NISTADS in collaboration with Russian Academy of Sciences organized an International Conference entitled "Socio-economic and technological innovations in the globalizing economy (STIGE-2011): Mechanism and Institutions" during November 2-5, 2011 in New Delhi.

This conference aimed at searching a framework of comparative policy research on domestic institutions of economy society and S&T that are no longer just domestic. The conference was also about searching aspects where mutual country institutions could learn or even strongly collaborate or else where the country institutions should necessarily follow singular track. The conference brought together scholars from Russia, India, China and other Asian countries and critically looked into current happenings and into nuanced meanings and application of innovation.

The conference was inaugurated on Nov. 1, 2011 by DG- CSIR, Prof. S.K. Brahmachari at CSIR Vigyan Kendra, New Delhi.



Dr. P. Banerjee, Director NISTADS welcomed DG CSIR and the delegates. He welcomed the academicians, the directors and the professors from Russia, the participants from Trinidad and Tobago and Vietnam and looked towards a fruitful conference ahead.



Prof. Brahmachari in his inaugural speech referred to the great scientific culture and the respect for scientists that Russia had during the Soviet Era. He was impressed with the presence of academicians in the conference and welcomed them with warm heart.



Prof. Brahmachari remembered his association with Russia since the Soviet times and referred to the changes that took place in both India and Russia. Being a member of the joint council of Indo-Soviet ILTP Program, he had repeatedly visited Russia over the last ten years and saw a new Russia, a new nation, a new way of looking at things from which India could perhaps learn. He introduced CSIR, its structure, network of laboratories and its role to create self-reliance in India. In his speech, he expressed a strong personal feeling that the relationship between India and Russia is the strongest bond that we can build, as we have great respect but both culture as well as science. Prof. Brahmachari introduced his new theory which believes that innovation provokes in extreme conditions. By inclusive innovation he emphasized on that innovation that will make the poorest of the poor better, not the wealthiest of the rich wealthiest. He referred to his recent visit in Vietnam and to learn that the government could reduce the poverty line from 56% to 9% in 16 years which was possible a great achievement but unfortunately expressed his concern that India has not been able to achieve that and still have few 100 millions of people who are very poor. So he felt our innovation model has to be different from the western model of converting an intellectual property, a patent into a product and making wealth. Therefore, India needs a very different innovation and that's what this conference on Social and technological innovations should discuss, bring it out and see how we can create in a globalised economy. The best minds of the world can come together in an open space to solve problems of the world that affects everybody and he thought that climate change and solar energy utilization is a good problem to work on an open source innovation space.





Lastly Prof. Brahmachari expressed his happiness for the conference of such relevance to take place and wished participation of young students and scientists of other laboratories who are not exposed to social science. He thought the conference to be a very important topic and always believed international workshops, seminars are not only scholarly activity but it also brings people to people contact, knowing each other as it is very important. He wished the delegates wonderful stay and felt sure that colleagues at NISTADS will look after and take care of them.

2nd November 2011

The conference technical sessions were organized from 2-5th Nov, 2011 in the National Agricultural Science Complex, NASC complex, PUSA. The first day of the conference had plenary sessions in the symposium hall and the speakers were academician Prof. Vladimir Maevsky and Prof. Eduard Kolchinsky, Director, S.I. Valivov Institute for the History of Science & Technology, St Petersburg branch, RAS. Prof. Eduard Kolchinsky made a very vivid presentation on the Science Mobilization in the Soviet Union since the 18th Century. Prof. Vladimir Maevsky proposed the new version of the reproduction theory and hoped that it will be possible to mitigate the negative socio-economic consequences of the change of technologies.



The Technical Session on **Innovation and National Systems** discussed the various stages in building the National Innovation System of a country (the case of Russia, India and Trinidad and Tobago), the role of Science and Technology in shaping the National Innovation System, the multidisciplinary approach and the balance between Science Technology Society and Innovation that is required. The session also had intensive discussions on innovation taking place at all the levels, national or sectoral or regional and that the instrument of planning has a strategic role to play and needs to be shaped for the development of "peoples' needs" with the aim to bring an appropriate set of changes in the culture of innovation.

The Technical Session on **Globalizing process and S&T resources** discussed the pros and cons of Globalization of Technological Innovation and laid stress on the requirement of an efficient public policy which could should enforce the positive side of catching-up and diminish its negative consequences

The last Technical Session for the day on **Technology and Globalization** had several models for making forward looking prediction which would then help policy-makers to take corrective actions but the validity of such models with respect to individual countries were stressed. For

pre-industrial societies, one of the reasons for state breakdowns is the Malthusian trap which could be overcomed through technological innovation. But such an escape from one trap will lead them to be caught in another kind of trap, that of political destabilization against the background of high economic growth. The session also discussed the measurement of new knowledge diffusion by an export-import matrix of knowledge flows and claimed that the knowledge generation process will be faster if there are more collaborative works.

