

Emerging PPP model in science and technology in India

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ABSTRACT

Knowledge society is the result of various socioeconomic and political aspects such as globalization, emerging technologies, innovations and their management. Various studies have concluded that technology innovation contributes significantly to nation's productivity, economic growth and standard of living. Technological innovation in a country has been accepted as an integral component of Knowledge Economy Index. Business leaders have also highlighted the role of innovation in national growth, competitiveness and quality of life. Fast moving global technology based business and need of access to proprietary technologies has increased the interest in public-private collaboration. Several new mechanisms for accessing new technologies are evolving. Further, there is an increase in the general understanding of IPR and its importance as a strategic tool. The emerging IP regime is creating new business opportunities and new models in research collaborations. These include new business and legal options to gain access to proprietary technologies through confidential agreements, material transfer agreements, licensing, purchase, and joint ventures.

Government influences the overall technical innovation system through supporting innovation in public and private sectors, and through regulation of market operations and industry structures. Active and effective governance also ensures compliance of policies through rules, processes, procedures and specific actions for innovative technologies and their dissemination. Indian government is promoting dissemination of scientific results through involvement of private players for the benefit of society. Public private partnership (PPP) is one of the important mechanisms through which Indian Government is encouraging stakeholder participation and innovation process by promoting various technological interactions and public-private collaborations.

The present article is about government policy and programme fostering PPP model in Indian science and technology sector. The objective of this article is to give an overview of on PPP concept in Science and Technology, operating PPP models in Indian technology sector, and emerging legal and IP issues in technology based business and public private collaborations.

KEYWORDS: Technology Commercialization, PPP Model, IPR Strategy, Government Policy

1 INTRODUCTION

Public private partnerships (PPP) is an arrangement between government agencies and private sector agencies to achieve specific objectives by providing finance, certain infrastructure facilities and services, and strategic guidance which were conventionally provided by the public sector only. Such collaborations are meant for dedicated allocation and utilization of resources, flexibility in decision making, harmonization of risks and return. The PPP arrangement ensures that the private players finance, develop and operate the project with innovative technologies and professionalism to attain maximum efficiency whereas the government agencies manage social objectives and environmental norms [1]. Public-private partnerships do not replace any organization. Rather, they complement institutional activities by creating new tools more quickly and flexibly to overcome the problem of traditional system. Government also influences the overall technical innovation system through supporting innovation in public and private sectors, and through regulation of market operations and industry structures.

In the era of market oriented research, PPPs can serve as a major step towards development of people and economy of India on the whole. The PPP models have been overwhelmingly successful in infrastructure sector and Indian government is expanding the scope of these partnerships into new sectors of development such as science and technology. Indian government is promoting dissemination of scientific results through involvement of private players for the benefit of society. Public private partnership (PPP) is one of the important mechanisms through which Indian Government is encouraging stakeholder participation and innovation process by promoting various technological interactions and public-private collaborations.

2 TRANSFORMING PUBLIC PRIVATE PARTNERSHIPS IN THE INDIAN SCIENCE AND TECHNOLOGY SECTOR

There are various potential types of cooperation between public organizations and private enterprises which can be worked out based on the nature, location and end users of the project. The popular PPP modalities to encourage major private sector investment include Service contracts, Operation and management contracts, Build Operate Transfer (BOT), Build Transfer (BT), Build Own Operate Transfer (BOOT) and Build Own Operate (BOO) [2].

Several factors make it difficult to attract the necessary investment in commercial research and development for high tech research area (like biotechnology, nanotechnology, medical biology), which includes high technical complexities, uncertainty, long gestation period, business risk, distribution challenges in countries, and lack of investment policies and regulatory guidelines. Other issues such as weak IP enforcement regime [3], compulsory licensing and lack of awareness on new technology have created further disincentives for companies to invest in products that primarily serve developing-world markets.

Due to some of these challenges research funding in Indian companies has been highly diffused and rely largely on government support in the form of grants, parks, fiscal incentives etc. The Indian government is trying to transform industrial R&D through PPP by funding high-risk and high cost projects to convert basic scientific discoveries into usable products. These partnerships are driven by a defined goal and mandate for time bound delivery of research outputs.

Although the private sector has exploited new technological capabilities for creating new product and processes is common in industrialized countries, innovative approaches and models have not been developed in the countries of developing world like India.

Depending on the stage of development and the access or affordability issues at stake, the partnerships may require a range of legal solutions for IPRs. For such partnerships, intellectual property remains a tool to achieve equitable access of IPRs at low prices. Such arrangements may offer a range of possibilities for IPR terms negotiations to accomplish its goals including exclusive and nonexclusive rights, pricing agreements, technology transfer arrangements, and royalties.

The Government of India has adopted various PPP models and initiated various reforms to support the growth of technology based industry. Below mentioned few initiatives of Indian Government can be highlighted for public-private collaborations:

❖ **TePP, BIRD and PACE Programme:**

The Department of Scientific & Industrial Research (DSIR) under Ministry of Science & Technology, Government of India runs various programme [4] aimed at technology entrepreneurship.

