Festival of Innovation

2015

Building bridges for inclusive innovations

National Innovation Foundation-India

President Secretariat
Rashtrapati Bhavan
New Delhi

Foreword

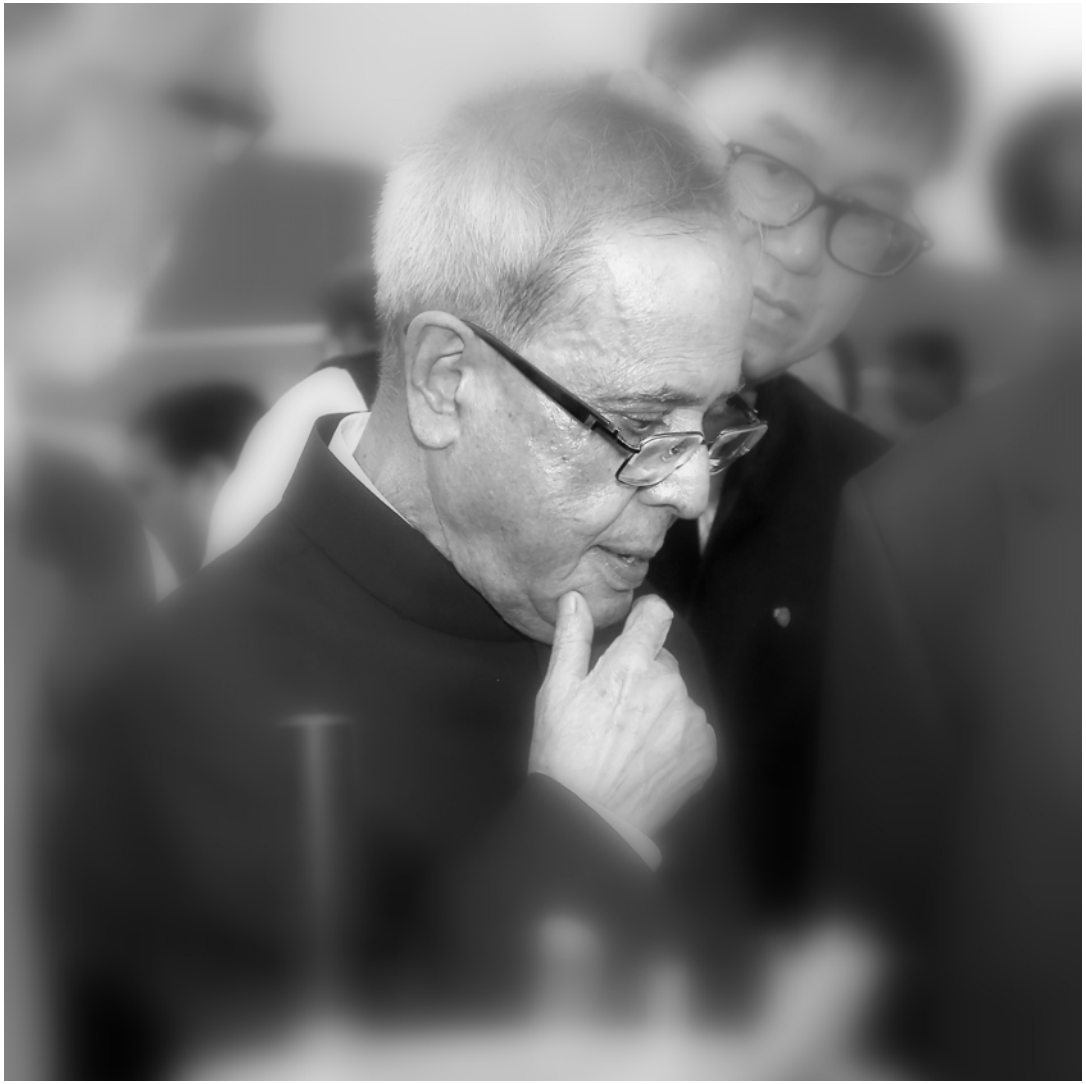
Innovation is the critical link in the value chain of economic growth and development. The President of India has been constantly emphasizing about innovation and its impact on society. He said and I quote: "The Indian innovation strategy must focus on generating ideas that promote inclusive growth and benefit those at the bottom of the socio-economic pyramid." There are many innovations taking place in different parts of our country. If such innovations are linked properly with the key players in the innovation eco-system like educational and research institutions, and the industry, it will increase the survival rate of innovative ideas which can transform into start-ups.

To promote an innovation culture in the country, the President of India has been taking numerous initiatives. He gave a call to all the central institutes of higher learning for starting innovation clubs that would serve as a platform for linking grassroots innovators with the academic world and for extending mentoring support for 'mind-to-market' conversion of innovative ideas. This initiative has received wide support from the institutions. An In-Residence programme was started two years ago, under which, innovation scholars selected from across the country spend a few weeks at the Rashtrapati Bhavan.

To take the engagement of this Presidency with innovation further, a week-long 'Festival of Innovations' was organized at the Rashtrapati Bhavan for the first time in March 2015 in collaboration with the National Innovation Foundation. It demonstrated new technologies and products made by the grassroots innovators. Global Roundtables on pertinent topics like Inclusive Innovation and Financing of Innovation were conducted during the Festival, which saw the participation of distinguished thinkers, policy-makers, academicians, entrepreneurs and financiers. The recommendations that surfaced from these interactions have strengthened the linkages between the key players of the innovation eco-system. The President also gave away the Biennial Grassroots Innovations and Outstanding Traditional Knowledge Awards on the first day of the Festival. The second Festival of Innovations will commence on Mar 12, 2016 and should live up to the expectations of an occasion of gravity and purpose.

This book documents the various events that were held in the Festival of Innovations 2015. It also contains the takeaways from the many interactive sessions held during the week. It will act as a valuable guide to the practitioners of innovation activity and to those who are keen to understand the emerging innovation landscape in our country.

Omita Paul
Secretary to the President of India
March 7, 2016



First Festival of Innovations
Rashtrapati Bhavan, Delhi
March 7-13, 2015

The celebration of grassroots innovation at Rashtrapati Bhavan empowers creative communities in a manner that was never tried before in the history of the country. The first Festival of Innovation (FOIN) March 7-13, 2015, at Rashtrapati Bhavan, New Delhi, focused the attention of the nation towards the untapped potential of knowledge-rich, economically poor people. India is perhaps the only country where the head of the state hosts such a festival at his house. Not only that, under a new initiative launched recently, ten innovation scholars in-residence were hosted at the President's house for two weeks. The FOIN was organised by the President's Secretariat, assisted by the National Innovation Foundation (NIF) and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), part of The Honey Bee Network.

The Honey Bee Network, a social movement to uncover the hidden innovative talent, started 25 years ago and has made a small contribution towards recognition, respect and reward for the unsung heroes of our society. This will help in making India a creative, compassionate and collaborative society.

The President of India, Hon'ble Shri Pranab Mukherjee, inaugurated the week-long FOIN, aimed at creating an inclusive ecosystem to boost grassroots innovations in India.
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Events as part of Festival of Innovations

- March 7: Biennial Grassroots Innovation Awards of NIF, at the hands of the President of India, Hon'bl Shri Pranab Mukherjee
- March 7 (afternoon): Global Roundtable on Inclusive Innovations
- March 8: Gandhian Young Technological Innovation (GYTI) Award to technology & engineering students and global roundtable continued
- March 9: Children's creativity workshop
- March 10: Meeting of National Innovation Clubs
- March 11: Biomedical devices and biotech innovations for grassroots application
- March 12: Exhibition of innovation in sanitation, bio-digestion and waste management
- March 13: Financing of Innovation, a national roundtable of chairmen and senior officials from Banks, NABARD, Indian Banks Association, Ministry of Finance etc.
- Closure of FOIN with the Presidential address

Nobel Laureate Professor Muhammad Yunus, founder of Bangladesh's Grameen Bank and other distinguished thinkers, policymakers, academicians and entrepreneurs, national and international, attended the conference.

Day 1: Session 1

March 7, 2015

8th National Grassroots Innovations & Outstanding Traditional Knowledge Award Function

Abdul I Nadakattan receiving Lifetime Achievement Award

The President of India, Shri Pranab Mukherjee, gave away the awards in presence of Dr Harsh Vardhan (Minister of Science & Technology and Earth Sciences), Shri Y S Chowdary (Minister of State, Ministry of Science & Technology and Earth Sciences), Dr Ashutosh Sharma (Secretary, Department of Science and Technology) and Smt Omita Paul (Secretary to the President) along with Dr R A Mashelkar (Chairperson, NIF),Prof Anil K Gupta (founder, Honey Bee Network), and Dr Vipin Kumar, Director, NIF.

The awards were given in six categories — one lifetime achievement award, 17 national awards, one posthumous award, four state awards, 16 consolation awards and three student awards (see details of awards at http://nif.org.in/dwn_files/award-books-biennial/NIF_8th_Award_book_2015.pdf)

Dr Mashelkar thanked the President for fuelling innovations across the length and breadth of this nation. He added that NIF has about 200,000 ideas, practices and grassroots innovations. It has filed

Much as the blooming of the spring, the innovations by local communities, students, farmers and others could bring smiles on the faces of millions of our people

-Shri Pranab Mukherjee

696 patents, 27 patent cooperation treaty (PCT) applications, 27 plant variety protection cases and several designs & trademark applications.

Along with the grassroots innovators, awards were also given to journalists for their support to the grassroots innovations movement, fabricators for helping convert ideas into prototypes/products, an international law firm for facilitating intellectual property rights (IPR) protection for these innovators in the USA, and science & technology councils of Sikkim and Uttar Pradesh for supporting the grassroots innovation movement, among others.

NIF received about 35,000 entries during 2012-14 from 18 states, of which 41 were awarded. All of these were subjected to technical and patent prior art search to ascertain the novelty/distinction and/or cost-effectiveness. The Research Advisory Committee, comprising the heads of top research & development (R&D) institutions, experts from engineering, agricultural and veterinary colleges, vice chancellors of various universities from different parts of India, screened and shortlisted the potential awardees.
Shri Y S Chowdary, Minister of State, Ministry of Science & Technology and Earth Sciences, said for innovations to become successful there is a need for collaboration between the academia, industry, government, investors and lenders. He added that the recent Budget allocated a special fund for innovations in rural areas.

Dr Harsh Vardhan, Minister of Science & Technology and Earth Sciences, complimented the President for opening the premises of Rashtrapati Bhavan for hosting the exhibition of grassroots innovations. He added, "NIF, with the help of volunteers of the Honey Bee Network, has identified thousands of innovators and traditional knowledge-holders from all over the country. The regions from where we have not had many awardees should be covered more rigorously in the coming years. Inclusive development cannot take place if excluded region, community sectors and other segments do not get recognised for meeting the unmet needs. I hope NIF will spare no efforts to cover all such hitherto excluded segments of our society. It is not enough to identify and award the innovators. I


Laxmibai Zulapi's Traditional brinjal variety


Hukum Singh Lodha's Sitara-Sringar Improved Mustard variety

am extremely happy that NIF has pioneered the concept of Micro Venture Innovation Finance (MVIF) to support individual innovators in different parts of the country, without any guarantee or collateral security. I am very keen that NIF throws up many more challenges in the field of sanitation, drinking water quality, and other socially-relevant areas wherever society has witnessed too much of inertia for far too long. The scientists should also come forward to join hands with the grassroots innovators and students who take their ideas forward."

List of awardees and their innovations

Lifetime achievement
Abdul I Nadakattan, Karnataka

The technologies developed by him – be it growing tamarind with alkaline water or automatic sugarcane sowing – have helped many farmers boost farm production and diversify into related activities. He devised several other innovations such as the tamarind-seed separator, a plough blade that does not strain the bullock, a lifting cart that unloads without unfastening the bullock and a water-boiling heater that saves time, among others.

Posthumous

1. Late C V Pathak, Maharashtra
Chandrakant V Pathak was a serial innovator, social entrepreneur and a dedicated social worker. Besides innovating products, he has helped upgrade technical skills of thousands of school dropouts, contributed to many social causes and promoted science, technology and innovation amid common people. Among his innovations is a bullock life-saving system wherein sturdy accessories were designed for the carts to update their safety. He also developed a flat-belt brake system, fitted to the rubber tyre of the cart, so as to help in regulating the speed and stopping the cart without causing injury to bullock. He also made the Vanarai bicycle pump which can be used for lifting water for various purposes like development of dry land, as a fire extinguisher, for construction work, used in gymnasiums and for irrigation. His other innovations

include bicycle-mounted spray pump, stump-drip-irrigation system, vegetable grinder, sprinkler and flourmill.

National First

2. Energy–Solar multi-muga reeling-cum-spinning

M Manihar Sharma, from Manipur, is a serial innovator, who has come up with a number of innovations like a handy incense stick-making machine, a dryer, automatic pump-operation system for overhead tanks, etc. The solar multi-muga reeling-cum-spinning machine simplifies the conventionally tedious task of reeling silk.

3. Plant variety – Sitara Sringar – improved mustard variety

Hukam Singh Lodha from Bharatpur, Rajasthan, has developed a high-yielding improved variety of mustard through natural hybridisation

National Second

4. Agricultural engineering – Compost-maker for mushroom cultivation

Jeetender Mallik, from Haryana, has developed a machine that can properly turn and mix the compost, remove lumps and add moisture to it. This results in good-quality compost in lesser time.

5. Utility– Cotton wick-making machine

Vijaybhai Solanki and Dipakbhai Vyas, from Gujarat, automated the process of making round cotton wicks, conventionally made by women manually.

Manihar Sharma exhibiting his innovation to Shri Pranab Mukherjee

6. Engineering – Brick/ block-making machine
Gujarat's Arjunbhai M Paghdar's block-making machine has mechanised the process of manual block/ brick-making using fly ash and lime, a laborious and time-consuming process otherwise.

7. Plant variety – Surjeet Basmati 1, high-yielding salt-tolerant paddy variety

Haryana's Surjeet Singh, a farmer, has developed a salt-tolerant, high-yielding paddy variety, which has long grain size.

8. Plant variety – Zion Mundi, improved black pepper variety

Kerala's P G George's Zion Mundi black pepper is high-yielding, resistant to rot and exhibits high-yielding characters even under shade cultivation.

9. Veterinary – Medication for respiratory distress in poultry

Shatadal Ghorai and Narugopal Ghorai, West Bengal, administer herbal formulation to treat medical conditions in birds.

National Third

10. Agricultural engineering – Sugarcane bud-planter
Roshan Lal Vishwakarma, Madhya Pradesh, made a machine which removes buds from sugarcane sticks. These buds are used for sugarcane plantation in horticulture.

11. Engineering – Brick-making machine

K Chandrashekhar, Andhra Pradesh, has come up with a low-cost manually-operated brick-making machine to reduce drudgery in the process. He has also made a manually-operated neem-oil extractor.

12. Energy – Modified boiler-based mawa-maker

Rajasthan's Subhash Ola has made modifications in the boiler of conventional mawa-making machine, which resulted in making the machine significantly more energy-efficient.

13. Plant variety –Punnathanam Jathy, an improved nutmeg variety

Kerala's Varkey Thomman developed in 1994 an improved nutmeg variety, Punnathanam Jathy, an extra-large one, through selection from a local variety and further multiplied by budding.

