: lactic acid and lactic acid based polymers;
23. Recombinant approach to produce  $\alpha$ -linolenic acid and docosahexanoic acid (DHA) in sunflower and yeast;
24. A cost effective Simple Office Computing (SofComp) platform to replace PC;
25. A PC based high-end 3D visualization platform for computational biology – '*Darshee*';
26. Improved genome annotation through a combination of machine learning and experimental methods: *Plasmodium falciparum* as a case study;
27. Oral delivery of insulin;
28. Pharmacological and genomic investigations on *Withania somnifera* - an Indian medicinal plant;
29. Development of novel fungicides;

30. Biotechnological approaches for improvement of plant species with special reference to pulp and paper;
31. Development of fuel cells based on hydrogen;
32. Development of a 500 kW low cost horizontal-axis wind turbine;
33. Novel expression system;
34. Development of selected medical implants;
35. Genetic Improvement of *Jatropha curcas* for adaptability and oil yield;
36. Development of globally competitive 'Triple-Play' broadband technology;
37. Novel formulation for treatment of pulmonary tuberculosis – clinical studies;
38. Market seeding of SofComp and Mobilis to develop wide-ranging applications as well as increase awareness;
39. Process for tamiflu – a drug to combat avian flu;
40. Development of production system for tea polyphenols and their condensed products;
41. Development of an integrated micro PCR system with in-situ identification;
42. A prospective study to correlate gene signatures with clinical outcome of astrocytomas and identification of potential therapeutic target(s);
43. Development of Next Generation Plasma Display Technology and a 50 inch High Definition (HD) TV prototype;
44. Wireless Sensor Network Chipset based on Ultra –Wideband Technology;
45. Development of high throughput marker assisted selection systems for improvement of drought tolerance and fibre quality related traits in cotton;

46. Novel method for development of B-type Natriuretic peptide (BNP) for diagnosis and treatment of congestive heart failure;
47. Conversion of cellulose and hemi-cellulose into sugars and ethanol;
48. Conversion of Bioglycerol into value added chemicals;
49. Novel approaches for production of hybrid seeds with characteristics of improved insect resistance and higher yield in Rice and Cotton; and
50. Mesoscale modeling for Monsoon predictions-Phase II
51. Design and development of cushion bonded organic ceramic clutch discs
52. Distributed video surveillance system
53. Intelligent monitoring and control of the interconnected electric power grid using phasor measurement units (PMUS)
54. Novel therapy for management of sepsis
55. A syndromic approach to diagnosis of infections: development of DNA macro-chips for simultaneous detection of pathogens causing AES (Acute Encephalitic Syndrome) and septicaemia
56. Development of rice resistant to the fungal blast disease
57. Development and characterization of an indigenous vaccine for Johne's disease