- Through **PRISM's Technopreneur Promotion Programme (TePP)**, DSIR offers grants for individual innovators and budding entrepreneurs to demonstrate proof of concept and/or prototypes of novel ideas. There are various schemes under the TePP program to fund various stages of technology development and needs of individual innovators.
- Under **Building Industrial R&D Promotion Programme (BIRD)**, R&D in Industry is being encouraged and supported; and support is provided for creation of Common Research Facilities for Small and Micro Industries.
- Under the scheme **Patent Acquisition and Collaborative Research and Technology Development (PACE)** Indian industries are being supported to acquire patented technology at an early stage from within the country or overseas on an exclusive as well as non-exclusive basis, add value to the acquired technology for exploitation in Indian / foreign markets and develop innovative and socially relevant products for public consumption in India and abroad.

❖ **National Science & Technology Entrepreneurship Development Board:**

The National Science & Technology Entrepreneurship Development Board (NSTEDB) under the aegis of Department of Science & Technology, Government of India is promoting knowledge driven and technology intensive enterprises. The Board aims to convert “job-seekers” into “job-generators” through Science & Technology (S&T) interventions.

- Through **Technology Business Incubators (TBI) scheme** [5] the Government is promoting technology based new enterprises, value added jobs & services, transfer of technology, entrepreneurial spirit, commercialization of R&D output, and specialized services to existing SMEs.
- Through **Science & Technology Entrepreneurs Park (STEP)** [6] the Government is creating necessary climate for innovation, information

exchange, sharing of experience and facilities and opening new avenues for students, teachers, researchers and industrial managers to grow in a trans-disciplinary culture.

❖ **New Millennium Indian Technology Leadership Initiative (NMITLI) Scheme:**

Under this initiative, the Government promotes R&D Programme in Public-Private Partnership mode through the Council of Scientific & Industrial Research (CSIR) [7]. NMITLI has so far evolved 57 largely networked projects in diverse areas viz. Agriculture & Plant Biotechnology, General Biotechnology, Bioinformatics, Drugs & Pharmaceuticals, Chemicals, Materials, Information and Communication Technology and Energy. These projects involve 80 industry partners & 270 R&D groups from different institutions.

Under this scheme the Government of India is funding along with industry through a specific scheme called '*NMITLI 50:50 initiative*' to assist financially sound companies with low R&D setup for developing network projects in new product/technology development. Under this scheme NMITLI is also involved in **Co-financing with Venture Capital funds** to jointly finance technology based projects. Such projects are being identified and evolved as per procedures established by NMITLI. The successes and failures resulting from the projects are to be shared on equitable basis. **NMITLI innovation centres** are also being set up in PPP mode. Such facility with requisite human resource as well as infrastructure are assembled at one place to cross the threshold of intellectual barrier in order to generate globally competitive technologies and products, IPR, and high quality publications. Few 'NMITLI Innovation Centres' are in the areas of Photovoltaics, Fuel Cells, White LEDs, Industrial Enzymes, Medical Implants, Vaccine development, Seed Development etc.

❖ **Biotechnology Industry Partnership Programme (BIPP):**

BIPP [8] is a government partnership with Industries for support on a **cost sharing** basis for path-breaking research in bio-technology having major economic potential. BIPP supports the development of appropriate technologies in the context of recognized national priorities in the area of agriculture, health, bio-energy, green manufacturing. The focus here is on viability **gap funding** for very high risk, nationally and socially relevant areas, with no assured market and enhancing existing R&D capacities. It is envisaged that public institutes would be useful partners, so that the basic R&D leads can be translated to product development by the industry. It is focused on IP creation with ownership retained by Indian industry. Till now more than 50 startups and SMEs have been promoted under the scheme through soft loan and grant. A total of investment of US \$ 141m has been committed with US \$ 50m by Govt. of India and contribution of US\$ 91m from private sector.

❖ **Small Business Innovation Research Initiative (SBIRI):**

This scheme was launched by Department of Biotechnology (DBT), Government of India to boost public-private-partnership effort in different sectors of biotechnology namely medical, agriculture, food, industry and environment. The SBIRI supports the high-risk pre-proof-of-concept research and late stage development in small and medium companies to get them involved in development of products and processes which have high societal relevance [9]. SBIRI has direct focus on producing Biotech products by bringing together private industry, public institutions and government under one umbrella.

The SBIRI encourages smaller businesses to increase their R&D capabilities and capacity, stimulate technological innovation, use private industries as a source of innovation and thereby fulfill government objectives in fostering R&D, and increase private sector commercialization derived from Government funded R&D.

