

**Event Report of
Training Programme on
Technology Diplomacy**

11 – 15 July, 2011, Jaipur, India



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Executive Summary

CUTS CITEE¹ organised a training programme on “Technology Diplomacy” from July 11-15, 2011 in Jaipur in order to build the capacity of scientists and technologists working with various ministries/departments/councils/institutes/research labs of Government of India. The Department of Science and Technology, Government of India supported this training programme to fill the vacuum that exists in terms of absence of adequate institutional base in India to offer training/education on issues related with technology diplomacy.

Technology has played and will play a vital role in the economic development of countries. Given the increasing inter-connectedness between the nation-states, technology acquisition/promotion has become an important part of international relations. In recent years, the pace of technological development has increased manifold and it has significant implications on international trade. More than 60 percent of today’s trade occurs between firms (intra-industry trade) and it is proved that technological advancement is the most important driver of intra-industry trade.

Given this importance of technology in our future economic development and the increasing level of India’s outwardness, it is important to develop the skills and knowledge of our negotiators (especially those who are engaged in negotiating comprehensive economic agreements in general and technology agreements in particular) on various aspects of technology diplomacy.

Unlike their counterparts in developed countries, negotiators and policy makers in developing countries often lack understanding underpinning science and technology promotion and agreements therein. It is true that science and technology is a specialised subject and most of our negotiators come from a general knowledge background. The question is how we bridge this gap.

One approach of bridging this gap is to develop the skills and knowledge of our negotiators (mainly from foreign affairs and trade ministries) on various aspects of technology diplomacy (technology promotion/acquisition, etc). Second is to get inputs from our scientists and technologists on their areas of expertise and then blend them with the nuances of technology diplomacy.

This programme, supported by the Department of Science & Technology, Government of India and implemented by CUTS International, is an endeavour which is based on the second approach of bridging the gaps between our scientists and technologists and those who are engaged in international (bilateral, regional and multilateral) negotiations on comprehensive economic cooperation agreements in general and technology agreements in particular.

Ideally, this programme should be a blend of participants from among the scientific/technologist community and the negotiating community. However, and for practical reasons, it is targeted to our scientists and technologists who are working in various ministries/departments of the Government of India and their affiliated institutions. CUTS takes the responsibility of sharing the inputs (on technology acquisition/promotion and related matters) from our scientific/technologist community with our negotiating community.

¹ CUTS Centre for International Trade, Economics & Environment (CITEE) was established in 1996 with an aim to be a high-level global standard institution for research and advocacy on multilateral trade and sustainable development issues. Consumer Unity & Trust Society (CUTS), the parent body, was established 25 years back as a consumer rights organisation and has been engaged actively in research and advocacy on policy issues. For more details about CUTS International and CITEE please visit our websites www.cuts-international.org and www.cuts-citee.org

Over a period of five days, this programme will cover a range of issues – from basics of technology diplomacy to technology promotion, technology sourcing and assessment to the application of intellectual property rights (IPRs). Case studies and simulation exercise will be conducted to impart practical skills and knowledge. A number of subject-specific experts will be engaged to deliver this programme.

Session 1: Opening and Inauguration and Understanding Participants' Expectations

Archana Jatkar, Coordinator & Deputy Head, CUTS Centre for International Trade, Economic and Environment

Ved Mitra, Former Science Counsellor to Germany

Deepak Bhatnagar, Head, Centre for International Trade in Technology

Anthony de Sa, Director, Centre for South- South Industrial Cooperation, UNIDO

Archana Jatkar inaugurated the training programme by providing an overview of CUTS International and shared that CUTS after an existence of almost a decade, entered into the field of international trade during the peak of Uruguay Round in 1991 and since then has contributed as a non-profit organisation. She said that CUTS has done intensive work in the field of international trade and works closely with government department on various WTO and related issues. She apprised that the training programme on technology is an excellent initiative undertaken with the support from the Department of Science and Technology (DST), Government of India.

She warmly welcomed the participants and expressed the hope that the training programme will prove beneficial to them and help them in understanding technology diplomacy issues in a better way. She also underlined the vital role played by technology in the economic development of countries and importance of expert inputs in successful negotiation of technology agreements. It is, therefore, important for the country that scientists acquire good understanding of technology diplomacy, and therefore, training of government officials.

Ved Mitra, Former Science Counsellor to Germany in his introductory remarks, mentioned the training programme on technology diplomacy will better equip scientists with basic understanding of what it takes to negotiate a better technology agreement/memorandum including knowledge that is required for protection of innovations and prevention of abuse of IPRs on such innovations.

While Deepak Bhatnagar, Head, Centre for International Trade in Technology addressed the participants in the inaugural session and emphasised on information sharing as the key to technology diplomacy, besides expertise in the domain area of work. Anthony de Sa, Director, Centre for South- South Industrial Cooperation, UNIDO emphasised on developing an entrepreneurial attitude among scientists/technologists of the government sector in India and underlined the objective of the training programme once again. He also praised CUTS and its efforts in general and also applauded the initiative for taking up the mentioned programme.

Expectations of Participants

The participants were requested to express their expectations from the training programme. These expectations are summarised as below:

At the close of the inaugural session participants were requested to express their expectations from the training programme. Their expectations are summarised below.

- To understand technology agreements which includes IPRs and the negotiations thereof;
- To learn assessment of technology and commercialisation through, sell, joint venture etc;
- To gain knowledge of patents in general, drafting and filing of the same;
- How to source technology and the related negotiations;

- To learn about diplomacy in general and specific to technology negotiations and the role played by various institutions;
- To learn about diplomacy in general and specific to technology negotiations and the role played by various institutions;
- To gather information and understand technology sourcing and related issues;
- To understand and learn about technology agreements and its negotiation;
- To learn the ways and means to assess technology thereby help in commercialising it?
- To understand the role of IPRs in technology diplomacy *vis-à-vis* technology agreements and to learn the ways of handling it more effectively? and
- To gain knowledge of patents in general, drafting and filing of the same.