14. Human – Herbal medication for diabetes

Bhikhiben Prahladbhai Bajaniya, Gujarat, has developed herbal medicine for diabetes. The medicine has benefited

K Chandrashekhar with his Brick Making Machine

many patients. Scientific validation of this and several other herbal medicines is under process.

15. Human – Herbal medication for diabetes

Thakor Makwana Panchabhai Virabhai, Gujarat, has developed herbal formulation for diabetes. He has treated hundreds of diabetics with this formulation, free of cost.

16. Veterinary – Herbal medication for mastitis

Gujarat's Becharbhai Samantbhai Devgania has been a herbal practitioner and has developed a useful cure for mastitis, a common problem in cattle.

17. Veterinary – Herbal medication for bloat

Bihar's Kailash Mistry and Sukhdev Rai administer herbal medicines for treating bloat in animals. Bloat is building up of gas in the rumen of cattle.

State awards

18. Assam – Interlocking brick-making machine – Umesh Chandra Sharma
19. Jammu & Kashmir – Kashmiri gas samovar – Shazia Jaan
20. Karnataka – Borewell scanner – Girish Badragond
21. Kerala – Wireless electricity-sensing device –Rishikesh C S

Consolation awards

22. Nutmeg de-sheller –Sachidanandan V R, Kerala
23. Biba fruit-shelling machine – Sachin Subhash Jagtap, Maharashtra
24. Power-operated passive weeder –K Mahipalchary, Telangana
25. Tapioca-cutting machine – J R Dhanraj and K Mani, Tamil Nadu
26. Multi-purpose kitchen tool – Jasveer Kaur, Rajasthan
27. Community rice-cooker – H Paokholien Lhungdim, Manipur
28. Modified hack saw – Kapil Dev Thakur, Bihar
29. Pappalu – Pest-tolerant cardamom variety – K V Paulose, Kerala
30. Kochukudy – Improved nutmeg variety – Jose Mathew, Kerala
31. Arjun – Improved cardamom variety – Menuwin Thomas, Kerala
32. HZKB – 1, traditional brinjal variety – Laxmibai Zulapi, Karnataka (community)
33. Medication for anestrus – Nathabhai Waghajibhai Patel, Gujarat
34. Medication for lactogogue – Prahallad Jala, Orissa
35. Medication for bloat – Naresh Ishwar Singh, Uttar Pradesh

Jitendra Mallik
Compost Maker for Mushroom Cultivation

Shalini Kumari

36. Herbal treatment for high blood pressure – Badri Mahato, Bihar
37. Herbal treatment for high blood pressure – Abdul Rehman Sada, Jammu & Kashmir

Student awards

38. Walker with adjustable legs – Shalini Kumari, Bihar

The walker has spring-loaded self-locking front legs to aid people who require support in walking. The legs of the walker are self-adjustable in accordance with the height difference between steps of a stair. While climbing up, the front legs of walker become shorter and while descending, these become longer.. It also has a foldable seat that can be pulled out for resting and is fitted with a horn and a light.

39. Low-cost braille printer – Santokh Singh and Khushwant Rai, Punjab

The students have modified a dot-matrix printer at a low cost to work as a Braille printer. The duo was inspired when they once visited a blind school for a school project. They saw that much of the printing work was being done manually, in a time-consuming manner.

40. Helmet-based ignition system for two-wheelers – S M Arthi, Laila Banu, S Vinotha

The three friends independently thought of using a helmet as an ignition in two-wheelers. Essentially, this means if someone is not wearing his/her helmet, the two-wheeler does not start.
The President Shri Pranab Mukherjee congratulated the winners for their creative contribution towards developing extremely affordable and useful solutions to the local problems for the benefit of society at large. He also appreciated the contribution of Dr R A Mashelkar and Prof Anil K Gupta in guiding an innovation movement in the country. He further observed:

Shazia Jan showing her innovation to Mr. Venkaiah Naidu

"I am told that the innovation exhibition will showcase novel solutions to the problems in multiple domains such as engineering, agriculture, health and other socio-economic sectors. These innovations are aimed at improving productivity and efficiency, and enhancing affordability and environmental quality. They provide a veritable impetus to the Make in India mission in our country. Apart from developing appropriate linkages with investors, entrepreneurs and financial institutions, the Union and state governments should also consider taking up these innovations for wider diffusion through their administrative channels, particularly in economically backward regions, and tribal & remote areas. In this context, it is only appropriate that agricultural universities, public-sector R&D laboratories, Indian Institutes of Technology (IITs) and National Institutes of Technology (NITs) are supporting NIF in validating and value-adding grassroots technologies."

Highlighting the in-residence programme, the President said, "To promote and nurture the creative potential of our people, the Rashtrapati Bhavan has been opened for innovation scholars, writers, artists, scholars from NITs and inspired teachers. Today, the second batch of innovation scholars, writers and artists has joined us for the programme. I welcome all of them and hope that FOIN will create synergy among these diverse creative people."

Dr Ashutosh Sharma, Secretary, Department of Science and Technology, offered a vote of thanks. The ceremony concluded with the National Anthem, followed by the President's visit to the exhibition.

The President then interacted with a new batch of innovation scholars and writers in-residence.

Subhash Ola's
Modified Bolier Based Mawa Making Machine

Priyanka Mathikashara, innovator of Super Stocker 3C Ultra Model Dustbinwith Smt. Omita Paul and Dr. Vipin Kumar

The Innovation Scholars In-Residence programme

An in-residence programme for innovation scholars and writers was organised from March 7 to 21, 2015 at Rashtrapati Bhavan.

The Innovation Scholars In-Residence programme was launched with a view to promote the spirit of innovation and give further impetus to the grassroots innovation activities. It was launched by the Honourable President of India on 11th December, 2013 with the objectives of providing an environment to grassroots innovators, linkages with technical institutions so that the innovators could strengthen their capacity to innovate. Mentoring and support were also provided so that the innovations can be used for the progress and welfare of the society.

A committee was constituted to implement the programme comprising following members:

(i) Smt Omita Paul, Secretary to the President (Chairperson)

(ii) Prof. Anil K. Gupta, Professor, IIM-A and Executive Vice Chair, National Innovation Foundation

(iii) Dr. A.K. Wali, Coordinator, FIIT, IIT-Delhi

(iv) Dr. H.K. Mittal, Secretary, Technology Development Board

(v) Dr. Shashi Bala, Director, DIPAS, DRDO, New Delhi

(vi) Dr. Girish Sahani, Director, CSIR-IMTECH, Chandigarh

(vii) Officer on Special Duty to the President (Member-Secretary)

National Innovation Foundation had examined all the applications that were received and these were shortlisted after preliminary scrutiny. To further scrutinise these short-listed entries in terms of degree of novelty, potential social impact, cost effectiveness, market acceptability, competitive advantage over existing technologies and user friendliness, a meeting of the committee was held on 2nd January, 2015 at Rashtrapati Bhavan. The committee then reviewed the shortlisted candidates.

After due deliberations by the committee members and also after visiting the exhibition at IIM-Ahmedabad campus, 10 entries were selected for the second batch.

Day 1: Session 2

March 7-8, 2015

Growth by itself is not sufficient to ensure that the benefits reach all the sections of society. But without growth, there will not be enough resources available to invest in inclusive innovations for dissemination through social or commercial markets. Many countries have overcome the constraints coming in the way of achieving a sustainable and balanced economic development. They have alleviated poverty and expanded opportunities for the disadvantaged citizens. India is evolving a new blend of entitlement and entrepreneurial choices in public policy. Frugality in consumption and lifestyles, sustainability in production, distribution within circular economy framework and harnessing the entrepreneurial aspirations of the youth have become a few major pivots for future development.

The global roundtable was organised to learn from the experience of those countries which have achieved outstanding success in mobilising innovative solutions to various social challenges through educational, technological, institutional and cultural creativity and innovations. Indian experience, in addressing similar challenges, was also shared. Perhaps, there is no universal solution to these challenges. But, learning from the strategies used by different countries, a universal, open, reciprocal and responsive innovation platform can definitely be developed.

The Global Roundtable on Inclusive Innovation tried to create such a platform under the guidance of Hon'ble President of India, Shri Pranab Mukherjee during March 7-8,

Innovation must be at the core of strategies, and be inclusive from the perspectives of technology and policies

2015. Distinguished thinkers, policy-makers, academicians, entrepreneurs and noble laureates were invited to the Roundtable. Key lessons were shared on March 7, in the presence of the President.

Innovations become inclusive by overcoming asymmetries and imbalances at spatial, sectoral, temporal, skill and social levels. Innovations that augment the underutilised resources, skills, cultural institutions, educational platforms and bypassed opportunities in disadvantaged regions help in bringing out a more balanced development. Every niche in the long tail of innovation needs to be addressed. Every genuine social need, left unmet, might sow the seeds of discord, cause alienation and, in some cases, might even disrupt the social order and peace. Extremely affordable, frugal, circular and thus sustainable innovations for inclusive development are an imperative for future peace and order in the world.

India, being a youthful society, has to rapidly unfold the entrepreneurial potential of our society. Some of the questions pursued at the Global Roundtable were:

a) What are the key lessons that one can learn from the experience of countries which have done so well in achieving development through innovative policies and institutions in S&T and all other sectors?

b) Are there mistakes that some of the countries have committed which can be avoided in the pursuit of rapid and balanced social-economic development?

c) Are there strategies which have not yet succeeded in overcoming the challenges but are trying to fill the gap or address the challenges and thus need to be looked at critically?

d) What lessons can be learnt from emerging economies and less-developed countries which may have achieved success in fulfilling social aspirations in certain priority sectors if not the entire spectrum of economic policies?

e) What are the creative fiscal and non-fiscal routes developed to raise resources for supporting social and economic enterprises?

f) Are there innovative models of collaboration between the public, private and social enterprises, to serve a particular target group or address a particular persistent problem?

It was noted that inclusive innovations are relevant across countries no matter what their level of economic development is.

The global roundtable discussions, held on March 7-8, focused on four perspectives:

Technological innovations
Social innovations
Institutional innovations
Ecosystem of inclusive innovations

The four sessions were chaired by Dr R A Mashelkar, FRS, Chairperson of NIF-India; Prof Muhammad Yunus, founder of Grameen Bank; Mr Jack Sim, Singapore and Prof Anil K Gupta, founder of Honey Bee Network.

The participants were from Bangladesh, Japan, Republic of Korea, Singapore, Denmark, Finland, Germany, Canada, USA, Uganda, Zimbabwe and India. They represented at the highest level, a variety of organisations such as universities, non-governmental organisations (NGOs), national and state

government departments, judiciary, research institutes and UNICEF. (see the list of participants in the appendix).

Inclusive innovation

Inclusive innovation is an alternative model of innovation that addresses the needs of those excluded from the fruits of mainstream innovation. The marginalised groups include women, youth, the disabled, ethnic minorities, informal-sector entrepreneurs, and those with the low level of incomes, all part of the very large informal sector of developing economies.

Inclusive innovations are not only R&D-based innovations, but also innovations based on community practices and social & business innovations. The concept is relevant to all economies, but inclusive innovation for development is imperative globally. The economic and social divide between the formal and informal sectors of developing economies has remained quiet large in many developing countries despite various innovations in the past. The discussants at the Roundtable addressed the necessity for future model of innovations to be based on 'affordable excellence'.

The 2011 strategy paper, Towards a More Inclusive and Innovative India, was accompanied by a declaration from the President of India that the next decade of innovation would have a focus on inclusive growth. The platform identified the need for a redefinition of innovation to mean new and unique applications of old

technologies, using social design to develop new products and services, developing new processes and structures to improve performance in diverse areas, promoting organisational creativity and reinforcing public-sector initiatives to enhance delivery of services to the poorest.

The vast source of untapped ideas among the marginalised communities, the innovations at and from grassroots, were not given

adequate attention in the past.

Role of technology in inclusive innovations

Breakthrough technologies create excitement, but they must have three characteristics: firstly, to be inclusive in nature; secondly, to be affordable, a factor in accelerating inclusion – if only 10 per cent can afford the technology, it has no social value; and thirdly, to offer affordable excellence through which lower-income people benefit from excellent quality features.

A source of affordable technologies is 'shelf technologies'. There is a tremendous pool of them in universities and corporate R&D centres. At Cornell, there are 4,000 unused patents which have been screened for their potential for introduction in needy areas.

A similar exercise has been carried out in a large US corporation where there was a search for "technologies in cupboards." The development of these into inclusive innovations however is a problem. If the mode is a partnership between a grassroots innovator and a corporation, both sides would have to learn to understand and respect each other.

Commercialisation process for such technologies is very difficult and depends entirely on the execution of great ideas into real products and services of value to the marginalised communities. Inclusive research assists in overcoming this difficulty by bringing in the communities that will use innovation in the research process and help define the research objectives and plan.

In Canada, Community-University Research Alliance (CURA) enables university-based researchers and students to undertake joint investigations with community partners and to ensure that research responds to community needs. Projects in healthcare are currently in focus.

In Finland, which has a strong small & medium enterprise (SME) sector and a long history of public-private partnership (PPP) and joint research between universities and companies, testing centres foster the engagement of the end-users of innovations. The public funding of research also supports the objective of reduced costs in developing inclusive innovations.

Another consideration in ensuring that benefit of marginalised communities from new technologies is the need for social engineering, not relying only on market-driven development. Purpose is to embed them within public and private organisations and communities for social benefit.

Another approach to connecting affordable technologies to potential users in marginalised communities is university students working with the local communities during their research projects. The Honey Bee Network is already working on this through Techpedia.in.

The delegate for Japan observed that the fourth anniversary of the Tohuku, Fukushima, earthquake and tsunami provides an opportunity to examine how technology is aiding the reconstruction of that community, and the role of young people whose energy has been used constructively.

The agriculture, forestry and fisheries sectors suffered great harm in Fukushima and are being rehabilitated through agro-industry-commerce collaborations and government support. Examples are: a small-space seaweed production system, suburban-style farm project for vegetable nutriculture, next-generation local foods research, and an innovation centre for organic electronics. The calamity of the earthquake and tsunami were exacerbated by the nuclear power plant accident in Tohoku. The five pillars of a new Tohoku community being promulgated by the government are: safe and healthy growth of children, a vibrant super-aged society, development of regional resources such as agriculture & tourism, and a sustainable energy and social infrastructure.

Although the roundtable discussions were mainly focused on inclusive innovation for the marginalised in developing countries, the Tohuku case provides an interesting contrast of how a highly-developed country such as Japan is reconstructing a community that faced massive destruction and loss of life. Japan has strong technol-

ogies and a huge source of grassroots innovators on which it develops inclusive innovation strategies for marginalised populations.

Social innovations for inclusive innovation

Social innovation refers to developing new ideas, services and models to better address social issues, in particular for the social inclusion of children, the homeless, the poor, the elderly and people with disabilities. Its application is universal, for example the European Commission's European Social Fund for the 2014-2020 period, will focus on four of the cohesion policy's thematic objectives: i) promoting employment and supporting labour mobility, ii) promoting social inclusion and combating poverty, iii) investing in education, skills and life-long learning, and iv) enhancing institutional capacity and an efficient public administration.

The Honey Bee philosophy is based on open source and open innovation which can revitalise the economic activity and reinforce a participative social structure, based on reciprocity and redistribution. However, to take this approach to scale, reliance on volunteers alone may be inadequate. Financial investment may be needed to build a new social and ethical business model. An observation was made that if governments and companies did the right thing, there would be no social problems. However, with cost-reducing innovations, corporates can contribute to the resolution of social issues.