❖ **Mega Food Parks Schemes:**

The Mega Food Parks scheme involves the building of food parks under a PPP arrangement with private players. These parks broadly promote food processing industry in a market driven manner commensurate with both global and national demands. The Scheme is providing a mechanism to link agricultural production to the market by bringing together farmers, processors and retailers so as to ensure maximizing value addition, minimizing wastages, and creating employment opportunities. The Scheme is based on “Cluster” approach and envisages a well-defined agri/ horticultural-processing zone containing state-of-the-art processing facilities with support infrastructure and well-established supply chain [10]. The Scheme operates in hub and spoke model under which there will be a Central Processing Centre (CPC) which is networked with farm proximate Collection Centres (CC) and Primary Processing Centers (PPC). While the CPC is providing core processing infrastructure, the PPC/CC facilitates the basic infrastructure facilities for cleaning, grading, sorting and packing facilities, dry warehouses, specialized cold stores including pre-cooling chambers, ripening chambers, reefer vans, mobile pre-coolers and mobile collection vans.

Under this scheme the Government envisages a onetime **capital grant** of 50% of the project cost (excluding land cost) in general areas and 75% of the project cost (excluding land cost) in difficult and hilly areas of India.

To summarize the various approaches being adopted by the Indian Government for PPP in Science and Technology sector, we can say that the government is partnering with industry at various levels ranging from technology development to technology commercialization including research funding, Co-funding, infrastructure creation, incubation and scale-up support, technology transfer, entrepreneurship promotion, IP acquisition and protection.

3 CASE STUDY: BIOTECH CLUSTER UNDER PPP

Favourable government policies and demand for scientific environment have resulted in the development of biotech clusters in few cities of India. The city Hyderabad has emerged as one of the leading hubs of privately held clusters and biotech parks largely funded by Government agencies, financial institutions, biotech companies and real-estate funds. These biotech parks have world class infrastructure and creation of dedicated R&D facilities for contract research, clinical trials, collaborations, educational support and manufacturing activities.

Genome Valley is the first state-of-the-art biotech cluster in India for life science research, training and manufacturing activities with dedicated funding from state government [11]. **ICICI Knowledge Park (IKP)** and **Alexandria Knowledge Park™ (AKP)** are located in the hub of the Genome valley cluster in Hyderabad.

The **ICICI Knowledge Park (IKP)** has promoted 65 companies so far, and is currently associated with 47 of them [12]. IKP features mix of ready-to-use, customisable modular wet laboratory blocks and developed plots for construction of own R&D centres. Presently, there is 84,000 sq. ft. of laboratory space in the multi-tenanted Innovation Corridor with a built-up area of 140,000 sq. ft. IKP has allotted around 70 acres of land on long lease to 10 anchor companies to build their own research facilities. Another 20 acres are available. The operations and maintenance of the Park are ISO 9001:2008 certified.

The **Alexandria Knowledge Park (AKP)** was developed in a Public Private Partnership mode with the Government of Andhra Pradesh. Today AKP has evolved as a preferred destination for leading Indian and Global companies to conduct research & development activities. AKP is spread over 306 acres, and has a unique mix of individual campuses with multi-tenanted research buildings and incubation facilities. Alexandria Innovation Center (AIC) is designed to provide incubation lab space with options for leasable Pilot Plant(s) facility and Common Analytical Area [13]. AIC facilitates enterprises in translating their research ideas into commercially viable technologies without making large R&D investments upfront.

4 CONCLUSION

Public private partnership (PPP) is an important mechanism for the public sector institutions to achieve substantial growth in science and technology sector. PPP is any type of collaboration between the public and the private-sector entities in which the partners jointly plan and execute various activities with an agenda of accomplishing certain common objectives while sharing the costs, risks, and benefits incurred in the process. PPPs help to inject a broader set of skills and talents to create a solid foundation for innovative thinking and creativity. PPPs also help private companies embrace innovation and bring together new financial resources and business capital to facilitate innovation in increasingly competitive environments.

The science and technology industry provide an ample scope for the private players to come in a PPP mode with the Government and bring a turnaround in the economy and delivery of product and services to the common man. The need to foster such arrangements in the technology industry is realized by the public sector's inability to provide certain technological solutions entirely on its own in an effective and equitable manner because of lack of resources, management issues and market approach. There is an urgent need to remove the bottlenecks in the technology sector by fostering private sector participation in the areas of project financing, capacity building, operations and better integration of stakeholders. The Indian science and technology sector has a tremendous potential to set new

benchmarks. PPP in this context can be the best vehicles to achieve all round sustainable development in the technology sector. The need is take policy measures to extend incentives in terms of facilitating subsidy, grant-in-aid, and healthy environment for technology transfer and exchange which can provide a right platform for initiating technology based business in India.

The public private R&D partnerships discussed in this article are still nascent and experimental. It is also evident that far greater resources must be invested in technology sector to provide technological solutions for developing countries. Nevertheless, the partnerships provide a real opportunity for success. They offer a new and effective response to the public needs. The projects supported by these partnerships also represent new industrial activity in R&D that would not otherwise take place [14], and the scientists have new opportunities to exploit discoveries, a trend that will lead to more directed research for new products.

The above discussions show that PPPs are critical instruments for innovation in India. Public-private partnerships are being increasingly encouraged as part of the comprehensive development framework in India. Such partnerships help government agencies become more inventive by creating a space outside the government structure. Indian government should utilize vast technical resource pool by promoting more PPP models in cost efficiencies, by providing strong government support [15], facilitate reduced time to market, and by strengthening IP environment in the country.

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