Session 2: Basics of Technology Diplomacy and its Importance in International Relations

Anthony De Sa, Director, Centre for South-South Industrial Cooperation, UNIDO

Anthony de Sa in his presentation covered some important facets of diplomacy, including meaning and need of technology diplomacy – its importance in international relations, tools, techniques; advantages and disadvantages; and various parameters.

At the beginning of his session he underlined the importance of the role played by diplomacy in shaping international relations in the recent periods. He highlighted four thrust areas in diplomacy security, aid, trade and technology. He opined that increasing orientation of the world community towards these thrust areas are reshaping the international relations between countries.

Anthony de Sa further discussed as to who can be considered as a technology diplomat, a scientist/technocrat or a combination of both. He explained the role of technology diplomats covers a wide spectrum of activities which includes providing advice; active participation; policy formulation and playing useful and effective role in regulatory matters. He said that if technology diplomacy and technology diplomats are combined together, they seek to achieve three basic objectives of transfer of technology; flexibility for use of technology in accordance with national priorities; and thirdly international norms and standards setting.

Anthony de Sa explained and discussed comprehensively as to the scope of technology diplomacy and expressed today it covers much wider issues in variety of areas than before. This is especially due to emergence of new areas of concern at the international level such as environment, e-sphere, food security and energy. Other areas of work for technology diplomacy include security, industry and health.

He then moved on to introduce the participants with the UN system and its various institutions such as United Nations Environment Programme, United Nations Educational, Scientific and Cultural Organisation, United Nations Industrial Development Organisation, Institute of Asian Studies, International Telecommunications Union, Food and Agricultural Organisation, and others which are playing the role of a diplomat/facilitator to promote cooperation among countries on emerging issues. He also talked about some economic and trade jargons (multilateral; plurilateral; bilateral; North-South; South-South; emerging economies; economies in transition and others) and global trading system which have gained prominence these days, and how the tasks of diplomats have become more challenging now as they have to deal with different types of negotiation requirements.

While discussing the global trading system, Sa also highlighted major limiting factors in technology transfer including tariff peaks and escalation, lack of capacity (finance, information, and skill), and also vulnerability to change in standards. Towards conclusion he discussed some emerging issues for India in the field of technology diplomacy as below:

- Need for a TD policy
- Dislocation in a technology back up
- Reforming the diplomacy apparatus, and
- Track 2 TD

Session 3: Historical Perspective and Approaches to Technology Diplomacy

Deepak Bhatnagar, Head, Centre for International Trade in Technology

At the beginning of the session, Deepak Bhatnagar thanked CUTS for inviting him as a speaker and appreciated the initiative of the Department of Science and Technology and CUTS. This session was interactive in nature and the queries raised by participants were answered, as and when they arose. He mentioned that technology diplomacy is a vast and complex subject, and grasping the concept for its fuller exploitation needs open-mindedness and lateral thinking.

International diplomacy today demands that government negotiators deal with both specialisation and integration. In his presentation, Bhatnagar focused on the evolution of technology diplomacy in India and mentioned that India has a long history of technology diplomacy. The first such diplomat was King Porus, who gifted 100 talens of steel to Alexander the Great in 326 BC – unwittingly using ‘diplomacy’ to avoid being hanged or becoming a prisoner-of-war. The talens, a metal, in those days was used for making high quality swords and other battle weapons. He then stated technology diplomats of India in recent times have emerged as important players in global technology diplomacy and mentioned few names of the diplomats such as Dr Sanjay Gupta, now with the Barrack Obama (US President) Administration, Sabeer Bhatia (Hotmail), etc. The place of pride in technology diplomacy in India, however, goes to eminent Indian scientists such as Nobel Laureates C V Raman, Hargovind Khurana, S Chandrashekhar and Venkataraman.

He discussed the role of science and technology in international diplomacy and trade. Bhatnagar underlined two key features in international negotiations: i) Scientific knowledge becoming increasingly specialised demands greater expert input into international negotiations; and ii) the application of science and technology (S&T) to development requires the ability to integrate the divergent disciplines to solve specific problems. Young scientists need to have both specialisation and the ability to integrate divergent technologies.

Bhatnagar further asserted that young scientists should be focused in their research work, inculcate a regular practice to note down new research ideas; share these ideas with other known scientists; and forming a network, and so on. He also informed the participating scientists that the Government of India has several programmes under various departments to promote excellence in research-related activities and young scientists should prepare themselves to exploit such opportunities. He also oriented participants with various collaborations efforts such as India – EU ‘India Gate’ project, joint ventures of cooperation in science and technology with US and various other initiatives.

He also enumerated and discussed various initiatives undertaken by several inter-governmental bodies such as UNCTAD, United Nations Commission on Science and Technology for Development (UNCSTD) in technology diplomacy.

Bhatnagar also dealt with various aspects of technology evolution and cited example of steel sector. He apprised that humble beginnings were made in India in 1874 when the Bengal Iron Works (BIW) came into being at Kulti, near Asansol, in West Bengal. The possibility of larger production became visible after the establishment of Tata Iron and Steel Company (TISCO). The TISCO plant at Sakchi (renamed Jamshedpur) in Bihar started pig iron production in December 1908 and rolled out its first steel the

following year. However, it was only after independence that the steel industry found a strong foothold, when the Rourkela, Bhilai and Bokaro Steel plants were established in collaboration with the erstwhile Soviet Union. Soviet Union, in those times, was the most important and accessible country for India, in terms of technology acquisition. The country extended its support not only in terms of setting up of the plants but also supporting in operationalisation and day to day running of these factories. One of the main reasons of India's collaboration with Russia was that they also agreed to share the technology, whereas most of the other countries showed their reluctance.