The UNICEF's global network of innovation labs, founded a year ago, intends to be open and collaborative. These may act like incubators and accelerators that bring business, universities, governments and civil society together, to create sustainable solutions in particular areas of health, education and community inclusion. The question arose as to how can the various innovation platforms support the UNICEF platform? Three ways were identified:

i) Design for the user: UNICEF believes that grassroots innovators are a critical resource and therefore is partnering with the Honey Bee Network
ii) Design for scale: This is a particular challenge as many different approaches are needed as UNICEF has many protocols that hinder fast replication and expansion
iii) Open standards which support making goods and services available as a public good

Institutional challenges include inability of many governments to have the right systems in place to empower grassroots innovators; weak linkages between governments and corporations; and UNICEF's inability to work sometimes with the private sector because of comparative advantage issues. However, "design with communities" is a particular role for UNICEF, and it can support distribution of grassroots innovations.

Delegates from Nordic countries outlined social-innovation developments in their countries to deal with their aging societies, for whom care

by the welfare state is now becoming untenable. Grassroots innovators are coming up with small-scale, low-cost empathetic ideas that may have application in developed countries under economic squeeze. EU's platform Social Innovation Europe (SIE), underlines three main challenges that social innovators face in Denmark: i) inclusion, self-determination & empowerment of marginalised groups, ii) a growing aging population, and iii) care and services provision for people with physical and /or mental disabilities.

Focus on social innovation is growing. The dominance of the welfare state is a problem to developing and implementing entrepreneurial innovations. However, the rising awareness of the importance of social innovations as a solution to social problems is being met by the increasing involvement of the private and business sector in developing a social economy and small social businesses within Denmark. An example being The Specialists – a self-sufficient company that employs only autistic people.

Universities are developing research centres for social entrepreneurship and social economy. Engineers are getting involved in social innovations as are designers. A non-profit Social Development Centre (SUS) is an incubator for social inventions and innovations.

Finland, which was a very poor country until 50 years ago, has developed many social innovations, especially from the 1960s when free school lunches were introduced. Social innovation in Finland has achieved prominence in health and welfare sectors. In 2007, an open national innovation environment called Innovillage, was started as a response to the challenges around the aging population (also called silver market). In 2015, a new era of social innovations is emerging in response to high levels of unemployment.

Hawaii faces a problem with multi-national companies and their financial power in particular with respect to land development for luxury housing and resorts keeping poor out of such developments.

Grassroots innovators can help progress social justice with appropriate leadership to counteract the power of some of the less socially-responsible corporate.

An Indian delegate from GOONJ raised the issue of how to clothe the poor in northern cities who face survival challenges in winter months. This basic need is never referred in government policies. In other countries, textile and clothing recycling brings social, environmental and economic benefits. For example, a firm in Japan is converting waste cloth into clothing for the poor. They now have nine sales centres and the products are appealing to wider sections of the community.

Another example of a social innovation is the production of low-cost mosquito nets in Bangladesh that are sold by hawkers at a very low price.

Inclusion is not only about new ideas, but also about existing ideas. There is a necessity for an ecosystem that enables socially-relevant current ideas and existing innovations to be disseminated. Social innovation requires samvedana, a Gujarati and Hindi word, meaning empathy and compassion. The internalising of the pain of others is a driver of inclusive innovation. The example of the Sway innovation, part of the GYTI awards, was recalled. The innovator understood the need for the deaf to be aware of rhythm while learning to dance. Such innovations should be thought of as global products/services, not just for India.

Institutional innovations and inclusive innovation

A major development in institutional innovations is the recognition that the 20th century model of closed hierarchies is inefficient in dealing with rapid changes in technology, major economic and social disruptions, and the necessity to foster scalable learning across institutions. Closed hierarchies in the formal sectors of economies have to open up and develop horizontal linkages to access the core operating processes of partner enterprises for supply-chain management, product innovation and customer-relationship management. There is a need to build scalable, trust-based relationships that can accelerate learning among all actors and encourage sharing of people's informal knowledge through horizontal social networks.

The delegate from Fab Labs, USA, discussed how digital technology infrastructures are leading to new forms of institutions, reflecting evolving new hortizontal architectures of relationships. The new economy is becoming decentralised. Products can now be made anywhere. Ordinary people can make technological complex solutions.

Fab Labs has 34 workshops in different countries which are not yet connected because of language problems

and use of different terms. In Fab Lab Barcelona, there is a series of digitally-linked labs of open and accessible technologies in the city. There is a mobile Fab Lab in the White House to demonstrate personal manufacturing. A new structure for national labs could be a series of connected local labs.

The implications of this are:
• Academic networks will enable tutors of school children to be connected globally
• Global supply chains will be disrupted by communication technologies and digitalisation of production
• Digital innovations will provide tools for grassroots innovators who are everywhere, but face limitations in not being able to make what they can see
• Top-down investment is required for bottom-up ideas

The Canadian Innovation Foundation has created 25 networks of experts. A nodal structure has been developed around centres of excellence which are funded by the government. Three main networks have evolved — one with a research focus, another follows a pull model, formed by companies who suggest what they need, and the third brings ideas to market.
In Finland, PPPs are well established. In these, the roles of industry and academia are usually clear, but the role of government is usually not well-defined. Industry's interest is relevance, academia's is new opportunities in science, and the possible roles of government are: i) regulatory and enabling of partnerships, ii) funding the research activities of companies to support the creation of high-value job opportunities, iii) driving the change, creating new markets, creating demand, and iv) solving societal needs, and taking highly-targeted action to promote the benefits of innovations. It can also promote and fund the formation of joint venture companies between corporations and universities to allow them time to realise their research agenda. The government also has a role in ensuring social relevance.
The role of government in developing new institutions applies to India also, where the Department of Biotechnology has set up Biotechnnology Industry Research Assistance Council (BIRAC) as a non-profit entity in 2012 to support start-ups, in the life sciences sector, to marry social innovations with biotechnology. This is perhaps the only innovation funding body in the government which invests even at idea stage and takes a creative idea to various stages of funding as it progresses.

In 2014, SPARSH was launched by BIRAC to support early-stage innovators. Fellows are funded to go to centres to identify topics of further research. However, the pool of mentors is narrow. Biotech start-ups are pooled to develop platforms between similar start-ups. BIRAC aims to attract investment through its incubator programme, to deal with the mismatch between investors and social enterprises. Social innovations maybe sustainable in the longer run by coming to the market rather than operating as charities.

Again the problem of commercialisation arose in the discussions in this context of organisational innovations. Different models to the dominant investment model are needed to grow, nurture and scale up inclusive innovations. In Zimbabwe, Cluster Agriculture Development Services (CADS) is in need of a network to support commercialisation. It is a farmer NGO with a focus on sustainable agriculture programmes that need support from the commercial sector. Their experience is that social innovations produced within grassroots local communities are successful, but they need to have support for value-addition opportunities and in the go-to-market.

There are many kinds of markets and the ecosystem should allow both managed and spontaneous ideas. incubator as well as sanctuary models. In the incubators, the chaos is outside and the order is inside. In sanctuary model, chaos is inside and order is outside. Many young people need much more freedom and flexibility than many incubators provide at present. New models are needed of how people might take ideas forward, to serve the relevant communities. An example was given of 'telephone-renting ladies' in Bangladeshi villages, who were given licenses for mobile phones to serve their communities. Over four years, the number of customers grew to 0.5 million. The issue is how to harness social imagination and create institutions that can materialise such inclusive innovation at grassroots level.

Several delegates raised the need for organisational innovations in the education sector, particularly in India. Issues identified were the need of opportunities for creative thinking through new teaching methodologies, links with grassroots innovators, small but effective innovations to celebrate children's achievements, raise motivation and retention rates, how to extend the provision of higher education within tight budget constraints and how to provide work-related skills in education institutions.

The model for the Gandhian Young Technology Innovations Award (GYTI) is worth emulating in other countries as well. It rewards students for three kinds of technological innovations: one on technological edge; second, meeting social unmet needs; and third, providing frugal or 'More from Less For Many' (MLM) solutions.Techpedia.in also tries to link under- and post-graduate students with communities and small enterprises to address their unmet needs.

It was noted that some of the universities in India do not allow faculty to be engaged in start-ups, whereas the IITs do. This is reflected in the number of GYTI submissions which is higher from IITs. It Is not just the policy which comes in the way of encouraging faculty to set up start-ups in and around universities, but also the mindset of faculty and students also which hinders the process.

The innovation ecosystem for inclusive innovations

The ecosystem for breakthrough technologies requires heavy investment in R&D, subsidies for R&D in corporations to achieve breakthroughs, and incentives to do that quickly. With these kinds of policies, India could make a very significant contribution to alleviating the problems of the poor in the world. However, research institutes like LIGTT (Institute for Globally Transformative Technologies, Lawrence Berkeley National Lab, USA), are facing particular challenges in achieving breakthroughs in areas in which the private sector is not willing to invest in breakthrough innovations developed for emerging countries like India. A question to be considered is not only how innovation takes place, but also is how it invades social space. There are systemic issues faced by frontier innovators and grassroots innovators in going to both local and global markets.

Innovation must be at the core of the economy, but its nature will vary from country to country. For example, Canada, after adopting a policy to invest in innovation, leading to the founding of the CFI (Canada Foundation for Innovation) in 1997 and consistent investment in R&D, can now attract researchers from all over the world, and produces five per cent of cited papers globally. In 2014, a renewed Science and Innovative Technologies policy was adopted based on four core principles: promoting world-leading excellence, focusing on targeted priorities, fostering partnerships and enhancing accountability. More specifically, the policy focuses on a) people, by attracting and retaining highly-qualified and skilled individuals, b) knowledge, by investing in research and infrastructure, and c) innovation, by helping bring new ideas and knowledge to market in a variety of ways.

The search for excellence extends to outside of Canada, and five per cent can be invested in other countries if that is where excellence is located. Innovation is best leveraged through partnerships and the CFI has as one of its 2015 Innovation Fund objectives "to forge and foster productive, value-added partnerships within and among institutions, sectors and disciplines that will nurture creativity and innovation."

The Indian government has an important role in the innovation ecosystem through firstly, its procurement practices, which currently favour long-established firms and generally biased against start-ups, and secondly, the provision of stronger support for IPR. The policy on standards also needs to be reviewed to allow some flexibility to encourage young innovators.

The Ministry of Science & Technology and Earth Sciences in India has been examining mentorship, PPP & the ecosystem for scaling up of inclusive innovations, and funding students. Students are envisaged as being able to provide a bridge between grassroots innovators and formal institutions. Corporate Social Responsibility (CSR) funds will be mobilised to provide financial support.

The Ministry of Skill Development is examining how to certify skills in the unorganised sector to which 93 per cent of India's workforce belongs. The question is: How to link appropriate skill development programmes with the needs of entrepreneurs and innovators? A memorandum of understanding (MOU) with NIF is being sought to identify different levels of skill such as entry level, re-skilling, and traditional-knowledge skills, and to have them certified.

In Finland, the Prime Minister is leading a study on innovation strategy, execution of the strategy, and institutional supports such as finance. Research centres are based on themes on which the level of knowledge needs to be raised. The public procurement policy is a mix of centralised and decentralised (municipal) systems, and sustainable procurement is encouraged. The Finnish Innovillage is an example of the development of an ecosystem to support generation of solutions to issues concerning the aging population. In 2014, there were 800 development projects in the Innovillage database, 1,600 models and 130 networks (Social Innovation Europe www.webgate.ec.europe.eu).

In Berkeley, California, The Garwood Center for Corporate Innovation focuses on large-enterprise innovation, and offers students an opportunity to solve real-world problems by leveraging open innovation. US companies have become dinosaurs in dealing with innovation challenges, so the centre works with them to explore opportunities presented by open innovation.

Open innovation is a two-way street, to put out internal ideas to be incorporated in others' systems to produce benefits, and to develop others' ideas.

What made the US great was closed innovation, in fortresses, the implications being that some were made great as knowledge was unevenly distributed to benefit a few. In the Second World War, most PhD theses in engineering were classified as secret in the leading universities. However, the web has changed the landscape. Knowledge can now flow freely. Distributed innovation creates value, and the US government encourages dissemination of research output.

The challenges now are: speed to market, the increasing cost of innovation, the rapid devaluation of knowledge assets (now 80 per cent of the balance sheet of many large corporates), unknown competitors, and competition between firms has been replaced by competition between ecosystems.

A minimal-value ecosystem needs to be developed. There needs to be a switch from mergers to hybrids, value propositions to be switched from content to context, and assets need to be moved from ownership to access to assets. Capabilities reside in the ability to orchestrate assets. Disruptive technologies are causing legacy firms to struggle, so they need to develop more microbusiness to cope with the challenges.

New models need to be built, which provide benefits to rural communities at no cost. Berkeley Haas required students following its Building Smart Cities, Leveraging Open Innovation course to visit India to carry out research.

The Gosling Research Institute for Plant Preservation (GRIPP), University of Guelph, Canada, offers a case study of an ecosystem for the preservation of plant species through cloning that is able to revive selected plants that died 100 years ago. Where plants are suffering diseases, they are cloned in order to preserve them.

GRIPP welcomes International following areas: Services to support new, high technologies in horticulture; Education in the recognition of plants, especially for children; GRIPP high-school projects offering a medal for winners (one child has published a paper in a leading scientific journal), living ornament-market development and sales and spiritual botany for the elders.

There is a need to map all the institutions in the innovative ecosystem to reflect and strengthen the symbiotic relationships in order to achieve substantial gains in innovation. To

develop social business, there is a need to identify the blocks in the system, and to redefine the system to achieve a greater appreciation of who will benefit from the social good. Donations are generally of little value to the poor, job training is a better solution. India can achieve rapid growth with an active grassroots innovation-based social economy, that will need a large-scale move of grassroots innovations to the market. Studies of supply-chain dynamics in the Ayurveda industry are being made to understand how such knowledge can be put to use by society.

A world trade-centre for the poor is needed. A BOP World Design Centre is being built in Singapore which will be open to all, throughout the day and will support collaboration in finding solutions.

Summary report to the President, the Honourable Shri Pranab Mukherjee

The President was provided a summary of the ideas and recommendations on public policy, financing and inclusive innovations arising from the global roundtable discussions. It was noted that inclusive innovation is relevant across countries as demonstrated by the members of the roundtable.

The following recommendations were presented:

Technology

- Support for affordable breakthrough technologies through government investment in R&D in national institutes, universities and corporations
- Exploitation of shelf technologies in public and private research centres
- Encouragement of university-based researchers and students to undertake research with community partners to ensure relevance to the communities
- Use of testing centres to engage end-users of innovations
- Social engineering – education, skill development and employment generation to accompany technological innovations so that advancement of technology appears as a result of development

Social

- Recognition of the failure of markets to benefit the marginalised: new models of exchange are required as exemplified by the the Honey Bee philosophy is based on open source and open innovation which can revitalise the economic activity and reinforce a participative social structure, based on reciprocity and redistribution
- Cost-reduction innovations will provide an opportunity for corporate who can contribute to the resolution of social issues through more imaginative market mechanisms or hybrid structures..
- Role of agencies such as UNICEF in supporting the inclusion of grassroots innovations is vital. They provide an important platform in economies with large informal sector, in supporting dissemination of grassroots innovations across national boundaries.
- Importance of open-innovation platforms, with particular foci on resolving social issues by linking formal and informal sectors .

