

Capacity Building for Innovation: Role of IP Infrastructure*

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The paper discusses the role of IP Infrastructure and areas that are to be addressed in capacity building for innovation. The Indian experience is benchmarked to examine and augment the role of intellectual property infrastructure, as a facilitator of innovation. According to the author, there exists a pertinent need to improve IP infrastructure in developing countries.

Keywords: Intellectual property, capacity building for innovation, role of IP infrastructure, innovations, developing countries, IPR

Innovations in science and technology are widely recognized as the engine that drives the economic transformation of developing countries. However, this recognition is only beginning to be featured as a part of national development policies¹. Increasingly, the real innovation bottleneck is not the supply of new knowledge, but external factors surrounding the process. The Indian experience is examined with a view to augmenting the role of intellectual property infrastructure as a facilitator of innovation.

Innovation was an integral part of ancient Indian civilization and culture. India has great scientific discoveries and technological innovations in various fields to its credits. Albert Einstein once said: "We owe a lot to Indians who taught us how to count, without which no worthwhile scientific discovery could have been made"².

Indians overseas have made a formidable mark on global science and technology enterprises. While expatriate Indians working in a more nurturing environment have developed tetracycline, invented gene synthesis, discovered white dwarfs in the universe, created Pentium chips, and have dominated the IT industry, modern India is far from being a knowledge superpower as its intellectual resources are not being harnessed to its full extent.³

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This is amplified in the knowledge for development programme of the World Bank⁴, which benchmarks how a country's economy compares with its neighbours, competitors, or others, it wishes to emulate. In the development programme, India's knowledge index is rated at a mere 2.44 in a scale of 0-10⁵.

Knowledge and its application are now acknowledged as key sources of growth in the global economy. The increasing importance of knowledge has created both a challenge and an opportunity for developing countries. If properly adapted to circumstances and effectively deployed, knowledge can be a key driver of development. To create and sustain an effective knowledge economy, countries must put in place appropriate arrangements to stimulate, encourage and grow knowledge practices and to become more knowledge-competitive⁶.

The creation of an environment in which innovation can be effectively harnessed presents challenges at multiple levels and requires long-term innovation capacity building. Developing countries need more than just the minimum institutional capacities required to provide a reasonably smooth system for administration and enforcement of IPR. Rather, they require a wider institutional framework.⁷

Key Factors for Innovation Capacity Building

The key factors that need to be addressed in innovation capacity building are technology and information infrastructures, legal framework, business support services, human resources and

financial infrastructure. Commercialization of innovation into new processes and products that can benefit the economy requires infrastructure such as universal standards, policy and guidelines, venture capital, skilled labour, organised alliances and networks. Equal emphasis will need to be given to the provision of these infrastructures to ensure that world-class research and its commercialization can take place⁸.

Technology Infrastructure

Many developing countries demonstrate selected technological capabilities, but their overall infrastructure has not matured to engender broad-based technology development. An important aspect of technology infrastructure is the creation of institutions or framework for nurturing or inculcating small businesses from laboratory results, referred to as Technology Business Incubators (TBI), Technology Parks, Small Business Technology Transfer Programmes (SBTTR), etc.⁹

Developing countries need to put in place national networks of well-equipped laboratories and workshops with facilities for standard tests/analysis and high level scientific and technical research work in various fields, including high technology, as these are important for all persons engaged in innovative and inventive activities.

To improve the efficiency of their economies, developing countries should invest heavily in innovation and technology infrastructure just as they would invest in roads, rail, water, etc. This national technical infrastructure

must reach a critical level or threshold to ensure absorption, assimilation, diffusion and adaptation of imported technologies, the development of indigenous innovations and inventions, the manufacture of quality products, the internationalization of science and technology in the social cultural milieu, and with it, the demystification of technology and the assurance of national technological capability¹⁰.

India recognized the role of technology as an important element of national development and brought about 'The Scientific Policy Resolution of 1958', 'The Technology Policy Statement of 1983' and more recently 'The Science & Technology Policy 2003'. These policies enunciated the principles on which the growth of science and technology in India has been based over the past several decades.

Today, there is a sound infrastructural base for science and technology in the country.¹¹ For example, in the field of information technology (IT), India has earned itself a reputation of an IT superpower. Software Technology Parks of India (STPI)¹² have played a seminal role in accomplishing this status. Today, STPIs all over the country are synonymous with excellent Infrastructure and Statutory support aimed at furthering the growth of IT in the country.