The Indian steel industry can be said to have now arrived at the world stage, with the emergence of a number of leading steel producing companies in India, including SAIL, Tata Steel and others. In the last over six decades of evolutionary phase, the industry has now attained the status of one of the leading producers of iron and steel in the world. The technology used by the Indian steel industry has also improved significantly. This all was due to successful technology diplomacy.

Session 4: Interface between Technology and Political/Economic Diplomacy

Ved Mitra, Former Science Counsellor to Germany

Mitra emphasised the fact that politics no longer drives economics and therefore the need for placing importance on economic diplomacy is universally recognised. Now countries design their economic diplomacy to influence policy and regulatory decisions of foreign governments and foreign organisations. Economic diplomacy now goes much beyond the issues of only trade and development, he said. It is increasingly used to find resolution to international economic and political conflicts. Economic diplomacy is now performed by the official representatives of the state.

Some of the basic objectives of economic diplomacy are:

- Influence economic and commercial policies of the host country and to make them conducive for the national interests;
- Work with rule making international bodies for shaping their decisions in the interests of the diplomat's own country;
- Reducing potential conflicts with foreign governments, economic actors and CSOs so that risk of doing business is minimised; and
- Use of multiple fora and media to enhance and safeguard the image, capability, reputation and capability of diplomat's own country and its enterprises.

Science and technology is the base on which the structure of technology diplomacy is constructed. There are three ways in which science and technology play role in shaping diplomacy and development. Firstly, science and technology provides the objective data for making policy choices and also for implementing policies. Secondly science and technology provide solutions to challenging development and other global problems. Thirdly, science and technology are an important element in building strong international relationship. He cited few examples of how science and technology play a role in shaping international policy. The most well-known and familiar example is the Intergovernmental Panel on Climate Change (IPCC), which has played a critical role in providing policymakers with comprehensive analyses of the scientific data regarding earth science and the changes occurring. There are many other examples. Consider the problem of managing fisheries in the oceans, particularly fisheries for stocks that cross boundary lines separating waters under the jurisdiction of different nations. To manage such fisheries, nations have established a series of regional fishery management organisations.

Mitra also discussed the role played by science and technology diplomacy to address global challenges such as climate change, food security, energy and water scarcity concerns and so on. Towards conclusion

he explained the following two way in which science and technology diplomacy helps in economic/political diplomacy:

1) Technology Transfer and FDI

The abilities to create new technology and acquire and adapt technologies from both external and internal sources are critical determinants of a country's ability to compete successfully. Given the centrality of technology to economic and social development, and the need of technology acquisition by developing countries as a means of furthering development. It is essential that countries should be able to benefit from transfer and diffusion of technology.

Foreign direct investment (FDI) is considered one of the main sources of technology transfer to developing countries. However, the pace, direction and quality of FDI vary across countries and time. A number of developing countries have reformed their policies in expectation of FDI. FDI is not an automatic carrier of technology and the ability of any country to benefit from such investment depends on a wide range of policy measure.

2) International Technology Alliances

One of the most significant developments in the structure of the global economy is the establishment of network involving pasturing activities. These networks are the product of complex inter-linkages between a wider range of enterprises, links that are designed to the risks associated with the development of new products as well as to facilitate information exchange. More specifically, these pasturing arrangements help to provide sources of financing through licensing and upfront fees for research and development expenses, reimbursement of expenses etc. Venture capital is one form of financing which benefits from such an arrangement.

Session 5: Technology Promotion: Role of Ministries/Departments and that of Missions

Ved Mitra, Former Science Counsellor to Germany

This session covered issues such as modes and tools of technology promotion and associated good practices; synergetic effects between technology diplomacy and technology promotion; role of ministries/departments and that of missions. It was an extremely interactive session and the queries raised were satisfactorily answered by the faculty.

The session focused on the inter-linkages between science and diplomacy. It covered issues such as commonalities and differences of technology diplomacy and political/economic diplomacy; relationship between them; how one can influence other. He elaborated on the three dimensions to the relationship between diplomacy and science. The first dimension is *science in diplomacy*. Science offers new channels for engagement and improves relationships with other nations. According to him, science provides a non-ideological environment for exchange of ideas amongst people. Given these advantages, more effective mechanisms for dialogues between actors involved in foreign policy-making and scientific community are required. This would require leadership by the policy makers in the form of provision of opportunities to scientists to engage in policy debates and discussions. To identify the possibilities for involvement of the scientific community, the diplomats should have a minimum level of scientific literacy or network to communicate with scientists. Improving the scientific capacity of delegations from developing countries is particularly important, especially for international negotiations on health and climate policy.

The second dimension is *diplomacy for science*. Mitra emphasised that international scientific and engineering collaboration is imperative to meet global challenges. It seeks to facilitate international cooperation. It is important for the pursuit of both top-down strategic priorities for research or bottom-up collaboration between individual scientists and researchers.

The third dimension is *science for diplomacy*. This dimension primarily draws on the ‘soft power’ of science, i.e. its attractiveness and influence, both as a national asset and a universal activity that transcends national interests. Science for diplomacy can be extended by many means: Science cooperation agreements; creation of new institutions to reflect the goals of science for diplomacy [e.g., European Organisation for Nuclear Research (CERN)]; educational scholarships; ‘track two’ diplomacy; and science festivals and exhibitions.