Institutional

- Digital technologies are leading to new forms of institutions reflecting new evolving architectures of relationships characterised as networks rather than hierarchies
- Partnerships between industry, academia and government have potential to push the agenda for inclusive innovations — technological and social — for dissemination to the marginalised. More support for sanctuaries, incubators and testing centres is needed as they are particularly useful for start-ups.
- Organisational innovation, at all levels in the education sector of India, is a pressing need to support creative problem-solving, innovative thinking, and entrepreneurial spirit. At the tertiary level, research leading to the establishment of start-ups should be encouraged in all institutions. The potential of Techpedia.

in and similar programmes to link college students with marginalised communities is important.

Ecosystem

- Innovation must be at the core of developmental strategies in all sectors and be inclusive from the perspectives of technology and policies;
- Skill development must recognise valuable traditional knowledge also under threat of erosion;
- Bringing diverse groups together improves creativity, to this end-encouragement needs to be given for collaboration across countries, student exchanges across countries are also necessary
- Indian universities need sustained funding
- The government needs to recognise its role in fostering innovation through its helpful procurement policies for start-ups, and in providing support for socially-relevant innovations through modification in relevant standards

Address by the President of India, Shri Pranab Mukherjee Global Roundtable on Inclusive Innovations

Hon'ble President Shri Pranab Mukherjee said that India has had a long tradition of grassroots innovation and common people in this country have ushered in novel solutions to overcome their day-to-day difficulties. "The drivers that influence the pursuit of innovation are many — from basic survival to propulsion of growth. A healthy ecosystem is needed for harnessing the innovative potential of various segments in different sectors and at multiple levels in our society. Creating an inclusive ecosystem calls for linkages between grassroots innovators on one hand and academic institutions &market forces on the other. Countries successful in building such a network have become innovation leaders," the President said.

Highlighting the Innovation Scholars In-Residence Programme, the President said, "I am glad that the second batch of innovation scholars has joined us today. During their two-week stay at the Rashtrapati Bhavan, they will be mentored and connected with relevant stakeholders, to give wings to their ideas."

The President has been urging the leaders of the higher education sector to establish a connection between their institutes and grassroots innovations in their hinterland, and to also set up innovation clubs. "Youth power has to be galvanised for nation-building. Thus, the students have to be encouraged to sense the unmet needs of the common man, and search, spread & celebrate innovations. The members of these innovation clubs are participating in FOIN, taking place for the first time in Rashtrapati Bhavan," said the President.

The President praised Noble Laureate Prof Muhammad Yunus, who has created an outstanding model for microfinance that has led to the emancipation of poor in developing countries, and said, "To my mind, the next major breakthrough will come through Micro Venture Innovation Fund (MVIF), which has been pioneered by the Honey Bee Network and NIF. By partnering with companies and colleges in India and abroad, our grassroots innovators will propel a different kind of globalisation. The products and services, based on grassroots knowledge and creativity, will reach global markets in an affordable, accessible and accountable manner."

The President added that the Union Minister of Science &Technology, Dr Harsh Vardhan, is spearheading the scientific and technological strategies for an inclusive growth under the leadership of the Prime Minister Narendra Modi. "The Make in India, Clean India and Inclusive India, under which financial inclusion is of prime essence, need a significant push. Many amongst you have shared your experiences about how your countries and institutions have made progress in the direction of inclusive innovation. I am also happy at the interest evinced by you to engage with stakeholders from India. An Atal Innovation Mission as an innovation-promotion platform, involving academics, entrepreneurs and researchers, has been announced recently. It will draw upon national and international experiences to foster a culture of innovation, R&D and scientific research in India," the President concluded with an invitation to the guests to visit the Mughal Gardens.

Conclusion

The Global Roundtable Discussions on inclusive innovation brought together thought leaders from four continents, 13 countries and several states in India, to deliberate on policies and practices that can bring about improvements in the lives and livelihoods of marginalised communities not only in India and other developing countries but, also in the developed world.

Entrepreneurship for a sustainable and inclusive world is developing in scale and scope. The cost of new technologies that can support inclusive innovation is reducing dramatically, new actors and new loci of inclusive-innovation capabilities are emerging, newly or more readily-accessible markets among excluded groups are being established, and new modes and contexts for inclusive innovation are coming to the fore.

In the vast informal sector of India and other developing countries, where market mechanisms are weak, reciprocity and redistribution are dominant modes of exchange, network forms of organisation might be more effective. The irrelevance of formal hierarchies is also evident in the new digital economy where personal manufacturing has become a reality. In these contexts, the role of government has become a key factor in enabling supporting ecosystems for bottom-up inclusive innovations to be generated and disseminated by the marginalised communities themselves, and for top-down technological affordable excellence to reach the marginalised.

Day 2: Session 1
March 8, 2015

Gandhian Young Technological Innovation (GYTI) Awards

Signing ceremony for a MOU between BIRAC, SRISTI and LIGGT Lawrence Berkeley National Lab, USA

The Gandhian Young Technological Innovation (GYTI) Awards is a SRISTI initiative to foster youth-driven innovations across India. The 4th GYTI Awards Function was held on March 8, 2015 during the first FOIN at Rashtrapati Bhavan. The awards were given by Dr R A Mashelkar, Chairman, NIF.

GYTI Awards celebrate the spirit of student innovation in the fields of engineering, science and other applied technologies. The awards have been classified under three categories:

MLM (more from less for many) Award—Award for this category is given to projects that use significantly less material/energy to create sustainable solutions.

SRISTI Socially-Relevant Technological Innovation Award—Award under this category recognises students who have a demonstrable proof of concept/prototype that possesses

This first FOIN teaches us not only about innovation but also about sharing and learning

-Dr RA Mashelkar

a significant amount of novelty and social application.
Technological-edge Award— A breakthrough or a significant technological advance in any field of engineering, pharmacy, medical, agricultural or other disciplines qualifies a student for this award.

For GYTI 2015 awards, 1,900 nominations across 50 technological domains from 150 universities/institutes were received. The participants belonged to 28 different states, and six Union Territories.

The panel in this session included Prof K VijayRaghavan, Secretary, Department of Biotechnology; Dr RA Mashelkar, Chairperson, NIF; Dr Renu Swarup, Managing Director, BIRAC; Prof Anil K Gupta, Executive Vice Chairperson, NIF; Dr Vipin Kumar, Director, NIF; Mr Ramesh Patel, Secretary, SRISTI and Mr Hiranmay Mahanta, coordinator, Techpedia. sristi.org.

Prof Anil K Gupta stressed how the Honey Bee Network is trying to reach those communities, whose needs and creativity often remain out of reach of formal institutions. Prof Gupta also talked about the initiatives taken by SRISTI, founded in 1993 to focus on social, technical, educational and institutional innovations. He mentioned that 34 shodhyatras (besides12 shodhyatras under Indian Institute of Management — Ahmedabad's Shodhyatra course) to often remote communities have been undertaken in the past 17 years, covering around 5,500 km.

With regard to education, Prof Gupta mentioned that the website www.teachersastransformers.org provides a rich source of in-school innovations. "During the global roundtable discussions among thought leaders yesterday, it was observed that inspired teachers make an important difference. The President of India makes it a point to meet inspirational teachers whenever he visits educational institutions," he said.
BIRAC and GYTI have formed a partnership in which BIRAC offers funding and incubation services to grassroots innovators and students with innovative ideas, and will link them to high-level science institutions.
Dr Renu Swarup said, "Techpedia.sristi.org offers a base for innovators from which it puts applications for BIRAC support. Close to 2,000 applications were received for the current awards, of which BIRAC has screened the bioscience innovations. 15 will be supported each year, to the amount of Rs 15 lakh each, over the next three years. BIRAC has funded close to 150 entrepreneurs, 15 per cent of whom are ready with their prototypes, to be funded by companies, while several have already formed companies. In the MoU, the idea of giving Rs 1 lakh each, to 100 best student and grassroots innovations, has also been proposed. The amount is given to appreciate their raw idea and to see if it can flourish. BIRAC hopes that in over the next two to three years, we will be able to see a sea of young innovators and innovation hubs across the country."

Prof VijayRaghavan said there are

many exciting challenges ahead, and even though the problems-in-hand seem huge, the solutions to them are tractable with the help of enthusiastic innovators like the GYTI winners.

An award ceremony was held for the GYTI winners, during which GYTI 2015 book, supported by JSW and Honey Bee Network institutions, was also launched.

An MoU was signed between BIRAC, SRISTI and LIGTT: Institute for Globally Transformative Technologies, Lawrence Berkeley National Lab, USA. This event was followed by a short speech by Dr Shashi Buluswar, Executive Director, LIGTT. He observed, "India does not have to be only a strong military or economic leader. I think, by solving problems of global poverty, India can become a much better social leader."

Dr Mashelkar appreciated the ideas of the GYTI innovators and said, "Making high technology work for the poor is very difficult, because you are talking about both equity and excellence — excellence in terms of higher technology, and equity in terms of affordability. Of course affordability is relative, as was mentioned by one of our expert members yesterday. But, when you look at billions of people living on $2-per day income, you can clearly define that level of affordability. It cannot just be affordability; it has to be extreme affordability. The India of our dreams is one which brings affordable excellence." Hiranmay Mahanta, coordinator, Techpedia.sristi.org thanked the dignitaries, stakeholders and volunteers, and said "One of the best part that came out of our analysis is that several of the previous-year awardees have successfully converted their innovation into start-ups."

On the same day, SRISTI Sanman Awards were presented followed by a book launch on the same. (Details in

Appendix 1)

Signing ceremony for a MOU between BIRAC, SRISTI and LIGGT Lawrence Berkeley National Lab, USA

Awards ceremony (see Appendix No … for the names of the awardees)
GYTI Awards were presented to 43 individuals/teams and SRISTI Sanman Awards were presented to 11 innovators.

Day 3-4
March 9-10, 2015

Children's Creativity Workshop

The Children's Creativity Camp/Workshop sought solutions to societal problems in slums around Delhi through creative ideas of 35 privileged children and 35 underprivileged children (see Appendix 2) for list of schools and nominating organisations). The workshop was held in the exhibition tent of the FOIN, thus exposing the children to innovations by children, technology students and people at the grassroots like farmers, mechanics, etc. The children were given an exposure to different solutions to real-life problems tried by innovators at the exhibition. They were encouraged to imbibe the empathetic values in developing innovative ideas to solve basic problems faced by people living in underprivileged areas like slums.

The overall objective of the programme was to develop an operational framework for empowering children to not only articulate their problems but, also to find solutions, both individually and collectively.

The inverted model of innovation implies that children ideate/innovate; fabricators design and companies/agencies diffuse commercially or socially. Involvement of children in solving their challenges will help us understand micro and macro strategies, which can mobilise the creative potential of children around the world. This may help in overcoming persistent social inertia in developing countries. The children addressed the following: a) the challenges they face; b) challenges that the society around them faces, and c) other problems that inhibit the unfolding of their potential.

Pedagogy:

a) Purpose: Discussion about the purpose of the workshop

b) Process: Brainstorming about some of the solutions in one domain and how these can trigger new solutions in other domains

c) Perception: Once their curiosity was triggered, their visit to the exhibition was organised to enrich their repertoire and also reinforce their confidence

d) Pursuit of innovation: After briefing about the fieldwork, children were divided into four groups comprising privileged and underprivileged children

e) Practice: Each group visited one slum area of Delhi — Bhalaswa, Yamuna Pustha, Batla House and Kusumpur Pahari — to interact with the local communities, children and others, to observe and study their day-to-day problems.

f) Presentation of solutions: Each group sketched the problems they saw and presented their ideas to solve them on March 10, 2015 at FOIN. The workshops aim at tapping the dormant creative potential of under-privileged children who probably did not have the courage to articulate their ideas. Likewise, those children and youth who have innovated in some areas may come out with creative ideas in other domains as well. The workshop was held over two days. The first day involved brainstorming, visiting the displays in the FOIN exhibition and meeting grassroots innovators, a briefing on field work and then visits to the slums. On the second day, the children worked in groups in the exhibition tent, sketching the problems and presenting their ideas to solve them.

During an on-the-spot idea competition the children came up with brilliant ideas regarding bicycles. Where we normally consider a cycle only as a tool for transportation, these children saw it as a livelihood and subsistence tool. What we adults regard as normal, children look at that with different and interesting perspectives. Once their curiosity is triggered there is no looking back.

Visit to Slums at

Kusumpur Pahari

Batla House

Bhalswa Lake

Yamuna Pushta

The ideas generated by the children in a matter of a few minutes were:

1. Electricity generation from a cycle; cycle can be used to power escalators; and cycle can be used to extract sugar cane juice — Mohammad Rafiq
2. Cycle can be used to grind grains; harvesting can be done by a cycle, and cycle can be used for film projection— Ashu Chandra
3. Sweeper can be attached to a cycle — Tanu

4. Blower can be attached to a cycle and cycle can be used to wind wires — Affan Siddiqui
5. Cycle can be used as a plough — Kajal Verma
6. Cycle can be used for cutting grass — Vivek Kumar
7. Cycle can be used for thrashing paddy — Mayal Lepcha
8. Cycle can be used to break-up soil clods in the field — Abu Sufiyan
9. Cycle can used to draw water from a well — Richa Kumari
10. Trash-picking machine can be attached to a cycle — Ahmad Raza

Visit to the slums
Objectives:

- Children would get exposure to different solutions for real-life problems tried by innovators
- They would gain confidence when they see that other children and common people have developed innovative solutions to everyday problems

After a briefing on how to conduct the fieldwork, the children were divided into four groups of 14 to 25 children, each group comprising privileged and underprivileged children, led by SRI-STI personnel and volunteers from NGOs in Delhi. Each group visited one slum area of Delhi to interact with the local communities and for studying their day-to-day problems.

Delhi slums
There are about 2.15 million slum dwellers in Delhi (14 per cent of the population),70 per cent of whom come from backward districts of Uttar Pradesh and Bihar. Hence, poverty, unemployment and deprivation have compelled these people to migrate to slums in Delhi.

About life in the slums:
• More than 99% of the households do not have a kitchen
• Nearly 97% households do not have a toilet
• Only 63% has access to running-water supply from taps
•96% slum dwellers have electricity connection in their house
• About two thirds of the households have been living like this for the past 16-30 years (CGDR, 2011)

Group 1

Kusumpur Pahari, in SW Delhi is Delhi's largest slum of about 100,000 residents. Many of the slum dwellers are servants, drivers, gardeners, sweepers who work for the wealthy people living in nearby Vasant Vihar.

Group 1—Kusumpur Pahari visited by 14 children

1. Nisha Chauhan, standard 11 from Anupshahar, UP

Problem: Water shortage in the area
Solution: Houses should be made in such a way that rain water can be harvested so that more water is available for daily use

2. Manisha, standard 9, from Kusumpur Pahari & Liyangsung Lepcha from Sikkim

Problem: One of the main problems in Kusumpur Pahari slums was of garbage
disposal. Wet and dry garbage was not segregated.