3rd November 2011

There were parallel sessions conducted from 3rd Nov, 2011 onwards. The Technical Session on **S&T system: institutions, structures, policies, changes in countries and globally emergent** in training hall discussed theoretical papers on the Innovation policy dynamics of Russia using theoritical models and the prospects of such models were discussed. Papers on factors which allow developing countries to move at par with the global leader were presented and models to make the long term predictions of global economy were suggested. Sector specific Innovation diffusion models were presented and some major limitations of the model and avenues for future enhancement were discussed.

The parallel technical session in the conference hall discussed on the S&T systems in Russia, New patterns of science and education in Russia, e.g. new status of universities as as national, federal, and national research centers, changes in pattern of student enrolment, research atmosphere made more competitive etc. A paper on positioning of India in Innovation Map with Reference to Patents and R&D, 1970-2009 was presented which found in terms of numbers, CSIR to be the most prominent followed by DRDO, ICAR, ISRO etc. CSIR had the highest percentage of patents in Chemistry and least in Aerospace



The next session in training hall on **Technology and Globalization** had speakers presenting a mixture of literature review and empirical results. The first speaker gave an intensive review of literature on increasing returns. Ideally the economic theory talks about the presence of diminishing returns arising from various economic activities. But, this speaker identified that recently in the process of development, one can also find the reasons for increasing returns. Some of the reasons cited for increasing returns were due to R&D, learning from the past etc. A good attempt at citing some of the important effects of increasing returns was made by the speaker. Another speaker talked about the empirics of patterns of technological growth dynamics

discussing the overall pattern of divergence/convergence between the core and the periphery. Literacy rate was the key factor that distinguished the core from the periphery. The fastest economic and technological breakthrough was achieved by those countries that had attained sufficiently high literacy levels. This reflects upon the fact that development of human capital was an extremely essential factor of economic development. Another aspect that differentiates the periphery is the demographic transition which makes the periphery lag far behind the core. Claim was that for sustainable development to take place it was essential for the core to give full support to the periphery development programs, this fact was well substantiated by various empirical estimations as well.

The technical session in the conference hall on History of Scientific Thoughts and Institutions discussed the issue of Integration of Natural and Human Sciences in Science Education in the Indian institutions. The research conducted by the speaker had attempted to answer the following three questions, they being what have been the problems of natural science education in India, why there is a need to integrate natural and human sciences, and how to go about integrating them in science education institutions. The speaker suggested that the process of integration between the two sciences can be attained through a soft programme and the strong programme both of which aim to integrate the natural and the human sciences to produce new and relevant, third kind of knowledge which neither would exclusively be natural nor human science knowledge. The speaker gave an elaborative and enlightening account of the history of integration in universities and institutes in India. The second speaker discussed the case of Indian forest Service; as a much maligned category of wood-keepers who are often caught between the demands of the state, industry and the whole mass of people whose survival depend on their daily collections from the nearby forested area. The speaker efficiently traced the origin of the service in the colonial context, the social and educational profile of its early recruits, their motivation, perceptions, pedigree, sense of authority, social responsibility and thus their place in the over-all hierarchy of colonial institutions and Anglo-Indian society. The speaker concluded by stating that the quest of colonial foresters needs to be recognized as men of science. The next speaker of the session in his paper examined whether even in 18th century the Indian economy was a knowledge economy. The speaker stated that indeed innovation and knowledge with its different aspects have been a part of the Indian history except for the 20th century there has been a gap. Asia's way of change was contextualized by its culture and social structure. Cutting edge knowledge was missing in the 18th century India. Innovation in the 18th century India failed to meet the social requirement. The 20th century though witnessed several contributing the development of knowledge. World War-I saw the stress on institutionalization in order to materialize the idea. Pre-independence produced a number of eminent scientists. However, post independence the aura of science has come up in the form of institutions but yet possibly it has not succeeded in generating a consolidated knowledge pattern. The speaker concluded by stating that the science and technology debate is lacking form India and so the a self critical assessment of current knowledge base is needed. The last speaker stated that the globalized nature of public good in the current time necessitates the involvement of public in local policy making in the form of stakeholder governance. Moreover, as the role of public opinion gains importance along with the government at times acting as a substitute for the government and at others complementing the traditional governance, it becomes important that each individual of the society along with the decision makers, recognize and completely understand the scientific aspects of public issues, as such an understanding of the scientific aspects of a certain issue would lead to correct internalization of information in the eventual decision making in public policy. Science thus plays an important role in improving the quality of both the public and private decision making. This speaks of public science domain in the globalized world.