There is another upcoming dimension to the relationship between science and diplomacy, i.e. international security. Science in diplomacy can be used to diffuse tensions among countries posing military threats to each other, traditionally. He gave the instance of utilisation of science to strengthen the relationships with the Islamic world, which is otherwise a huge challenge. Conflicts over resource distribution and utilisation can also be solved, to some extent, through use of science.

In conclusion, Mitra said that the fluid concept of science diplomacy is gaining increasing importance in the US, the UK, Japan and elsewhere. It has an important role in solving the problem of governance of international spaces beyond national jurisdictions, including Antarctica, the high seas, the deep sea and the outer space, which otherwise cannot be managed through conventional models of governance and diplomacy. These issues require flexible approaches to international cooperation, informed by scientific evidence and underpinned by practical scientific partnerships.

Session 6: Technology Sourcing (including Technology Acquisition) and their Assessment

Vinay Kumar, Former Adviser & Head, Technology Management Division, DSIR and Visiting Faculty, IIT Delhi

Vinay Kumar started the session by giving an introduction to the gamut of issues that faces the management of technology and innovation, emphasising on technology sourcing or acquisition and assessment. He stressed on the importance of optimal management of technology, keeping in view the economic viability of commercial application of new technologies. Main areas of technology management are: (i) developing technology strategy, (ii) technology life cycles, (iii) technology acquisition, (iv) technology transfer and contracting, (v) technology pricing, (vi) R&D management, and (vii) management of IPRs and technology financing. One of the main components of technology management is technology forecasting.

Before proceeding on to explain each of these topics and their relative importance, Kumar described technology management as it is done in India at the governmental and private corporate levels. He explained the structure of relevant departments of the Central Government that are responsible for the implementation of national S&T policy. He dealt with the history of science policy in the country and the main differences between S&T policy of 2003 and its predecessors and the main features of the current policy. He cited various examples of technology acquisition being carried out in India at the official level in which almost all ministries are involved and mentioned that some portion of international technology transfer agreements also comes under the governance of the National Foreign Trade Policy.

Kumar then explained the purpose of technology diplomacy, referring to it as provision of science and technology advice to multilateral negotiations and the implementation of the results of such negotiations at the national level. It thus covers activities both at the national and international levels pursuant to international commitments. The need for technology diplomacy arises because of issues associated with technology management such as shorter life cycles of technology, intense national and international competition, quality, cost, delivery, after-sales service, international standards, intellectual property rights, high risks in investments.

Shorter time between innovation and commercialisation, drawbacks of domestic research and development infrastructure, dire requirement of energy efficient and environment friendly technologies and socio-economic and socio-political factors etc. are also factors behind increasing utility of technology diplomacy. Kumar then briefly dealt with the fast changing paradigm of R&D and said that research is getting increasingly interdisciplinary and collaborative. After covering the various options of technology acquisition and comparing between various scenarios of in-house development and acquisition of technology, he concluded the session by delving on opportunities of technology sourcing from exhibitions and conferences, international organisations, technical journals and directories, industry associations, patent literature etc.

Session 7: Simulation Exercise on Technology Sourcing/Acquisition and their Assessment

Vinay Kumar, Former Adviser & Head, Technology Management Division, DSIR and Visiting Faculty, IIT Delhi

In continuation of his previous session, Vinay Kumar, dealt with in detail, the main aspects of technology management viz. R&D management and technology sourcing. Given that time and cost of R&D are important, proper coordination between research team members with diverse skills is imperative. The requirements for efficient R&D management include organised, disciplined and accountable approach towards assessing the threats and opportunities arising from the impact of all exogenous factors. He dealt with the following aspects of R&D management: (i) developing corporate strategy on IPR, (ii) formulating research proposals, (iii) identifying potential zones, (iv) mapping prior knowledge, (v) monitoring competitors' areas of operation, (vi) cross-licensing of patents, (vii) technology forecasting, (viii) identifying opportunities and threats, and (ix) identifying possible collaborators, business mergers and strategic alliances.

The next important topic presented by Kumar was the issues involved in technology sourcing. According to him, the process of sourcing sequentially follows identifying sources of technology, evaluation of technology and its supplier, examining the status of IPRs, consideration of price and forming appropriate strategies for negotiations. He said that these evaluations must also consider the longevity of the technology and towards this an organisation must monitor the recent developments in the market and forecast emerging threats that may affect the longevity of a particular technology in use. Estimating the price of the technology to be acquired is yet another sensitive issue which is made complex because of the involvement of many components of technology package, difficulty in assessing key features of technology and unknown future changes in technology preferences.

An interactive discussion on different facets of assessment procedure that precedes technology acquisition followed. Kumar facilitated sharing of experiences by participants on R&D set up, ownership of technology, authority to transfer, procedural difficulties in buying and selling of technology and its commercial application, especially the complexities of entering into sublicensing agreements and IPR violations etc. He said that while acquiring new technologies, reputation of the seller amongst other technology acquirers, suitability to locally available raw materials, projection of its expected life cycle, input-output ratios, safety issues etc. must be taken into consideration

Session 8: Presentations from Simulation exercise

Vinay Kumar, Former Adviser & Head, Technology Management Division, DSIR and Visiting Faculty, IIT Delhi

In this session, Vinay Kumar presented a case study based on the discussions in the preceding sessions. He circulated the case of technology transfer, in which a model technology licensing agreement between a

technology acquirer in India and a technology supplier abroad is to be framed. In this case, a brief each on the interests and concerns of both the parties to the agreement, the supplier and the acquirer, was given to the participants and the participants were to pin point the relevant factors that must be included in the drafting of the legal text in the light of the preceding discussions. Kumar also circulated a model agreement and the participants were required to list down the deficiencies and gaps existing in the agreement that may lead to unnecessary misunderstandings between the contracting parties and consequently to disputes. Participants were also required discuss the case within themselves and provide suggestions to remedy such deficiencies.