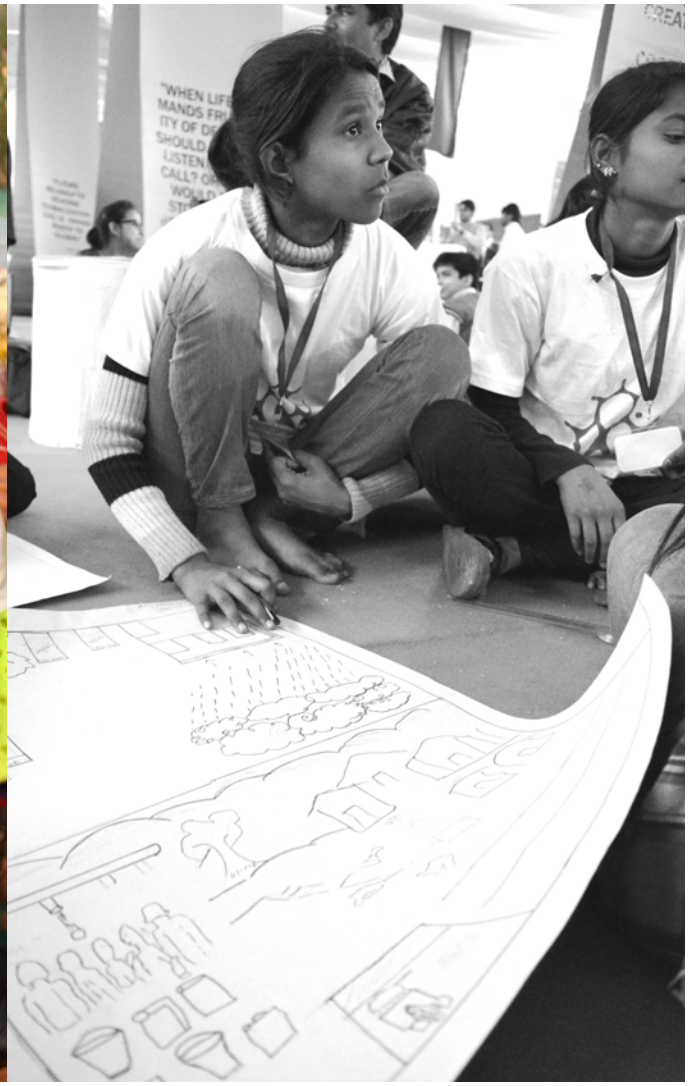
Solution: Manisha and Liyangsung both found a solution to the problem; they made a sketch showing proper disposal of garbage by segregating wet and dry garbage, from the source itself. The wet garbage can be used to make manure while dry garbage can be further segregated and materials such as clothes pieces in it can be used to make soft toys for children.

2. Iqra Khan, standard 5, SDMC primary school, Nizamuddin West and Abu Sufiyan, Madarsa Jamia Arabia, Madina Masjid

Problem: There was no playing area for children; garbage was collected in the playground. Sufiyan observed that people in Kusumpur Paharilive in small houses with neither electricity nor water connections, some children go to school
while others stay at home and help their parents.

Solution: A clean area for children to play should be made. Dustbins should be placed at the corner of the play area so that garbage is collected in it. Sufiyan suggested that better houses should be built for people living in Kusumpur Pahari. Electricity and water connections should be provided to all. It should be compulsory for children to attend school.

4. Nisha Khan, standard 11& Rahila Sultana, standard 9, both from Anupshahar



Problem: There was a small, open area where garbage was disposed and pigs were roaming around.

Solution: A separate play area can be kept for children. Garbage can be disposed of in dustbins in another corner of the ground. A fenced area can be built to keep pigs.

5. Affan Siddiqui, standard 9, The Indian School, Josip Broz Tito Marg, New Delhi

Problem: People have to wait in a long queue at public water taps to fetch water.

Solution: Pipes can be attached to the main tap, like a 'tap-root system', so that many people can fetch water at the same time. He also suggested knee caps for people who cannot walk and do not have the proper equipment for walking and
have to drag their bodies. A small, portable sewing machine should be made available to each household so that people can stitch clothes easily.

6. Laila Banu from Tamil Nadu and Shalini Kumari from Bihar

Laila Banu suggested a multi-purpose box to deal with power shortages. The box includes a ladder, solar panels and solar antennas. To help women who carry water for long distances in rural areas, Shalini suggested wheels that can be put beneath water buckets, pots or canons.

Laila Banu has won the IGNITE Award 2011 and GRI Student Award for2015 with two others for the idea of using a helmet as an ignition switch to start two-wheelers. Shalini Kumari has also won the IGNITE Award 2011 and GRI Student Award 2015for a walker with adjustable legs.

7. S Vinotha and Laila Banu — both GYTI Award winners
Problem: Children in Kusumpur Pahari did not have a proper playing area as such. To reach the playing area, a gutter had to be crossed.

Solution: A multipurpose box can be made, which transforms into a plank used to cross the gutter. The plank can also be used as a ladder to climb trees as well as a box when closed.

Problem: When Vinotha spoke to the children in Kusumpur Pahari, they said that their houses have ceiling at a low height, which becomes a problem when children grow taller than their parents.

Solution: Houses in slums should be constructed in such a way that its height can be adjusted when required.

Ideas of children from Kusumpur Pahari
How to improve the use of a matchstick and other ideas:

Kavita and Khushi: Apply flammable substance to both ends

Sohail: Apply flammable substance again after using the matchstick once
Golu: Break the matchstick and to get two matchsticks
Sohail and Golu: A broom should be modified so that one end can be used tomop the floor while the other end sweeps
Durgesh: Cycle can be used for grinding grain, as a chaff-cutter and can be used to draw water from a well

Group 2

Bhalaswa is low income housing colony built on landfill of Bhalaswa Horsehoe Lake, northwest Delhi

Group 2- Bhalaswa visited by 20 children
1. Naushad Ali, 10th NIOS, Jama Masjid

Problem: Waste in Bhalaswa
Solution: Small waste-picking machines should be used by everyone living in the slum to reduce dependence on the civic bodies.

3. Ali Mahummad, standard 5, SDMC Primary School, Nizamuddin West

Problem: Children who accidently enter the garbage heap have died of asphyxiation.

Solution: A safety gear, if children are employed (though they should never be made to work), and proper barricading of the area to stop further accidents.

4. Nishu Sharma, standard 9, Anupshahar

Problem: Gutter contains a lot of waste in Bhalaswa. It is not cleaned properly.

Solution: Waste can be collected directly from gutter and disposed off.

4. Sheeren Shekh, standard 5, SDMC primary school, Nizamuddin West

Problem: Children do not wash hands before eating lunch in schools.

Solution: A printed sticker inside and outside the lunch box, with the message 'Wash your hands before having lunch' to remind children to wash hands.

5. Preeti Kumar, a standard 11, Katha Lab School, New Delhi

Problem: Dirty, unwashed hands spread diseases.
Solution: She came up with six inspiring and fun steps to keep hands clean.

6. Ahmad Raza, standard 4, SDMC Primary, Nizamuddin West

He came up with the idea of collecting disposable cups in an innovative box. A conventional box normally holds 150 cups, Raza's idea can take up to 750.

7. Alam Hansari, standard 2, Nur Was Public School, Delhi

Problems: Instead of teaching the class after taking attendance, teachers leave the class and sit in the staff room, idle. Teachers also collect money from students for personal reasons, without informing school authorities. Only one teacher is available for many students. Mid-day meal for students is sub-standard and has led to stomach upset in many students in the past. Safe drinking water is also a problem in government schools.

Solutions: Every school should have a complaint box along with a centralised punching system. There should be regular inspections by the district education department. Non-performing schools should beclosed and students studying there
should be shifted to better schools. A centralised water purification system should be installed at all schools.

8. Bhaskar Jha, standard 8, Deepalaya Kalkaji Extension, Delhi

Problems: Bhaskar identified the following problems:

- Unavailability of safe drinking water
- Playground not proper
- Impure tanker water, foulsmell
- No drainage system in sewage
- No street lights
- No security and cleanliness
- No proper school

The group together gave following recommendations to improve conditions in
Bhalaswa:

Problem: In cities, vehicles create a lot of pollution
Solution: Solar system should be used in vehicles to prevent pollution

Problem: During rainy days bikes skid and commuters get injured
Solution: The tyres should be made skid-resistant

Problem: The pile of dirt and waste in Bhalaswa is very dangerous. Students have died after playing there.
Solution: The waste could be converted into some useful material or gas, which could be used for power generation or making fertilisers for plants.

Problem: Used water from industries leads to a foul smell in the surrounding areas.
Solution: It should be treated properly before being passed by industries.

Problem: The water in Bhalaswa is polluted and causes various diseases.
Solution: A machine, which could treat and change waste water into clean water, should be invented. This water can be used for washing clothes.

Group 3

Batla House, Jamia Nagar, Jamuna in SE Delhi, is close to the Yamuna River and is inhabited by mainly The Muslim community

Group 3- Batla House was visited by 17 children

-Sajjad, H. & P. Jain, 2014, Assessment of Socio-Economic Vulnerabilities among Urban Migrants in South-East Delhi, India, Journal of Studies in Social Sciences, Volume 7, Number 1, 2014,65-81

Not only were children from the Creativity Camp enthusiastic about sorting out the problems of the Batla House community, but the community children were also equally keen to share their experiences.

1. Manshi Chauhan, standard 11, Pardada Pardadi Inter College, UP

Problem: Heaps of plastic waste
Solution: Recycle plastic material and make plastic slippers

2. Soring Lepcha, standard 5, Sikkim

Problem: Long queues to fetch potable drinking water. Water filters are too expensive for individual households to install.
Solution: Community water-filter should be installed, so that each and every household does not require an individual water filter.

3. Vivek Kumar, standard 8, Deepalya School, New Delhi

Problem: Load-shedding

Solar panel works with sunlight. Can somehow moonlight be put to some use like that?
-Anurag Singh

Solution: Use of solar and wind panels

Problem: Water scarcity
Solution: Store rain water and utilise it

Problem: Sanitation and hygiene
Solution: Communities should take responsibility by forming committees that could build community toilets

4. Priyanka and Anjali Rena, Rashtrapati Bhavan

Problems: Pile of waste
Solutions: Each house should have two dustbins — one each for food (wet) waste and plastic/paper (dry) waste. The food waste can be utilised as fertiliser and the plastic waste can be recycled and used.

5. Anurag Singh, standard 8, Deepalaya School, Delhi

He gave the idea of generating electricity through walking trousers and use
of solar panels.

6. Richa Kumari, standard 9, Pardada Pardadi Inter College, Bulandshahar, UP

Problem: Stagnant and dirty water in Batla House, which paves way for water borne diseases
Solution: A waste-water treatment plant to be built up in the locality, where the water can be re-supplied after purification

Group 4

Yamuna Pushta on the banks of the Yamuna River, north of Old Delhi. This area has been subject to slum clearances, the last being in 2004 in preparation for the Commonwealth Games.

Group 4's visit to Yamuna Pushta by 25 children from Dr Rajendra Prasad Sarvodaya Vidyalaya, President's Estate, Rashtrapati Bhavan

The visit to Yamuna Pushta was led by Dinesh Kumar who works for Aman Biradari, which runs the 'Dil Se' campaign for children who live and work on the streets. They also run a health-recovery shelter and mobile-street medicine clinic in Yamuna Pushta for male patients and for female patients in Jama Masjid. Founded in August 2013, by January 2015, 100 patients per night were being treated, including 25 tuberculosis patients, four HIV and 20 physically injured patients. Trained medical staff offer medical and referral services, food and counselling support offered to help reintegration with families or employment. The children found that there were 26 beds in two different tents.

Parul Prakash, standard 12; Ankur, standard 8;AnjaliDayal, standard 6;Ayush Prakash, standard 4; Karan Arya, standard 6; Rahul Arya, standard 9; Rajat Thakur, standard 7 and Omkar Pal, standard 9 from Dr R P Sarvodaya Vidyalaya, President's Estate, New Delhi, suggested the idea of separate water supplies in shelters for patients with infectious and non-infectious diseases. Common water point for two patient shelters nullified the advantage of having separate shelters patients suffering from contagious and non-contagious diseases.

Suggestions:

Solar panels should be installed on the tents to provide sufficient electricity;
Toilets should be cleaned once a day and be kept open for all;
A pure drinking-water supply should be provided to all residents and patients;
The surrounding area and the bank of the Yamuna River should be cleaned;
Walkers should be provided to patients with fractures;
Privileged residents of Delhi can give their old clothes and food to these people.

Children observed the area surrounding the tents and asked the doctor and the head of shelter the following questions:

- Why doesn't the government take any action against poverty?
- Why are sick people discarded by society?
- Why is the government not taking care of poor people and providing resources?
- How can we help these poor sick patients?
- Why is the government not taking care of the Yamuna river? Why is this area so dirty?

Conclusion:

- Exposure, empathy and imagination for generating innovative solutions can be linked in a very short time period
- Once exposed to the creativity of other children, their expectation from themselves is increased
- Some children are laidback by nature, some are born ideators, while others come out with creative ideas under the pressure of expectations by outsiders
- More than a dozen alternative uses of a cycle were triggered in less than five minutes. This shows that just a trigger in the form of an earnest question can unfold the innovative and empathetic potential of children
- Graphic presentation of ideas brought precision and also in many cases the totality of the children's idea. Children tend to describe much less in the narrative form than in the graphic form
- Initiatives for institutional policy changes can indeed be designed based on children's ideas
- If we could mobilise children of the world for solving the persistent problems around us, the world would change at a faster space

SRISTI thanks UNICEF, NIF, and the Office of the President of India for facilitating the organisation of the Children's Creativity Workshop during the FOIN, March 7-13, 2015.

Prof Muhammad Yunus- Noble Laureate with his gracious presence in this session along with Prof. Gupta inspired the children and all others in the workshop.

Day 3: Session 2
March 9, 2015

Yuvaan Tea Launch

NIF India and BVG Life Sciences Ltd have entered into a Public Private Partnership to harness Traditional Knowledge of Grassroot Innovators. NIF, India and BVG Life Sciences Ltd launched Yuvaan Wellness Tea on 8th March at RashtrapatiBhavan. The six variants of Yuvaan team are– anti aging, anti-obesity, anti-diabetic, anti-hypersensitive, anti-inflammatory.

The Yuvaan tea was launched in the presence of PrakashJavadekar- Minister of Information and Broadcasting, Prof. Muhammad Yunus- Nobel Laureate, Mr. HanmantraoGaikwad-BVG-Chairman and MD, Dr. R A Mashelkar- NIF Chairman, Prof. Anil Gupta- NIF Executive Vice Chairman, Dr. Vipin Kumar- NIF Director.

With the launch of Yuvaan Tea, the dignitaries on the panels shared their views.

Shri Prakash Javadekar, Minister of Information and Broadcasting, congratulated NIF and BVG on such collaboration. He said that Dr. R A Mashelkar and Dr. Anil Gupta have been passionate gurus who are developing a streak of innovation in the younger generation. He said that innovation is a kind of mutiny, India has loads of resources, but unfortunately there is no rebellious environment and that's why we lack in the proper growth at the innovation front. He further added that innovation is the key for the development for India and like Middle Eastern countries, which explored their oil resources for their development, India should go on the development path with an innovation era.

Dr. Vipin Kumar, director, NIF, explained the vision and mission of the partnership. He introduced the six kinds of teas that are based on traditional knowledge— anti-obesity, anti-ageing, anti-diabetic, antioxidants, anti-inflammatory and anti-hypertension. He also said that NIF works on land-to-lab-land model. NIF has scouted about 200,000ideas, innovations and practices (not all unique), out of which 200 innovations have been tested, validated and procured patent. NIF venture with BVG is a module of the form of Mind to Market and Grassroots to global. He said that Prime Minister'sideals of 'Make in India' have inspired their vision.