STPI maintains internal engineering resources to provide consulting, training and implementation services. Services cover network design, system integration, installation, operations and maintenance of application networks and facilities in varied areas ranging from VSATs to

ATM based networks. In India as on date, 40 Centres have been set up under the aegis of STPI; fifteen more locations have been approved for implementation. This is a positive development accruable to government initiatives supporting technology infrastructure in India.

Information Infrastructure

Information Infrastructure is an important entity in capacity building for innovation, which must be disseminated effectively and widely. Although innovation in the field of Information and Communication Technology (ICT) takes place in a number of developing countries, access is likely to be a greater priority than the promotion of innovation.¹³ Automated information systems are key requirements for efficient administration of IPR and an important indicator of institutional capacity¹⁴. Although some larger, higher income developing countries have fully automated systems for searching and application processing, a large number of countries still have manual, paper-based systems. This not only hinders efficient processing of applications, but also greatly complicates collection of important statistical and management information¹⁵.

India is currently fostering its information infrastructure in relation to IPR to bring it at par with world standards. Projects relating to the modernization of patent information services and trademarks registry have been implemented with help from WIPO/UNDP. The Government of India is implementing a project for moderni-

zation of patent offices incorporating several components such as human resource development, recruiting additional examiners, infrastructure support and strengthening by way of computerization and re-engineering of work practices, and elimination of backlog of patent applications.

Legal Framework

The legal framework related to innovation brings about the important issue of intellectual property laws. Developing countries face arduous institutional challenges in implementing IP protection. At the same time, these nations need to ensure that their national IP regimes operate in public interest and are effectively regulated. The challenges include formulating appropriate policy and legislation, administering IPR in line with international obligations, and enforcing and regulating IPR in a pro-competitive manner appropriate to national levels of development.

In the Indian context, enforcement of IPR is seriously lacking. India's Copyright Act has broad exceptions, which weakens protection of software. Piracy of copyrighted materials, particularly, software, films, popular fiction and certain textbooks remains a setback. Cable television piracy continues to be a significant problem with estimates of tens of thousands of illegal systems in operation. Protection of foreign trademarks remains difficult due to procedural barriers and delays. Trademark owners must prove that they have used their mark to avoid a

counterclaim for registration cancellation due to non-use, thus making it difficult to enforce their rights. Inadequate and ineffective enforcement of patent laws, lack of effective enforcement against counterfeiting and piracy has put India among 15 countries on the 'priority watch list' of the US for shortcomings in enforcing intellectual property protection.

Judicial delays mean that cases can take up to 10 years to see resolution and payment of damages on IPR violations. Such delays spring up from issues like procedures involved in trial and conviction, lack of familiarity with new IPR laws amongst lawyers, the courts and the police. On the other hand, there are also examples of regions in India that have effectively increased IPR protection. In Chennai, where there is a separate Deputy Police Commissioner who deals with copyright infringement, industry reports a steep decline in film and music piracy in the city. This success could be repeated in other regions throughout India provided government and industry cooperate in dedicating sufficient resources to strictly enforce intellectual property rights. There are also some impressive private sector initiatives¹⁶.

The Indian government is responding to the need for development of IPR infrastructure. A major modernization programme is underway for patent office operations and an Intellectual Property Appellate Board has been set up in Chennai. India has also taken positive steps towards greater IP protection by bringing about amendments to its various intellectual property laws with even further amendments forthcoming.

Further to this, India must also raise its intellectual property protection to world-class level, thereby laying foundation for further economic growth across all sectors of the knowledge-based economy.

Business Support Services

Another important plank of innovation facilitators is that of business support services through appropriate government agency or professional association that forges and maintains a linkage between the inventors/innovators, research organizations and the SMEs with respect to sourcing of technologies, know-how, equipment, workshops and test laboratories for quality assurance, and formulation of demand-driven research projects, and ready commercialization of inventions¹⁷.

At one end of the spectrum, India has an extensive system of broad public consultation, which includes public workshops on controversial topics such as protection of biodiversity and traditional knowledge and use of compulsory licensing, and on high-level expertise in the academic, business and legal communities. Even some civil society groups have intellectual property policy research and advocacy programmes, such as the CUTS Centre for International Trade, Economics & Environment in Jaipur¹⁸. These systems foster the effective use of IP systems by bringing about increased awareness.

At the other end of the spectrum are linkages often promoted by a deliberate Government policy on industrial location and incentives for the development of sub-sectorial clusters of SMEs. Such

clusters would have shared facilities, with common pool of information network on markets, venture capital, databases, etc¹⁹. Sustaining regional innovation clusters requires continuous interaction between research centres, universities and local business leaders in order to sustain cluster growth and the development of new science-based industries²⁰.