Session 9: Values and Visions

Vandana Sharma, Soft Skill Expert

This session dealt with organisational values and ethics that will help to achieve targeted goals through concerted and planned efforts of the employees. Vandana Sharma stated at the outset that it is important for the employees to know about the organisation's values and visions. Following an introduction to the importance of values such as responsibility, integrity and commitment, she briefly outlined the relationship of ethics and values with diplomacy. The participants were asked to relate their understanding about their own organisational visions to their current activities and job profiles.

Vision and mission statements act as a motivating and guiding force for an organisation and helps employees to match their vision to the overall organisational vision and achieve the same.

Sharma further stated that Vision and values may become assets for any organisation if the organisational culture is healthy. To create ethically viable culture it is imperative to have well defined purpose (vision) and process (values) and to operate on a long-term basis in the global world an alignment between vision and values is quite essential. Defining vision, she said that vision gives meaning to every action of the individual and the organisation, like a lighthouse that guides approaching ships. Also, vision must be attainable and must not be restricted to specific aspects of development or any one facet of the organisation. As regards values, they are subtle beliefs and life principles that get indoctrinated into the human psyche over time. She said that clarity on purpose and process are the main factors that influence organisational well-being and differentiates a successful organisation from a mediocre one. While the former indicates the destination one wants to reach, the latter provides the path and clears the route that the organisation needs to take.

In order to demonstrate these points, Vandana Sharma engaged the participants in a practical exercise. The participants were divided into 6 groups and each group was given a folder containing slips of vision and mission statements as well as action plans of 12 organisations, however, in an assorted manner. Also, one of the three slips (vision, mission and action plan) for each organisation was missing in the folder. Thereafter, the participants were asked to match the right slips for each organisation and fill up the gaps based on their understanding. After completing the exercise, a representative of each group was asked to narrate the experience and the learning from it. Responses from various groups underlined that this simple exercise helped them to recognise the importance of team work as well as of following values and visions in professional and personal lives.

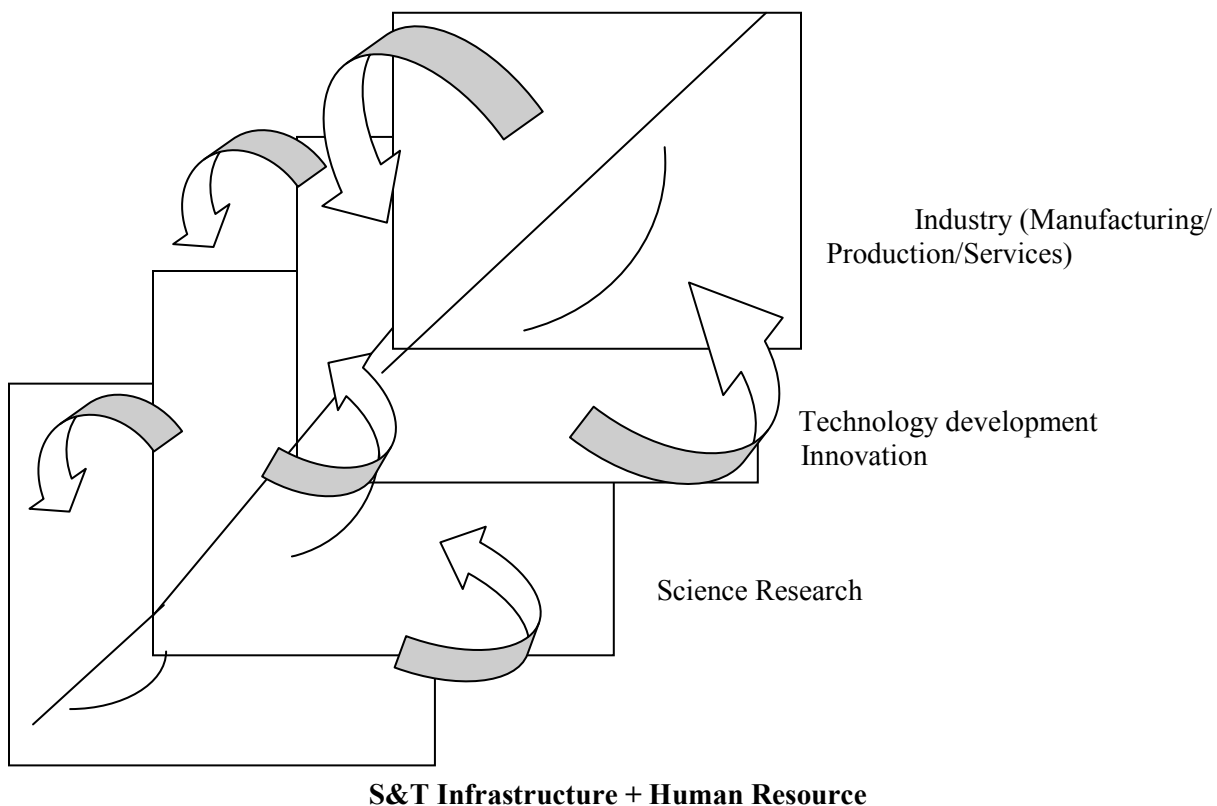
Session 10: Negotiations of Technology Transfer

Ashok Jain, Vice President, Research & Academic Development, EMPI School

In this session Ashok Jain discussed about trade and technology transfer and various aspects of negotiations. He focused on do's and don'ts of negotiating a technology transfer deal such as whether the deal is economically viable, the IPR issues, the environment issues, etc. He provided a perspective on outward technology transfer, theoretical outlook regarding external technology exploitation as well as its practical analysis.