Mr.HanmantraoGaikwad, Chairman and Managing Directorof BVG said that he is extremely happy with this partnership and that his ideas and BVG are inspired by Swami Vivekananda.

Prof. Anil Gupta, executive vice chairperson, NIF said that we should learn the fundamental, ethical principle of acknowledging, cross-pollinating and reciprocating the knowledge from the grassroots through fair and just benefit sharing. So, a Mind to Market platform has been enabled. He said that the innovations must not be left where they are, instead all concerned should collaborate to diffuse them through social or commercial channels. Prof. Gupta further said that thus we all should collaborate together to make India self-reliant and a clean India. He said that this partnership of NIF with BVG is a mere beginning.

Prof. Mashelkar added that a kind of history has been made with the first FOIN - an idea conceived by President of India. He said that this first FOIN teaches us not only about innovation but also about sharing and learning. He said that it is about grassroots people, who work in laboratories of life. He said, "actually 1.25 billion Indians represent 1.25 billion minds. The 700 patents done by NIF are of the semi-literate people. It is a great achievement that the ideas born with grassroots innovators are finding such a huge market. Thank you for the President's blessing for making this a movement".

Prof.Muhammad Yunus said that every business should have three basic models of ethics, which can lead us to be better human beings.
The models are as given below:

- We shall do no harm to people
- We shall do no harm to planet
- We shall not exploit any person

He said that such ventures (public-private partnerships) are a great initiative as they come up with the idea of doing well to people.

MadhuSudhanNayyar thanked Prof. Anil Gupta for coining the term, 'Yuvaan'. And the session culminated with a vote of thanks,

Six kinds of teas that are based on traditional knowledge anti-obesity, anti-ageing, anti-diabetic, antioxidants, anti-inflammatory and anti-hypertension to make life healthier and better

Day 4

March 10, 2015

Meeting of National Innovation Clubs and their Interaction with Grassroots Innovators

A meeting of National Innovation Clubs of various universities, IITs and NITs was held as part of FOIN. The innovation clubs shared their achievements and ideas to promote innovations within their campus and outside. More than 100 participants from 42 institutions attended the meeting.

The Hon'ble President Shri Pranab Mukherjee had exhorted the academia to set up National Innovation Clubs in central universities and institutions of higher learning viz IITs, NITs and IISERs. Accordingly, the clubs aim to promote inclusive innovations by linking the creativity in the formal and informal sectors. Primarily, the clubs aim at four functions: [a] search creativity and innovations, [b] spread information about useful innovations, [c] sense the unmet needs and [d] celebrate the spirit of creativity. Volunteers from among faculty, staff and students are expected to join hands with the innovators at different levels and in different sectors to ensure widest application for creative and innovative ideas.

Youth will rise to the occasion and take up the responsibility of bringing about change and extending the frontiers of knowledge in order to build an inclusive society

-Smt Omita Paul

The panel for this session included Smt Omita Paul, Secretary to the President of India, Nobel Laureate Prof Muhammad Yunus, founder, Grameen Bank, Mr Suresh Yadav, OSD to the President, Prof R K Shevgaonkar, Director, IIT, Delhi, Dr Ajay K Sharma, Director, NIT, Delhi, Prof Anil K Gupta, Executive Vice Chairperson, NIF and Dr Vipin Kumar, Director, NIF.

Speaking on the occasion, Smt Omita Paul stated that one creative mind can unleash a flood of creativity and prosperity. She said it was her belief that the youth will rise to the occasion and take up the responsibility of bringing change and extending the frontiers of knowledge in order to build an inclusive society. She said that the endeavour to set up innovation clubs was with the vision that they will help in bringing the needs of the local areas to the fore and also help find solutions to those problems. Nobel Laureate Prof Muhammad Yunus also addressed the gathering and shared his experiences regarding Grameen Bank. A presentation on the future roadmap for development through innovation was given by Prof RK Shevgaonkar and Dr Ajay K Sharma. Prof Shevgaonkar emphasised on innovation for rural problems, which should be seen as researchers' social responsibility. There were presentations by innovation clubs of Babasaheb Bhimrao Ambedkar University, Lucknow, IISER, Mohali, IIT-Indore, NIT-Silchar and Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Wardha, IIT-Delhi and NIT-Delhi.

Projects taken by different universities are listed here:

Babasaheb Bhimrao Ambedkar University:

- Solar fencing of the campus
- Green BBAU initiative with 56 acres of constructed wetlands
- Paddle-wheel water-purifier for flood-affected areas
- Integrated approach towards waste water treatment and bioelectricity generation using MFCs
- Low-cost bioremediation techniques
- Smart wheelchair for specially-abled children
- Walking stick-cum-chair for the old people
- Treatment of waste water in the drains IISER, Mohali:
- Semi-automatic pipette filler
- Stop-cock free novel glass burette & universal semi-automatic burette filler
- Compact, palm-sized, lightweight, energy-efficient magnetic stirrer
- Radioactivity-detection drone
- Actinic flux-calibration device
- 3D solar-tracking using controlled perturbations via sequenced latching

Centre for Innovation (CFI) IIT Indore:

- Design space exploration of optimal k-Cycle cycle transient fault-secured datapath system with intelligent cut insertion
- Design space exploration system and method thereof using a bacterial foraging optimisation mechanism
- Design space exploration of optimal k-Cycle transient fault-tolerant datapath based on multi-objective power-performance trade-off
- Improved schedule-delay estimation process for datapath during high-level synthesis of application-specific processors
- Untrusted third-party digital IP cores: Power-delay trade-off driven exploration of hardware Trojan-secured datapath during high-level synthesis
- P-N tuned differential 8T SRAM cell
- A twin-security system for door

of National Innovation Club:

1. Babasaheb Bhimrao Ambedkar University
2. Banaras Hindu University
3. Central University of Haryana
4. Central University of Himachal Pradesh
5. Central University of Kerala
6. Central University of Punjab
7. Central University of Rajasthan
8. Dr B R Ambedkar National Institute of Technology (NIT Jalandhar)
9. Dr Hari Singh Gour Vishwavidyalaya
10. Guru Ghasidas Vishwavidyalaya
11. Hemvati Nandan Bahuguna Garhwal University
12. IISER Mohali
13. IIT-Bhubaneshwar
14. IIT-Guwahati
15. IIT-Indore
16. IIT-Roorkee
17. Jamia Millia Islamia
18. Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya
19. Malaviya National Institute of Technology Jaipur
20. Maulana Azad National Institute of Technology (Bhopal)
21. Nagaland University
22. NIT-Arunachal Pradesh
23. NIT-Calicut
24. NIT-Durgapur
25. NIT-Goa
26. NIT-Hamirpur
27. NIT-Jamshedpur
28. NIT-K Surathkal
29. NIT-Kurukshetra
30. NIT-Puducherry
31. NIT-Sikkim
32. NIT-Silchar
33. NIT-Tiruchirappalli
34. NIT-Warangal
35. Pondicherry University
36. Rajiv Gandhi University
37. Tezpur University
38. Indira Gandhi National Tribal University
39. Tripura University
40. University of Delhi
41. University of Hyderabad
42. Visvesvaraya National Institute of Technology (V NIT Nagpur)

Day 5

March 11, 2015

Biomedical, Medical Devices and Biotech Innovations for Grassroots Applications exhibition and Roundtable Discussion

A roundtable and an exhibition on 'Biomedical, Medical Devices and Biotech Innovations for Grassroots Applications' was organised, under the aegis of the ICMR. The idea was to celebrate outstanding innovations, with application at the grassroots level, in biomedical science and biotechnology. The exhibition was particularly focused on innovations with a strong potential societal impact.

The panel on the roundtable discussion included Dr V M Katoch, Director General, ICMR, Dr K VijayRaghavan, Secretary, Department of Biotechnology, Prof Anil K Gupta, Executive Vice Chairperson, NIF and Dr Vipin Kumar, Director, NIF.

Prof Anil K Gupta elaborated on the need for innovation in this sector and its linkage with different activities at FOIN. He further stressed on empa-

The most common generic problems of acceptance faced by all new inventions is due to a fixed mindset of the end users

-Dr. V M Katoch, DG ICMR,

thetic interactions among communities and researchers as being key to innovations.

Dr B P Sharma said that a festival to stage Indian innovations is a great idea, as innovation is the foundation of civilisation. An ecosystem for growth of new ideas is important for human civilisation. He emphasised that innovated products should be cost-effective and cited the example of 'Swasthya', a health tablet as a tool for multi-diagnosis. He said that the government was open to implementation of any new idea and encouraged the innovators to work on new ideas irrespective of the recognition or appreciation. He further thanked Prof Gupta and the innovators on the success of FOIN.

One of the speakers said that a positive 'medical ecosystem' has been created and it has been scaling up through government funding. He said that these biomedical innovations are our national legacy.

Dr K VijayRaghavan called the festival as an extraordinary mix of grandeur and the authority of the state. He talked about how the human transition has been in ages — from being affected by changes in nature to being the major cause for natural changes. "We have a habit of not wanting to change our lifestyles, but continuously look for solution as if they are some magic bullets. Real-time monitoring of many medical aspects are available today. And, the data generated can either be ignored

or used to make existing technology better as well as affordable," he said. Calling the innovators 'heroes', Dr VijayRaghavan added that innovators are the deciding factors for pushing forward new regulatory and safety guidelines, for devising solutions to complex problems we face today. But, he said, the innovators need to work in tandem with regulatory authorities. "This support and relevant advice will help the Health Ministry as well as policymakers understand the problems and devise relevant solution. We must try harder to facilitate such interactions, to bring academia, innovators and industry together using various platforms like incubators," he said.

Prof Gupta further said that NIF and ICMR need to collaborate for further ideas to bring some ideal change in the medical innovations based on people's contemporary as well as functional traditional knowledge. Another speaker said that innovations, which actually make an impact

on the society, should be given more consideration and provided assistance. For that matter, partnerships across different sectors of universities, private companies and banks should be promoted.

Dr V M Katoch stressed on the next steps we need to take after the closure of the exhibition and festival so that all the innovations reach the "masses". He highlighted the most common "generic" problems of acceptance faced by all new inventions due to a fixed mindset of the end users. He also said that there is need for an all-encompassing ecosystem, which can support the journey of all innovations from lab to market. He further talked about the commitment of Dr Raghavan and Department of Bio Technology (DBT) towards supporting this cause and moving from lab testing to larger validation. He also praised NIF for providing all innovators an equal footing to present their work without discrimination and for catering to all in their efforts. He hoped that support from ICMR towards establishment of the medical technologies presented in the festival will always flow unhesitatingly. Prof Gupta added that this will help cement the bond between NIF and ICMR further. He also said that inter and multidisciplinary approaches both should be mobilised for the purpose. He highlighted the commitment of PHFI and requested Dr K Srinath Reddy to use their network to test and validate these technologies.

Dr Sanjeev Kumar said that new ways of doing things should be acknowledged. He said that India should not be seen as a country with a burden of disease anymore, rather the one with solutions. Programs like Rural Health Information should be provided all the technical and other kinds of support. In portals like National Health Innovation, spaces should be added for new products and program innovation. In the initial phases there should be partnerships with the innovators. Emerging innovations from small geographical regions should be evaluated by third party while established innovations should be recommended to be included in the state programs. And, in the whole process of scaling up, a formal approval should be taken from the ministry.

Dr Reddy stated that it was a pleasure to screen and select the projects for the festival. He gave examples from the selected work for highlighting the wide spectrum of deliverables and sectors they catered to. He stressed the need for a multidisciplinary approach and an amalgamation of many fields by developing new partnership for addressing these complex challenges. He also said that the need of the hour was to build a platform to connect innovators for networking as well as evaluation of the innovations. This will help in building new partnerships to help successfully move along. He felt that now, society is beginning to realise the potential of how innovations can transform the lives of Indian people?

Policy recommendations

- There should be a third-party certification agency, which would give the authorisation for a global acceptance
- Physical incentives for indigenous technology should be strengthened
- The funding mechanism is still on old track and needs to be changed
- Post graduate and doctoral program should be more liberally funded so that medical innovations can be improved in the country
- Translational research should have the same value as applied research and HRD & Medical Council need to collaborate to work this out
- Research-felicitation pathway should lead to setting up of more and more innovation clubs
- Economically-viable business can be developed and ecosystem including IIT, AIIMS, and regional universities should be developed, so that they can collaborate together

Day 6
March 12, 2015

Sanitation, Bio-Digestion and Waste Management in Compliance with Swachh Bharat Abhiyaan

The exhibition held on March 12, 2015 was on sanitation, biodigestion and waste management. Shri Venkaiah Naidu, Union Minister of Urban Development visited the innovation exhibition based on the theme. The technologies were in compliance with Swachh Bharat Abhiyaan (Clean India Mission), a national campaign started by Prime Minister, Shri Narendra Modi.

The innovations/posters on display at the exhibition venue were:

. 1. Wrapper-picker
By Mukul Malaviya and Diptanshu Malaviya, Sirohi, Rajasthan

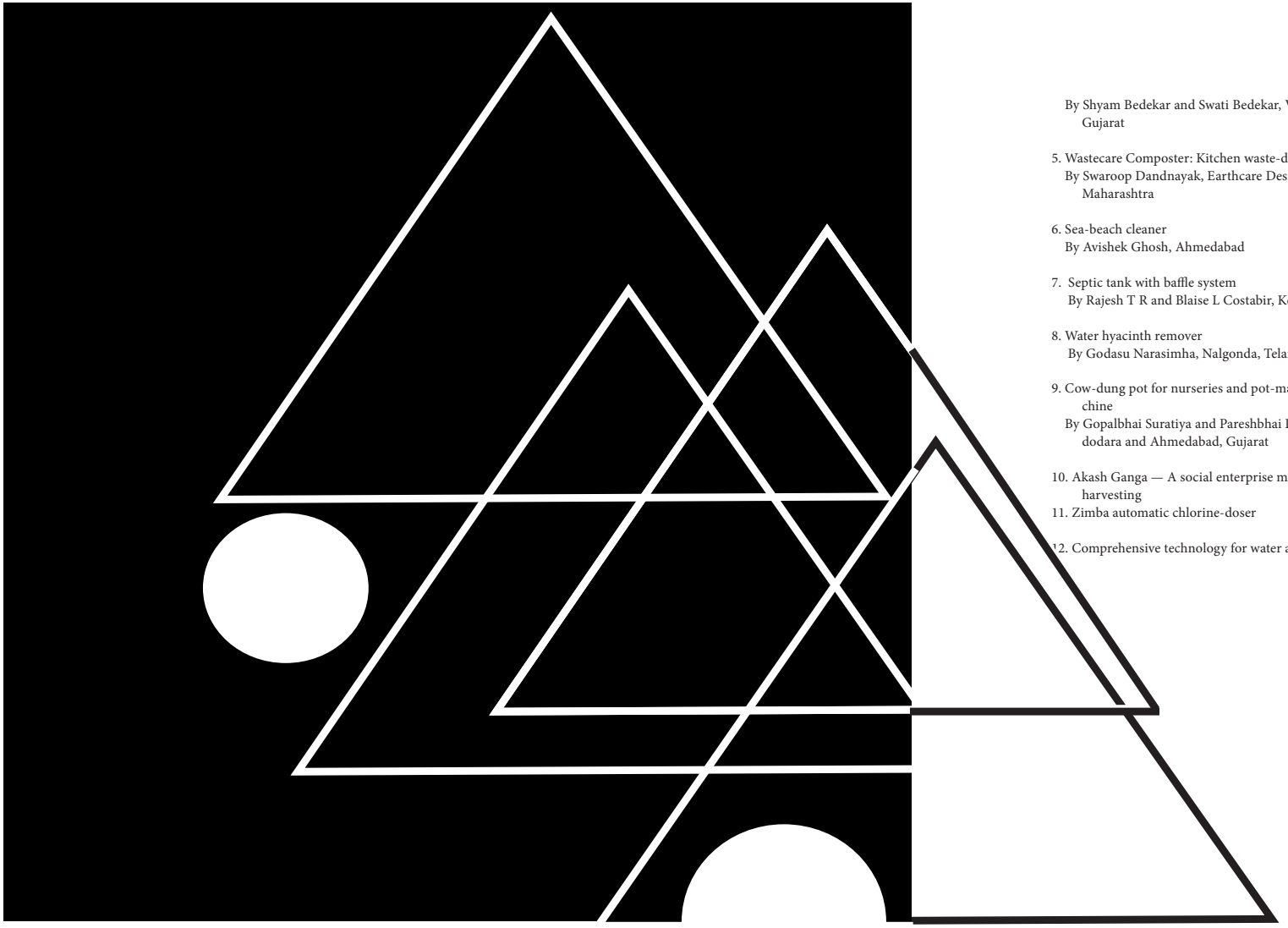
2. Super stocker 3C-ultra model dust-bin
By Priyanka Mathikshara Chennai, Tamil Nadu