The Government of India through various ministries has set up nodal agencies that provide entrepreneurial assistance, investor facilitation, processing of all applications which require Government approval, assisting entrepreneurs and investors in setting up projects (including liaison with other organizations and State Governments) and in monitoring the implementation of projects. Further, it has committed to ensure continued existence of an Apex S&T Advisory Body, which will assist in formulating and implementing various programmes and policies. The government will ensure appropriate representation of industry leaders, leading scientists and technologists and various scientific departments in the body. These are steps to ensure that scientific and technological expertises are swiftly and efficiently converted into concrete social and economic benefits.

A prime example of such clusters and initiatives is the National Innovation Foundation (NIF). The Department of Science and Technology and the Government of India constituted the NIF with an aim to recognize and support the creative potential of innovators at the grassroots and harness their creativity to help make India self-reliant and a leader

in sustainable technologies. NIF has been successfully providing institutional support in scouting, spawning, sustaining and scaling up grassroots green innovations and helping their transition to self-supporting activities. There are many such organizations in India like the Honeybee Network and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), Rural Innovation Network (RIN), Gujarat Grassroots Innovations Augmentation Network (GIAN), etc. that have been scouting innovations at the grassroots level.

Human Resources

Increasingly, research, innovation, inventive activities, operation and maintenance of equipment and facilities, and indeed the management of industrial production, especially in the high technology sectors are becoming more skill demanding. Similarly, the production of quality goods that can compete in international trade with imported goods in the local market demands very high skills and expertise for the product design, the maintenance of sophisticated equipment, and the marketing of products.

There is a dearth of skilled manpower in most of the developing countries. A wide range of training programmes need to be put in place to ensure availability of adequate pool of trained manpower in various areas and levels of technology-research, design, manufacture, management, data computation and analysis, information technology, legal, IPR and trade-related matters.

Well-funded and well-equipped universities and technical colleges and schools with sound curriculum (developed in close liaison with industry and research laboratories), coupled with vocational training, post employment education and on-the-job training, must have an important role in manpower development programmes of each nation. Such manpower development programme would provide the bedrock on which SMEs and national R&D organizations can blossom and be able to compete in the global market of the next millennium²¹.

It is clear that there have been considerable achievements in the last 5-10 years in terms of modernizing the IP infrastructure and developing the associated human resources in the developing world. Large number of people, from a variety of professional backgrounds, have received general and specialized training in IP subjects²².

India in comparison to other developing countries has a healthy figure in terms of researchers in R&D, availability of management and university education meeting the needs of a competitive economy and people ready to adapt to new challenges. While the number of scientists and technologists are large in absolute numbers, they are not commensurate with the requirement of other professionals like trained IP attorneys, enforcement officers, patent examiners, etc. The demand is bound to increase in the coming years with more intensive activities involving science and technology. There is a need to progressively increase the rate of

generation of high quality skilled human resource at all levels²³.

Industry has a simple and clear-cut economic interest in assisting developing countries to build their infrastructure in areas that ultimately encourage the development of IP assets, particularly, in the development of human capital, research and manufacturing capacities, and local enterprises. Developing this kind of infrastructure through training, funding of specific programmes, or in-kind assistance is complementary to the creation of strong IP institutions. Together these kinds of efforts help promote a healthy IP environment²⁴.

Financial Infrastructure

A key issue for developing countries is the institutional capacity for commercialization of research and knowledge²⁵. Capital investment is vital for the development and operation of industrial enterprises and R&D organizations as well as for transforming an invention or innovation into a product for the market. It is well recognized that an invention becomes important only when it is put into use. In other words, an invention until it is commercialized is nothing more than an idea on paper, which may just remain dormant and be of no service to humankind. Only when it is commercialized, its importance becomes manifested²⁶. Financial criteria and short-termism dominate usual innovation practice and are institutionalized within enterprises, which are the chief custodians of R&D resources and play the leading role in technological innovation²⁷.

Thus it is important to have programmes of investment and development, which will provide (i) venture capital for new industries (or older ones seeking expansion/modernization); (ii) funds for collaborative research between industry and research laboratories; and (iii) funds for the commercialization of research results²⁸. Equally important are financial support through fiscal incentives, such as, tax relief on R&D expenditures, excise duty waiver/exemption, import duty exemption for some machinery and equipment for research, tax holidays as well as other tariff measures aimed at assisting SMEs²⁹.