Jain began the session by explaining the meaning of technology and different types of technology. He stated that a key term ‘win-win’ should be kept in mind while negotiating. Negotiations are held at the macro level (which is the national level) and the micro level (which is the individual organisation/industry level). Negotiations should keep in mind both the interests of the nation as well as the individual organisation. Negotiating a win-win game involving different actors can bridge the macro and micro divide. It is important to note that at different levels, different actors are involved. For scientists, institutions, laboratories negotiations are at micro level and at the macro level, the likes of external affairs ministries are involved.

In negotiations, there are several elements that need to be linked with each other in order to have successful negotiations and these linkages are sometimes termed as the national innovation system. While categorising, he further explained that the top segment is the manufacturing industry, where the technology is and where the scientists are at work; the middle segment (science research) is important as it connects R&D with manufacturing; and innovation falls between these two segments. Negotiations at each level involve different actors and it is important to know what is being negotiated – industry, innovation, science research or infrastructure. Linkages between these segments need to be strong in order to serve the national interest. Jain cited example of Japanese technology negotiators as having a solid understanding of these linkages, as compared to their Indian counterparts.



Through the diagram he explained that if there is any internal mismatch in these linkages, negotiations are bound to flop. Jain also explained different types of negotiations held in each section of the diagram. In the lower section which is infrastructure and human resources, negotiations take place on improved support for technical education, internship programmes and exchange programmes, visa restrictions and free flow of professional services. However, in the middle section the main focus of negotiation is R&D. This negotiation takes into consideration national interest as well as interest of individual organisation.

Jain threw light on emerging issues which have not been addressed in negotiations. Some of these were how the presence of foreign R&D firms in India have benefited R&D in India; whether there should be a regulation for putting restrictions on staff movement to prevent transfer of intimate organisational knowledge; and restrictions on reverse engineering. He also mentioned the need to know the extent of development in the country which is negotiating with other countries. He said that in this context, the role of the Indian missions is crucial.

In his presentation, Jain mentioned the existence of five 'Ms' that go into production. He explained the importance of the need for synchronisation between these Ms and how this can lead to successful negotiations know-how suppliers (M1), material suppliers (M2), manpower suppliers (M3), financiers (M4) and marketing and servicing agents (M5). Jain said that each of these has related TRIPs regulations which need to be taken into consideration while negotiating.

Session 11 & 12: Simulation Exercise on Negotiations on Technology Transfer and Presentations

Ashok Jain, Vice President, Research & Academic Development, EMPI School

In this session, Jain divided the participants into four groups with a chief negotiator in each group. Jain gave them four different case studies on Lighting device, Silk reeling device, Water device and conducted a practical negotiation exercise on technology transfer. This exercise focused on technology transfer aspects of climate change negotiations. Four different aspects of negotiations were considered. Each of the four groups spent one hour to deliberate amongst them and culled out major issues which called for internal and external technology negotiations for the development of the industries, so as to solve the above mentioned barriers in a systematic manner.

After deliberations, four chief negotiators selected from each group presented the negotiation strategies formulated by their respective groups. The major points put forward by the groups provided solutions through carefully planned negotiations for finding new funding sources for their product/industry by taking care of risk factors and by making attractive and innovative offers to potential investors. These innovative methods include use of venture capital, various forms of PPPs, providing access to global primary and secondary markets, usage of international insurance products, partnership formation with successful international firms by way of subsidiaries, FDI and other forms of shared ownerships. Jain discussed the negotiation strategy on merits for each of the group and clarified some finer points to be kept while actual negotiations.

In conclusion, Jain answered several questions raised by the floor regarding recent developments at national level negotiations and also encouraged the participants to put their learning into practice in their respective professional careers.

Session 13: Stress Management

Vandana Sharma, Soft Skill Trainer

In the session, Vandana Sharma explained the meaning of stress and various reasons behind it. She showed ways to identify and understand stress, symptoms and internal and external sources of stress. Sharma categorised stress into three types: action-oriented, emotion-oriented, and acceptance-oriented. She mentioned that stress causes emotional disturbance which comes from depression, tearfulness, fits of rage, etc. To tackle stress, several activities were suggested such as regular physical exercise, healthy eating, drinking and relaxation techniques.

Sharma divided the participants in five (four members each) different groups and requested them to do an exercise which involves physical movements. She directed each group to perform similar action (steps) for one minutes in synchronisation and gave approximately 2 minutes to each group for synchronise their

action/steps and one minute to perform. After spending two minutes, each group performed with music in the background.

After the exercise, Sharma explained that the reason behind doing this task was to do something new which is not done in normal course of life. She also suggested the participants to indulge into such activities in order to de-stress.

Thereafter each participant explained reasons for and causes of their stress. Each participant came up with several reasons and by the end of the session Sharma explained that stress comes usually shows up because of unmet demands at professional or personal front.

At the end of her session, Sharma showed a video where a girl goes to small village, a place far away from the city. In that nice country side, she feels that there is no noise, no pollution. She watches flying birds and thereby considers it a beautiful day. However, the girl finds it difficult to set herself free in the nature. She realises that her life is full of stress because of many reasons and she has forgotten to enjoy the nature. After showing the video, she explained that today everyone is extremely busy in routine cores of life. All are required to meet deadlines at work, have many responsibilities at home and because of these reasons one does not get time to spend time with oneself, leading to stress. In conclusion, she suggested that one should find time from their busy schedule to do things which keeps them happy and help them to de-stress.

Session 14: Overview of IPRs and its Role in Technology Diplomacy

T C James, Director, National Intellectual Property Organisation (NIPO)

T C James, in his interactive session provided a general introduction to the concept of IPRs and their role in Technology Transfer. His presentation covered broadly, rationale of protection, different kinds of IPRs and IPRs and licensing/Technology Agreements.