3. The Cycle-O-Cleaner: Bicycle-based cleaner
By Riya Kothari, Nimran Kang, Kaamya Sharma & Mehr S Mehta,New Delhi

4. Sanitary napkin destroyer

The India of our dreams is one which brings affordable excellence

- Dr. RA Mashelkar, Chairman, NIF



By Shyam Bedekar and Swati Bedekar, Vadodara, Gujarat

5. Wastecare Composter: Kitchen waste-digester
By Swaroop Dandnayak, Earthcare Designs, Nashik, Maharashtra

6. Sea-beach cleaner
By Avishek Ghosh, Ahmedabad

7. Septic tank with baffle system
By Rajesh T R and Blaise L Costabir, Kerala and Goa

8. Water hyacinth remover
By Godasu Narasimha, Nalgonda, Telangana

9. Cow-dung pot for nurseries and pot-making machine
By Gopalbhai Suratiya and Pareshbhai Panchal, Vadodara and Ahmedabad, Gujarat

10. Akash Ganga — A social enterprise model for water harvesting

11. Zimba automatic chlorine-doser

12. Comprehensive technology for water and waste-water management

13. Novel technique for energy generation, coupled with treatment of wastewater and resource recovery using e-waste as electrode material in microbial fuel cell

14.Neeri-Zar — portable instant water-filter

15. Hand pump-attachable iron-removal plant

16. "Phytorid" waste water treatment of NEERI

17. Suchi-Ahvanna (innovative dustbin)
By Pratik Raj, Deepak Nagar, Kewal Chand Swami, IIITDM, Jabalpur

18. Recyclable porous sheets for low-cost water filter
By Abhishek Gandhi, IIT-Delhi

19. Electrospun cellulose acetate nanofibres for female-hygiene applications
By Shital Yadav, Illa Mani Pujitha, Tulika Rastogi, IIT-Hyderabad

20. Inch-worm mechanism for solar panel cleaning robot
By Bhivraj Suthar, IIT-Delhi

21. Novel algal bioreactor for wastewater treatment and biofuel (lipid) production by Durga Madhab from IISC, Bangalore

Day 7

March 13, 2015

Financing of Innovation (organised by NABARD) a meeting of banking chairpersons and senior officers from the Ministry of Finance; Closure of the Festival of Innovation

The roundtable on 'Financing of Innovations', was organised by the Office of the President, National Bank for Agriculture and Rural Development (NABARD) and NIF. With a total of 62 panellists, the invited participants spanned the breadth of financial sector as well as innovation ecosystem in India. Managing directors, CEOs, founding partners and other top management executives from the entire spectrum of financial domain ranging from public sector banks (including SIDBI, State Bank of India, Punjab National Bank, Canara Bank, along with multiple others from states), to private banks (such as ICICI and Axis Bank), to venture capital groups (such as Ivy Cap Ventures) along with multiple grameen banks and micro-finance institutions (MFIs) were represented, apart from NABARD's own team of bankers. Apart from the banking community, there were directors from educational institutes, representatives from Department of Science and Technology, Department of Skill Development and Entrepreneurship, along with leaders from BIRAC and Department of Biotechnology.
In addition, innovation scholars were present in Rashtrapati Bhavan as special guests of the President of India. This set the stage for an intense debate on bringing out the needs of innovators, scientists, educators and industrialists, and meeting them through efforts of bankers, businessmen, angel investors and the likes.

Setting forward an agenda for financing

'It is pertinent that sensitization and capacity building form an important agenda of inclusive innovation system"
-Shri Pranab Mukherjee

of innovations Dr Vipin Kumar, Director and Chief Innovation Officer at NIF, welcomed the participants. Mr T M Bhasin, Chairman and Managing Director, Indian Bank, stressed that one can not reach the root of the problems in financing innovations without developing empathy with the innovator.

Prof Anil K Gupta set a context to the innovation landscape in India by expounding the efforts of GYTI, Honeybee Network and SRISTI. He shared the impact of simple innovations like the wrapper-picker by 15-year-old innovator Diptanshu Malviya and the staircase-climber invented by Shalini Kumari, on his own ability to imagine and ability to think more empathetically. These children had thought about the problems that we are aware of but have not done much about. He stressed the need for linking banking system with innovation clubs at various central universities and institutions in India. These clubs aim to search, spread and celebrate innovations, and sense the unmet needs and provide a voice and visibility to them.
NIF itself had so far catalogued close to 200,000 ideas and funded 650 projects. However, only five per cent of these were taken up as business opportunities by entrepreneurs. Almost none of the innovative student projects awarded under SRISTI's GYTI programme had received organised financial support from the banking sector in India. Prof Gupta elaborated that this has been the case because there is a serious disconnect between the three stakeholders of a venture — the innovator, the inventor and the entrepreneur.

"All three roles often require very different skill sets. The innovator is not always an entrepreneur, and is often content with keeping his solution to himself. The entrepreneur does not actively seek innovators and often stays within the boundaries of traditional business models. The innovator cannot reach out for the right financing opportunities from investors for early-stage research, and the investor often has difficulty finding entrepreneurs to fund great business ideas with potential for commercialisation," Prof Gupta said.
Blurb: A Change not monitored is change not desired

Dr Harsh Kumar Bhanwala, Chairman, NABARD, said, "Although we have been building bridges between the needs of the society and emerging innovations, a lot of change will go into the existing educational system to promote innovation and entrepreneurship, which will make India an R&D powerhouse. At the same time, both social and familial support is necessary in bringing inventions from 'lab to land'. All of this must be considered in the context that India is largely an agrarian economy and there is an urgent need to resolve problems like making small-land holdings viable," he said. Dr Bhanwala foresees growth in India, fuelled by innovation, sponsored not just by risk capital, but through mainstreaming support, and thus feels that there is a need for developing architecture around financing innovations.
Prof Anil Gupta proposed a structure to the meeting by suggesting four aspects that need to be looked into by the panel:

I. Mentoring innovators and managing ecosystems: While bankers are the nerve centres of the Indian economy, connected directly or indirectly to companies, clients and special purpose vehicles in their day-to-day activities, they can provide a window of opportunities for an innovator. Helping create networks, even handholding at times, on the part of investors can help budding innovators and entrepreneurs find their missing blocks.

II. Monitoring and collaboration: This would involve monitoring the inflow of ideas, evaluating feasibility, creating milestones and taking systematic decisions both on the technical and financial front. Venture capitals have long called this due-diligence, but the Indian ecosystem calls for a much more collaborative approach.

III. Financing of innovations: Finance Ministry has allocated a corpus of Rs 1,500 crore to promote innovation-based investments. Micro Venture Innovation Fund (MVIF) set up through SIDBI has been actively disbursed without collateral, under single signature and with minimum paperwork to innovators through NIF. Similar efforts from the organised financial sector through simplified bank guarantees and overdraft facilities can help an innovator in the long term.

IV. Infrastructure required: India has become the bedrock for innovations in e-commerce systems along with the associated technology back-ends. Open-source ERP systems, implemented by entrepreneurs, can act as enterprise health-monitoring systems, and simultaneously provide financers transparent indicators to facilitate further lines of credit.

Discussion

- Mr Vikram Gupta, founder and Managing Partner of Ivy Cap Ventures, recounted his personal experience in investing in bottom-of-the-pyramid applications which have proved successful in their early stages. He claimed this was enabled by the support of IIT alumni the primary investors in his fund, and willing to invest in riskier projects that can have a tangible social impact as well. Going forward, alumni-driven investments would foster innovations.
- Mr Gauri Shankar, Managing Director, Punjab National Bank, highlighted the increasing digitisation of the banking sector. Through his experience in the New Innovation Division in PNB, he claimed that before considering financing of innovations, internal innovation and streamlining of processes are needed.
- Mr Sushil Muhnot, Chairman and Managing Director, SIDBI, elaborated the stages of financing, namely seed stage, early stage and late stage, and highlighted the role of angel investors, venture capitalists and traditional bankers at each stage. While the entrepreneur needs, in many cases, marketing expenditure for his product, the banker often faces difficulty in capitalising it. Furthermore, he distinguished assets as both tangible and intangible, and called for independent valuation agencies to bring forth credit rating metrics for both, and in essence help put a value to the innovative firm.
- Representing SBI, Ms Gitanjali Mishra stated that there is a clear passion mismatch between the bankers and the innovators, and this needs to be bridged. Identifying opportunities, improvising financial solutions and investing diligently is the approach a banker should take towards innovation.
- Dr Inderjit Singh, Department of Science and Technology, argued that we need soft-financing as well as hard-financing measures from banks, while ensuring continuous evaluation as well as monitoring of the progress made by the innovator. He also highlighted the plight of government departments, saying that accountability of appropriate utilisation of funds put a lot of restrictions on sanctioning of credit, making the process of disbursement slow and cumbersome.
- Ms Jyotsana Sitling from Ministry of Skill Development favoured creating an ecosystem, starting with creating a culture that is conducive to entrepreneurs. While creation of Sector Skill Councils covering 33 different sectors under their fold and establishment of a National Skills Qualification Framework is laudable, only 1.5 per cent of the current employed workforce in India has received some kind of vocational training, with the other 98.5 per cent having received no training at all. In this sense, it will be important for entrepreneurs as well as financers to consider workforce challenges as well.
- Prof Devang Khakhar, Director, IIT Bombay, asserted that his institute has been at the forefront of promoting small businesses and enterprises in the form of hi-tech start-ups. He acknowledged the role of venture funds in supporting innovations. He said that along with standalone innovations, we should focus on innovations happening within existing firms, especially SMEs. He claimed that incubator-based models have worked very well for IITs, and bringing them to Tier-II institutions through support of financial institutions can be a great leap forward.
- Mr Chattanathan D, Jt General Manager, ICICI Bank, explained that while crowdfunding efforts like Kickstarter and Kiva fall in a regulatory grey area, RBI needs to intervene and bring clarity on their operations in India. At the same time, using incubators as aggregators of infrastructure, and banks remaining financers of these assets can be a viable model, requiring minimum intervention. He called for a separate line for risk management created specifically for ventures.
- Ms Vertika Jaini, representing Tata Trust, called for an ecosystem-based approach to identifying and financing innovators. She cited the example of east and far-east tribal communities who are presently weakly connected with the rest of India, and said that entrepreneurs bringing inclusion to these communities must be supported. .
- Prof Anil Gupta added that rapid farm mechanisation could be one approach to improve productivity in agriculture, and mentioned that several innovations related to this area were on display in the innovation exhibition at FOIN. However, the support for replicating these innovations from banking sector could be enhanced.
- There was consensus on bringing up the same issues on industrial forums like CII or FICCI, where technical feasibility as well as commercial-viability link need to be further explored. It was

also proposed that while no mandate exists right now on allocation of loan portfolio of banks as innovation funds, a two to four per cent directive might bring standardisation across the financial spectrum.

Inputs from Department of Financial Services, Ministry of Finance
Mr Hasmukh Adhia, Secretary, Department of Financial Services (Ministry of Finance), quoted an NSSO survey, which says that there are about 57 million small entrepreneurs employing about 120 million people in India, a little over two people per enterprise. At the same time, the financial corpus available to this segment is only about Rs 11 lakh crore — about four per cent of which comes from institutional sources. "This is an appalling situation, and financial inclusion is therefore a critical need for small businesses and entrepreneurs.

Microfinance institutions, which have been classically refinanced by SIDBI, can now interface with Mudra Bank (Micro Units Development and Refinance Agency), a special-purpose vehicle subsidiary of SIDBI. It has a corpus of Rs 20,000 crore to refinance MFIs as well as act as regulator for the sector," Mr Adhia said, adding that the simplification of architecture around MFI loans would make credit flows easier to grassroots entrepreneurs and innovators.

Inputs from Chairman, Indian Bank Association
- Mr T M Bhasin, Chairman of Indian Bank Association, supported the cause of innovators and extended full support on behalf of the Indian Bank Association. He suggested that retired general managers and deputy general managers could be reached out to facilitate mentoring needs. This can be coordinated with National Innovation Foundation and its local representative offices. Banks can also allocate CSR funds for training innovators in basic financial knowledge and thereby raise financial literacy for their personal as well as company finances. Workshops where accounting for entrepreneurs is taught can be undertaken by Indian Bank Association. In order to strengthen bankers' commitment towards funding innovation, RBI can be approached for mandating the creation of a guarantee fund towards entrepreneurs and innovators.

Key recommendations to President of India

With the Roundtable discussions drawing to a close, Prof Anil Gupta summarised the recommendations of the panel for the Hon'ble President of India, Mr Pranab Mukherjee. He called on bankers to provide adequate oversight for the entire mind-to-market innovation chain.

A summary is as follows:
- Prominent leaders and management of financial institutions as well as regulatory bodies need to bring a greater level of personal touch to show their support towards innovators. Inviting budding inventors and entrepreneurs to branch/regional/head office can be a good first step.
- While microfinance institutions need to bring greater inclusion in their credit lines, micro-venture capital with minimum collateral needs to be established as a consistent source of equity infusion for early stage innovators, and existing efforts need to be scaled up.
- Innovation clubs, currently operational at most central universities, need to bring in banking experts for both evaluation of early-stage opportunities as well as act as network nodes to connect innovators with the right industrial bodies.
- While NIF can act as a platform to bring all stakeholders together, joining hands with NABARD can bring tremendous knowledge and experience from the financial services perspective. A special purpose vehicle can then be created which provides both R&D and financial inputs. Any assessment of innovative ideas can be then broken into two phases:
  - In the first phase, the innovator largely needs intangible support and guidance from the right mentors. The financial community can play an advisory role here.
  - In the second phase, the innovator-entrepreneur needs to raise capital to commercialise the idea. Active financing support is required here.
- In order to bring closer coordination, a mapping exercise needs to be conducted to connect all innovation clubs present in India with the most accessible sources of financing and financial expertise.
- The financial industry needs to see need for the risk management associated with innovative ventures differently from conventional credit lines. Promoting convertible debentures as a vehicle facilitating equity infusion will help innovators who need liquid capital and help banks convert their debt into equity.
- Furthermore, banking experts as members of incubator bodies will bring in significant expertise readily accessible to entrepreneurs, and at the same time help the financial community generate much-needed empathy towards innovators.
- Educational policy might need significant revisions at all levels to create a culture of creativity, innovation and entrepreneurship for all sections of our society.
- Regulatory bodies like RBI and SEBI need to bring in a robust mandate on modern financing vehicles like crowdfunding, remittance funding and funds from high net-worth individuals (HNIs) and angel investors to facilitate capital flows.
- Challenges such as skill development and productivity improvement among employees of such micro-ventures need to be tackled head on, and will require full support from relevant government bodies.