Conclusion

Innovation will become more advanced and diverse with significant influence on economies and the way people live. To harness innovation and to enhance the contribution of IP to the growth and competitiveness of developing countries, there exists a pertinent need to improve IP infrastructure. To sustain innovation, all countries need to continuously modify their institutional, information and innovation systems and provide incentives and a supportive environment for the human resources development³⁰. High priority resources, initiatives are needed to establish the cycle of intellectual creation. In addition, private and public sector interaction and collaboration needs to be institutionalized to share the cost, garner the research and commercialize innovation. The resources committed must be considered as investments towards capacity building for innovation.

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References

- 1 Calestous Juma, Karen Fang, Derya Honca, Jorge Huete-Perez, Victor Konde and Lee Sung H, Jimena Arenas, Adrian Ivinson, Singh Seema, Global governance of technology: Meeting the needs of developing countries, *International Journal of Technology Management*, 22 (7/8) 2001, 629
- 2 Prakash C S, Plant biotechnology: Need to foster: responsible debate and dialogue, *The Hindu* (Bangalore), 6 May 1999 http://www.agbioworld.org/biotech_info/articles/prakash/prakashart/plant_biotech.html
- 3 *Ibid*
- 4 World Bank Institute's Knowledge for Development Programme, <http://www.worldbank.org/wbi/knowledgefordevelopment/>
- 5 Data from knowledge assessment methodology (KAM), World Bank themes, <http://info.worldbank.org/etools/kam2004/>
- 6 About the importance of knowledge: Knowledge assessment methodology, <http://info.worldbank.org/etools/kam2004/index.htm>
- 7 Leesti Mart and Pengelly Tom, Capacity building for management of intellectual property rights, *Cooperative South Journal*, 2002 United Nations Development Programme, 40-65, (<http://www.iprsonline.org>)
- 8 Innovation and technology infrastructure, Department of Innovation and Information Economy, Queensland
- 9 Okongwu D A, Needs for establishing support services for inventors, innovators, SMEs and R&D organizations in African countries, presented at WIPO Regional Seminar on Invention and Innovation in Africa, organized by WIPO in cooperation with the Government of the Republic of Côte d'Ivoire, Abidjan, 1 to 3, September 1999
- 10 *Supra note 9*
- 11 India: Science & Technology Policy – 2003, <http://www.tifac.com/news/policy.htm>
- 12 Software Technology Parks of India (STPI), is a society set up by the Department of Communication & Information Technology, Government of India in 1991, with the objective of encouraging, promoting and boosting the Software Exports from India, <http://www.stpi.soft.net>
- 13 Intellectual property rights: Implications for development, UNCTAD-ICTSD project on IPRs and Sustainable Development, Chapter 4, New technologies
- 14 *Supra note 7*
- 15 *Integrating Intellectual Property Rights and Development Policy*, Report of the Commission on Intellectual Property Rights, London, September 2002
- 16 Larson Alan P, India's path to the future—Why intellectual property rights are a key component for economic success? <http://www.state.gov/e/rls/rm/2002/15047.htm>
- 17 *Supra note 9*
- 18 Commission on Intellectual Property Rights, study paper 9, Leesti Mart and Pengelly Tom, Institutional issues for developing countries in intellectual property policymaking, administration & enforcement; this report was been commissioned by the IPR Commission as a background paper
- 19 *Supra note 9*
- 20 Walshok Mary L, Furtek Edward, Lee Carolyn W B and Windham Patrick H, Building regional innovation capacity, The San Diego experience, *Industry & Higher Education*, February 2002
- 21 *Supra note 9*
- 22 *Supra note 15*
- 23 Human Resource Development, Strategy and Implementation Plan, Science & Technology Policy – 2003, http://www.tifac.com/news/policy_5.htm
- 24 Promoting intellectual property growth for economic growth, address by Her Excellency Ambassador Rita Hayes, *Vanderbilt Journal of Transnational Law*, 36(3), 2003
- 25 Commission on Intellectual Property Rights, Workshop 9: Institutional Issues for Developing Countries in Intellectual Property Policy-making, Administration and Enforcement, 18

- February 2002. The workshop focused on institutional issues regarding intellectual property policy making, administration and enforcement
- 26 *Supra note 9*
- 27 Capacity-building for sustainable technology development and innovation, Sustainable Technology Development (STD) programme and its experiences, extract from the book, *A Review and Evaluation, Dutch National Inter-Ministerial Programme for STD*
- 28 *Supra note 9*
- 29 *Ibid*
- 30 Economic Commission for Europe - Coordinating Unit for Operational Activities, High Level Task Force on Valuation and Capitalization of Intellectual Assets, United Nations, Economic and Social Council, OPA/CONF.1/2002/1, 2 August 2002