James described the meaning in general of the term ‘property’ and then went on to elaborate on the definition and nature of intellectual property. He explained in detail various conventions and treaties which cover IPRs such as Paris Convention for the Protection of Industrial Property 1883, Berne Convention for the Protection of Literary and Artistic Works 1886, International Union for New Varieties of Plants (UPOV) 1961, 1972, 1978 and 1991, Convention on Biodiversity, 1992, Agreement on Trade Related Aspects of Intellectual Property Rights 1994 and Internet Treaties 1996

He categorised IPRs as below:

- Copyright and Related Rights and
- Industrial Property which includes Patents, Industrial Designs, Trade Marks Geographical Indications, Layout Designs/Topographies Integrated Circuits, Trade Secrets and Protection of New Plant Varieties

James thereafter explained in detail each of the above IPRs viz definition, characteristics, term of protection, exceptions by citing appropriate examples. He further explained the two organisations dealing with IPs the World Trade Organisation (WTO) and the World Intellectual Property Organisation (WIPO).

In later part of his presentation, James explained about licensing and technology transfer *vis-à-vis* IPRs and expressed that licence is a permission granted by an IP owner to another person to use the IP on agreed terms and conditions, while he continues to retain ownership of the IP. It creates an income source and establishes a legal framework for transfer of technology to a wider group of researchers and engineers. Some of the licensing conditions of IPR enumerated by James are as under:

- Owners of IP prefer to transfer technology through licensing agreements only
- All rights or limited rights can be licensed

- Can be exclusive or non-exclusive or sole (owner and licensee)
- Most such agreements provide for royalty payment and non-transfer to a third party.
- Royalties can be upfront, part upfront and part % per production/sale, only % per production/sale
- The particular uses for which the IP can be used are also generally specified
- Needs to be careful about the Competition Law

In conclusion he also pondered over if licensing is profitable and quoted several examples of profitability and licensing agreements of various companies such as IBM, Texas Instruments and so on.

Session 15: IP Asset Valuation and IP Audit

James, Director, National Intellectual Property Organisation (NIPO)

T C James in this session provided a general introduction to the concepts of IP valuation and IP Audit and explained IP valuation and the key definitions like assets, IP assets, value and IP valuation, the differences between various methods deployed to value IP assets, IP audit, the preparations, procedures and results of an IP audit.

He described Asset as an economic resource or anything tangible or intangible that is capable of being owned or controlled to produce value and that is held to have positive economic value is considered an asset. Asset can be divided into two categories – ‘tangible’ and ‘intangible’. IP assets come under the intangible assets and are more knowledge based

James elaborated in detail on the factors driving the intellectual property. He said intellectual property derives its value from a wide range of significant parameters such as market share, barriers to entry, legal Protection, IP’s profitability, industrial and economic factors, growth projections and new technologies. He also touched upon the risks involved with IP assets and the means of handling it.

James further dealt with valuation of the IP assets and expressed it as a process of determining value or worth of an asset which often combines objective and subjective considerations. IP valuation, according to him, depends on various factors such as IP valuation dependent on various factors, use of the IP assets, market share of company, openness of economy, legal protection of IP and its enforcement cost, economic growth and lastly on the profile of economy.

James illustrated on various benefits of IP Valuation such as it can provide a better idea of the overall value of the business, can be a tool to measure and manage the assets and provide security and backing for lenders, taxation benefits (taxation deductions) and so on. He further comprehensively explained the valuation methodologies - Transactional/Market Approach, Cost Approach and Income Approach. In last part of his presentation, James discussed on the topic of IP Audit and expressed that overall purpose of an IP audit is to identify and assess all of the company’s intangible assets in order to conduct a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to determine the valuable core assets and optimise their usage through a systematic long-term strategy.”

He also described the steps to be followed while carrying out the IP audits and the inventory required for such audit. The IP Audit reports general contains details related to inventory, rights issue, ownership issue, infringement issues, strategic and deficiency issues. He mentioned that IP audit can be carried out as a general management programme or can be specifically done at the time of business being sold or bought. He explained this by citing some relevant examples. In conclusion he stressed on the need of IP Valuation, Audit and an Asset Management strategy to optimise income and profit. The participants raised queries which were satisfactorily answered by the faculty.

Session 16 Excursion Tour

By CUTS International

These two sessions consisted of an excursion tour to local tourist places in Jaipur. The tour enabled the participants to understand nuances of old and new technology. Thus it was a useful exercise and the efforts of the organisers were well appreciated by the participants.

Session 17: Patent Application

By Chitra Arvind, Principal Associate, Rajeshwari & Associates

Chitra Arvind in her presentation covered Patenting Inventions and the challenges faced by the scientists. She began her interactive session by updating upon the condition of research today and highlighted that generally there is less/no collaboration between various disciplines and several restrictions operate at both academic and industry level. Arvind explained the general problems faced by scientists/technologists/academicians such as lack of time for patenting because of procedural delays to obtain patent, huge cost involved and so on. She further explained the importance and the advantages of the patenting to the participants and the loss incurred by not protecting the invention by citing various examples.

She further explained that obtaining patent is important as it provides recognition to the ownership of an inventor over the innovative idea. A number of new inventions have wonderful prospects of making profit for the inventor, unless they are used in an unauthorised manner that can prevent the inventor from making fair profits for his time and labour given on his original creation. In fact, a patent ensures protection to the commercial rights of the inventor as well as to the core idea for a certain span as decided by the government.

She also discussed about the issues related to publication and patenting. She mentioned that it is important to understand that it is a myth that publication is sufficient and there is no need to obtain patent. Patenting of an invention is an effective way as it covers a broad area of invention under its ambit and protects the invention from being misused in an unauthorised manner.