Presidential insight and closure of FOIN

Hon'ble President of India, Shri Pranab Mukherjee shared his observations and ideas before closing the roundtable on 'Financing of Innovations' as well as FOIN.
The President observed that the early days of an entrepreneur are filled with struggles at every step, requiring continuous micromanagement
"Even though there have been considerable productivity improvements across sectors in the mainstream economy leading to wealth creation, the Indian entrepreneur continues to lack financial access. While Prime Minister's Jan Dhan Yojana is a laudable step in the direction of financial inclusion, entrepreneurs' needs must be met through single-counter service too," he said.
Offering tips on making innovations marketable, the President said, "Understanding the customer is of prime importance. Technical mentoring helps in refining ideas. Bank branches have a crucial role to play in connecting innovators to their existing clients. The bank manager can open many doors for innovators in a few minutes, which, otherwise, is a struggle of years alone."

The President emphasised on the need for innovation clubs under central universities to be mapped with local banks, so that financial mentorship is never out of reach for innovators who need them. With this, the Hon'ble President of India, Dr Pranab Mukherjee closed the Roundtable as well as FOIN. He acknowledged the presence of each participant and shook hands with each one of them.

Note to self: Insert graphs and photos of slum areas in Children's workshop

Appendix-1

10	Rightbiotic: The fastest antibiotic-finder	TE	Shivani Gupta, D V Padmavathi & Anuradha Pal	Birla Institute of Technology and Science, Pilani, Hyderabad Campus	Dr Suman Kapur
11	Development of a powerful new antibiotic that kills all drug-resistant bacteria	TE	Venkateswarlu Yarlagadda	Jawaharlal Nehru Centre for Advanced Scientific Research	Dr Jayanta Haldar
12	Redefined spoon for Parkinson's patient	SSR	Dhyey Mayankkumar Shah, Eepsit Tiwari & Rajesh Patidar	IIT-Gandhinagar	Harish P M
			Hari Om Ashram Prerit Dr Amulya K N Reddy GYTI Awards		
13	Evaluation of blood pressure and arterial compliance by the radial arterial pulse-pressure waveform obtained using fibrebragg-grating pulse Recorder	SSR	Sharath U	IISc, Bangalore	Dr S Asokan
14	Taparch	SSR	Krishna Sai Inkoolu	GITAM University	
15	Reduced converters and brushless generators-based standalone microgrid for rural electrification	SSR	Krishan Kant	IIT-Delhi	Prof Bhim Singh
16	Development of shape-controlled palladium structures as electrocatalysts for fuel-cell applications	MLM	Kranthi Kumar Maniam	IIT-Madras	Dr Raghuram Chetty
17	Novel nanozyme technology for combating oxidative stress-related disorders	TE	Amit A Vernekar	IISc, Bangalore	Prof G Mugesh
			GYTI appreciations		
1	Food-vending machine for schools	SSR	Subrahmanya Shridhar Shetty, Chandarashekar Moger, Shivanada LC & Udaya G	NMAM Institute of Technology	Pradeep Kanchan
2	Affordable power-assist for wheelchair	SSR	Karthikeyan S D, Sripriya Kalidoss & Vivek Sarda	IIT-Madras	Dr Sujatha Srinivasan
3	Rapid diagnosis of brain injury–A novel approach using citrate-capped gold nanoparticles	SSR	Srishti Agarwal	IIT-Hyderabad	Dr Anindya Roy
4	Prashamana- A smart hospital bed	SSR	Jamdade Nikhil Kailas & Toshib Bagde	IIT-Kanpur	Dr Ramkumar Janakarajan
5	Suchi-Ahvana	SSR	Pratik Raj, Deepak Nagar & Kewal Chand Swami	IIITDM, Jabalpur	Awadhesh Kumar Singh
6	Methane-sensing module: From concept to prototype	TE	Anwesha Mukherjee	IISc, Bangalore	Dr Abha Misra
7	Injection mouldable polymeric composite-based passive polycentric knee joint	MLM	S Arun	IIT-Guwahati	Dr S Kanagaraj
8	Fabrication of nano object-imaging probe using simple &fast hydro -mechanical etching technique	TE	Fazle Kibria	University college of Science & Technology, University of Calcutta	Rajib Chakraborty
9	Biomechanical investigation of extracorporeal irradiation therapy in malignant bone tumours	TE	Sakshi Chauhan and K Manoj (AIIMS)	IIT-Delhi	Dr Anamika Prasad and Dr Shah Allam Khan
10	Tedkit — An audio tactile storybook for visually-impaired children	SSR	Ankita Gulati and Neil Shah	IIT-Delhi	Dr M Balakrishan
11	Rapid non-invasive diagnostics kits for diabetics patients to check glucose level thrice a day	SSR	Vijay Yadav	ICT, Mumbai	Dr Prajkta Jain
12	Electrospun cellulose acetate nanofibres for female-hygiene applications	SSR	Shital Yadav, Illa Mani Pujitha & Tulika Rastogi	IIT, Hyderabad	Chandra Shekhar Sharma
13	Recyclable porous sheets for low-cost water filter	MLM	Abhishek Gandhi	IIT-Delhi	Dr Naresh Bhatnagar

14	Effect of encapsulated linseed oil to enrich cardiac and brain lipids with Omega-3 fatty acids in rats	MLM	D Sugasini	CSIR-CFTRI, Mysore	Dr B R Lokesh
15	Linearly-polarised planar inverted F-antenna for GPS and worldwide interoperability for microwave-access applications	TE	Mayank Agarwal	IIT(BHU), Varanasi	Dr Manoj Kumar Meshram
16	Virtual reality-based minimally-invasive surgical simulator with haptics feedback	MLM	Raghu Prasad MS	IIT-Madras	Dr M Manivanan
17	Energy-efficient robust controller for autonomous underwater vehicle	MLM	Meenakshi Sarkar	CSIR — Central Mechanical Engineering Research Institute	Dr Sambhunath Nandy & Dr Sankar Nath Shome
18	One drug to cure them all	TE	Chandradhish Ghosh	Jawaharlal Nehru Centre for Advanced Scientific Research	Jayanta Haldar
19	Use of high-nutrient, low-cost natural materials for preparation of well-engineered emulsions for variety of applications	SSR	Lad Virangkumar Nanubhai	Sardar Vallabhbhai National Institute of Technology, Surat	Prof Z V P Murthy
20	Development of membrane technology for industrial progress, societal benefit and environmental safety	MLM	Siddhartha Moulik, Y V L Ravikumar, M Madhumala & D Manjunath	CSIR-Indian Institute of Chemical Technology	Dr S Sridhar
21	Utilisation of marine algae as substrate and methanogen inhibitor in microbial fuel cell	TE	Rajesh P P & Jadhav Dipak A	IIT-Kharagpur	Prof M M Ghangrekar
22	Inch-worm mechanism for solar panel-cleaning robot	MLM	Bhivraj Suthar	IIT-Delhi	Prof S Mukherjee & Prof Viresh Dutta
			BIRAC-SRISTI GYTI appreciations		
23	Algiculture	SSR	Abhitha R	IISc, Bangalore	Dr H N Chankaya

24	A novel process to commoditise carbon dioxide gas into fuels and high-value nutraceuticals at commercially-viable scale	TE	Dilip Singh	DBT-IOC Center for Advanced Bio-energy Research	Dr Ansu S Mathur & Dr Deepak K Tuli
25	Development of X-ray visible polymers via in situ Iodination-crosslinking for non-invasive real-time imaging	TE	Paulomi Ghosh & Arun Prabhu Rameshbabu	IIT-Kharagpur	Dr Santanu Dhara
26	Clubfoot deformity-measuring device	SSR	Dr Kanwaljit Singh	IIT-Delhi	Prof Alok R Ray& Dr P M Pandey

SRISTI Sanman awardees

Name	Award application
Shri Arvind Bhai Vallabh Bhai Marvaniya	Carrot farmer
Ms Braille Yadeshwari	Writes spiritual books in Braille
Shri D Dhanapalan	Documented traditional ethno-veterinary practices
Shri Daripalli Rammiah	Tree planter
Mr Genabhai Patel	Pomegranate farmer
Mr Harsukhbhai Dobriya	Bird conservator
Shri Jayaraman	Conserving and improving productivity of traditional paddy varieties
Shri Karthikeyan	Innovations in agricultural implements
Smt Rajeshwari	Nutritious food preparations using millets, entrepreneur
Mr Samatbhai Zada	Organic farmer
Mr Sandeepbhai Karbhari Gund	Initiative of a digital school

Appendix 2

Schools/NGOs which nominated 76 children to attend the Creativity Workshop in Delhi during March 2015.

Six children from Pardada Pardadi Inter College, Anupshahar, Uttar Pradesh
NGO Pardada Pardadi Educational Society gives free education to girls to 12th with vocational skills. Rs10 per day of attendance by girls is deposited in a bank account for them. Full attendance will give them Rs 30,000 on graduating.

Seven children nominated by the Aga Khan Foundation, living mainly in the Hazrat Nizumuddin area

- One child from The Indian School, south Delhi, co-ed, CBSE school, nursery to secondary. Founded 1996. Elite school

- Four children SDMC (South Delhi Municipal Corporation), Primary Pratibha Vidhyalaya Nizumuddin West
- One child each from: Madarsa Mahad al Sheikh, Hazrat Nizamuddin, near Batla House and Madarsa Jamia Arabia Nizamia Welfare Education in north east, Sunder Nagari

Eight children nominated by Aman Biradari
An NGO which operates the Dil Se Campaign in New Delhi, which supports the development of street children. They nominated children living in shelters for the homeless: Rainbow homes for homeless shelter for girls (five children—three in the following school, two unschooled):

- Nagar Nigam Prathmik Vidyalaya, school, Sangam Vihar, south Delhi, one of the largest unauthorised colonies in Asia, 1.5 million people, water supply is by tankers, no government hospital. (www.wikipedia.org)

- Ummeed Aman Ghar homeless shelter for boys; three children— one in the above school, two unschooled
Five children nominated by St Paul's Diocesan School

Co-ed, English medium, CBSE, founded 1972 by Delhi Orthodox Syrian Church Society, Elite school

Five children nominated by Salma Public School, Rataul, Uttar Pradesh
Founded by Prof Zahoor Siddiqi in 1993;recognised by the government in 2000. By 2012 there were 487 students, 204 are girls — significant in a conservative Muslim village.

Five children nominated by Jamghat are associated with Jama Masjid
Jamghat is an NGO that rehabilitates children living and working on the streets of Delhi, three attending NIOS schooling, two at Nur Niwas Public School 18 NIOS (National Institute of Open Learning) (www.nios.as.in) established 1989 as an autonomous organisation under Ministry of Human Resource Development. Secondary, senior secondary and vocational Nur Niwas Public School, a small school run by a society.

Eight children nominated by Deepalaya
Four each from the following two institutions: Deepalaya School Kalkaji Extension, Govindpuri, NGO focused on street children, girl children and disabled children through education, vocational training, healthcare, institutional care and women empowerment www.deepalaya.org.

Four schools in Delhi, Deepalaya Education on Wheels Project covers north Delhi, including Bhalaswa. Launched in 2006, a bus equipped with computer, library, TV, carpets and play materials
Three children nominated by Katha Lab School

Founded in 1990 as a learning centre in the slums of Govindpuri with five children, Katha Lab School now has 9450 children in 43 Katha Schools (www.katha.org) in Delhi (visited by Duchess of Cornwall in 2013) and five schools in the tribal areas of Arunchal Pradesh. From primary to 12th, academic and vocational classes, teachers from the slum areas.

Eightchildren nominated by Diksha Foundation live in Kusumpur, Pahara
Diksha Foundation is an NGO for the education of the socially disadvantaged in Uttar Pradesh, Bihar and in Kusumpur Pahari where it runs the Maadyam Experience Centre focusing on out-of-the-box learning for children (www.colearnindia.org) one child MCD (Municipal Corporation of Delhi) Primary School, co-ed, (several schools) three children from Sarvodaya Co-ed Vidhalya, Government school, Multan Nagar four unschooled.

25 children nominated by Dr Rajendra Prasad Sarvodaya Vidyalaya, the President's Estate School, Rashtrapati Bhavan.

Three children innovators whom we met during shodhyatra in Sikkim invited by SRISTI

Steering Committee members of FOIN (2015) - constituted to design the format, approach and content of the Festival of Innovation

Chairperson
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2) Dr R A Mashelkar, Chairperson, NIF Governing Board and National Professor, NCL
3) Prof K Vijay raghvan , Secretary (Additional Charge) of DST
4) Prof Sudhir Kumar Sopory, Vice Chancellor , JNU
5) Dr Devang Khakhar , Director , IIT - Bombay
6) Prof. Ashish Nanda , Director , IIM-Ahmedabad
7) Dr Ajay Sharma, Director , NIT Delhi
8) Prof Anil K Gupta, Executive Vice Chairman, NIF
9) Dr Vipin Kumar, Director and CIo, NIF

Member Secretary
10) Shri Suresh Yadav, OSD to the President -

Steering Committee members of FOIN (2016)

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Members
2. Prof. Ashutosh Sharma, Secretary, Department of Science and Technology
3. Dr. H. K. Mittal, Head- Enterpreneurship/ Innovation Division, Department of Science & Technology
4. Prof. Anil K. Gupta, Executive Vice-Chairperson, National Innovation Foundation
5. Dr. Vipin Kumar, Director & CIO, National Innovation Foundation
6. Dr. Renu Swarup, Senior Adviser/ Scientist "H", Department of Biotechnology
7. Shri Manoj Mittal, Dy. Managing Director, Small Industries Development Bank of India (SIDBI)

Member-Secretary
8. Shri Suresh Yadav, OSD to the President

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2) Shri Suresh Yadav , Officer on Special Duty to the President
3) Shri Pankaj Saurabh, Under Secretary
4) Shri S M Sami, Section Officer
5) Smt. Manjiri Joshi, Private Secretary

NIF Team Members

1) Dr Vipin Kumar, Director, NIF
2) Mahesh Patel, Scientist C, National Innovation Coordinator
3) Dr Vivek Kumar , Scientist D, Senior Innovation Officer
4) Dr Ravi Kumar , Scientist D, Senior Innovation Officer
5) Rakesh Maheshwari , Scientist C, Innovation Officer
6) Hardev Chaudhary, Scientist C, Innovation Officer
7) Dr Nitin Maurya , Scientist C, Innovation Officer
8) Dr Pawan Kumar, Scientist C, Innovation Officer

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Honey Bee Network