She further discussed comprehensively the advantages of patenting an invention as it not only protects the invention but also provides awards for invention in terms of royalty, lump sum, or on licensing basis and is useful in keeping the competitors at bay. Patents also consolidate market position for the invention and many other practical examples of the advantages were discussed in the session.

The session further elaborated on the patentability criteria and the subject matter that can be patented. She explained that a mere arrangement or rearrangement of known devices functioning independently in a known way or method of agriculture/horticulture, mathematical/business methods, method of playing games, essentially biological process etc. cannot be patented. It was comprehensively discussed the concept of patent portfolio creation and the steps required thereof.

Once the concept of patent was clear to participants, Chitra Arvind explained the participants the key points that should be considered while filing a patent. Some of them are mentioned below:

- Always maintain a lab notebook.
- Be aware of the prior art or the invention which already exist which relates to your invention.
- Differentiate your invention from the prior art and mentioning novelty, inventive step, and industrial applicability over known art.
- Give a complete scope of your invention.
- After filing of all possible research outcomes, publish it.

She also explained that not only patents can protect the invention from unauthorised usage but other IPs such as copyright, trade marks, trade secrets, industrial design registration; geographical indication can also provide the best claims for their innovations. She divided the participants into two groups and provided them with two products as models. The participants were to identify the characteristics of each of the models and also find out which IPRs could be applied to protect the product.

Session 18: Simulation Exercise on Patent Drafting

Chitra Arvind, Principal Associate, Rajeshwari & Associates

The session conducted by Chitra Arvind was interactive in nature and focused on developing an understanding of drafting a patent application. The presentation first defined patents and the criterion of granting one on the basis of novelty, inventive step and industrial applicability as required under Indian Patents Act, 2005. Arvind explained in detail on ways to spot the invention and to identify features that distinguish invention over prior art, and the invention itself. This was done by taking up various examples. Furthermore, the session also discussed if a particular invention is patentable and the broad guidelines specifying the list of ‘not patentable’ invention.

Thereafter, the focus of interactive presentation was directed towards drafting process of a patent application, and discussed in detail the various parts of an application like title, field of invention, background, prior art, objects of invention, detailed description of invention, drawings and claims. This entire process of drafting the patent application was explained through various examples and participants were engaged in the related simulation exercises.

Arvind explained each part of patent application by way of examples and explained various aspects while drafting a patent application such as whether it satisfies written description requirement; allows skilled person to practice the invention; shows that inventors had possession of the claimed invention; and patents reward disclosure, rather than secrecy.

A patent application can be divided into various, parts such as title; field of invention; background of invention; prior art; objects of invention; detailed description of invention; drawings; and claims. All of these must be described appropriately in the filing document, Arvind asserted.

Further, there are three primary criteria for granting a patent, he said. These include: novelty; inventive step; and industrial applicability. Steps required to file a patent application include: identifying invention; assessing patentability; drafting application; and patent filing and prosecution –grant.

Once the patent document is ready, the contents need to re-ascertain with a check list. The check list should have the following elements:

- Conduct search;
- Is the invention patentable?
- Has it been published?
- Ascertain whether complete or provisional is to be filed;
- Enlist problems in prior art;
- What is the problem sought to be solved by the invention?
- Is the solution obvious?
- Non-patentable items.

In addition to the delivering the mentioned documented information on patent application, the presentation also provided certain tips for filing patents. Also, with a view to ensure that the participants learn actual drafting of the patent application, various practical examples such as a hair-drier with iron, tea pot was discussed and so on were discussed at length in the session, which clarified the whole process further to the participants. The queries of the participants reflected that the exercise was well-received and the members of the training workshop gained from it.

Session 19: Presentations from Simulation Exercise

Chitra Arvind, Principal Associate, Rajeshwari & Associates

In this session, the participants were divided into two teams with a spokesperson for the presentation of their simulation exercise. Thereafter, Chitra Arvind explained the participants about the simulation exercise and its expected outcome. Participants were divided into groups and given two different products for drafting a patent for those two different items. Group I was provided with the traveling tooth-brush and group II was given a normal tooth-brush.

The two groups discussed amongst their group about the invention provided to them and had to draft claims for the product. Once the two groups drafted their main and other claims, their spokesperson presented and shared it with all. Chitra Arvind then discussed the actual patent application for tooth-brush drafted by various well known companies such as Colgate etc. and compared the claims prepared by the participants. She also pointed out some major positive points of the claims and some lacuna where the participants need to be careful. This helped participants to improvise on the drafting skill. In conclusion, participants gained a good practical experience from this exercise and were acquainted with number of specifications to be considered while drafting a patent application.

Session 20: Participants' Evaluation of the Programme and Closing Remarks

Archana Jatkar, Coordinator & Deputy Head, CUTS Centre for International Trade, Economics & Environment

In the closing session, the importance of technology diplomacy and the necessity to organise such training programmes was reiterated especially in the context of India. During the five days programme it was felt that in spite of technological developments in this field, there is still a room for a lot of activities to be carried out especially in India and this field offers great opportunities for promoting our growth and development.

Further, the participants were requested to provide the feedback on the training programme. They opined that the training programme provided them with a better understanding and exposure to technology diplomacy and related issues. They appreciated and acknowledged the rich experience and expertise of resource persons, quality of resource material and overall administration of the programme. Participants also suggested that for some sessions an additional time should be provided so as to gain more knowledge. The participants also thanked DST and CUTS for organising such a knowledgeable training programme for better understanding of the subject and implication on their work. Most of the participants expressed their interest to attend similar training programmes of longer duration in the future.

In her concluding remarks, Archana Jatkar thanked all the participants and resource persons for their valued participation and contribution in making the programme successful. She also thanked the DST for assigning this programme to CUTS. She also thanked to her colleagues for their immense support to make this programme successful.