4th November 2011

The Technical Session on S&T and society: Evolution and social change had a paper on role of CSIR in the National Innovation system which was very informative and helped the audience to understand about CSIR like its origin, number of research labs spreading across the country and their pattern of networking, manpower strength, annual budget, organizational structure and its core R&D strength etc. The talk gave a general overview of CSIR's various inventions like development of new drugs, sugarcane bio-refinery, chemicals from bagasse, bio-processing in leather, fertilizers, solar power assisted rickshaw- Soleckshaw, synthetic clonal reproduction through seeds, disease resistant rice variety, enhancing potability of water and post harvest drying & processing technology etc for empowering the farmers. The next paper on "Globalization induced ICT revolution and Socio-cultural changes in India" focused on the sociological analysis induced through globalization and ICT and its impact on social stratification, generation of new class of entrepreneurs, formation of social capital and sexual revolution etc. An interesting paper on "Definition, functions and indicators of the scientific elite" tried to formulate scientific elite as a group of highly qualified scientists carrying out significant cognitive and social functions and discussed the cognitive; organizationaladministrative and socio-cultural functions of these scientific elite in details. The last paper of the session on "International Mobility as a Significant Tool of Shaping the Scientific Elite (The Russian Case)" tried to analyse the international mobility of Russian scientists at the different historical stages and its effects on emergence of the scientific elite.





The parallel session on Interface of Sociological/Innovation Studies/ Industrial Structures and Changes: Public finance/tax incentives & Legal Form had presentation focussed on land acquisition under eminent domain, specifically, how the process should take place, which is through market intervention or through government intervention. The speaker discussed the relationships between laws relating to land acquisition with development on the one hand and other important societal goals on the other. The interesting conclusion that the analysis drew during the presentation was that the requirements for preventing the misuse of the eminent domain power are the same as the requirements for wealth-accretion. From this it was shown that constraining the eminent domain power with the public purpose requirement is conducive both for wealth-enhancement as well as for protecting the cherished social institutions and goals. As an outcome of the research it was established that land acquisition by government is not wealth enhancing and therefore there is no valid justification for the government to acquire land and give it to the private enterprise. The second paper on "Internet Laws: Some conceptual issues with special reference to India" looked at several Indian court cases pertaining to domain name allocation dispute and attempted an economic analysis of these court cases. Eight Indian cases were discussed in detail during the presentation. The cases were analysed from the point of view of economic efficiency. The Kaldor criterion was used for the analysis based on the concept of wealth maximization. As a result of the economic analysis so conducted a steady pattern of judgement was found across all the cases discussed by the speaker and the speaker concluded from the analysis that the law with respect to such disputes can be explained by the principle of efficiency though the courts did not explicitly take into consideration the economic impact of such fraudulent activities in all the cases. The last paper on "Limits to Institutional Reconfiguration through Technology: Insights from an evolutionary account of an Indian ecommerce portal" looked at the case of diffusion of e-commerce through one of the important ecommerce portal in India. For the purpose, Practice theory was used to specifically find out the form of e-commerce in India. Changes in e-commerce are spread across the entire site and ecommerce links up all the sites, change in practice was traced through changes happening in different components of portal. The analysis of the case was based on long, unstructured interviews of 20 managers at different administrative levels of e-commerce service provider organization, its main clients and bidding customers over a period of 18 months between 2010 and 2011. Based on a careful analysis the speaker argued that nodes of authority, its jurisdiction and span shaped the trajectory of technology implementation. The speaker also argued that without sharing of authority within non-vertical relations, the transformative potential of e-commerce was not realizable.

The Technical Session on Lessons from Policies: Cross country experience the authors have made a good comparative review of the traditional medicine's scene in two countries namely Brazil and India. It concluded that Brazil has oral traditions mainly for preparation of phytomedicines, while India has proper written documents and pharmacopea. In the field of regulation, Brazil is late starter, but quality control is far stricter than India. With regards to the innovation dynamics Brazil has a strong presence of public sector in basic research while the commitment is not so strong in India. The second paper on S&T components in FDI in the BRICS observed that such component of FDI is quite high although varies across countries & sectors and indicated that such a trend in the long run may prove to be beneficial to these countries. The third paper on the impact of globalization on the S&T Institutional structures: Case of CAS, RAS and CSIR concluded that gglobalization has placed pressure to become more innovative, efficient and competitive; Institutional structures became increasingly networked and decentralized with expansion in the breadth and scope of activities, at the same time specializing in key priority areas.

The parallel Technical Session on Education, Human Resources and S&T Reformation consisted paper on Technical Education in India: Emerging Issues and Challenges in which the author gave an overview of the technical education system in the country and raised issues of inferior quality manpower, unemployment and poor infrastructure associated in the system. The second paper dealt on Problems of Education of Foreign Students in Russia. The last paper on was on Institutional Arrangements for Skill Developmentin Vocational Education and Training in India where the author also gave an overview and raised concerns similar to technical education system

5th November 2011



The technical session **on Knowledge institutions in the promotion of innovation had** paper which argued that Indian planning exercises that shaped the economic policy interventions of the Indian Government did not take cognisance of deep institutional nuances of the country. Picking up examples from the planning models of Mahalanobis and other plan documents, it was argued that frameworks such as input-output matrices relied heavily on coefficients that were derived from the Western industrialization experience. Although empirical evidence was available to dispute the underlying assumptions of the planning models, the frameworks were not revised. This led to several problems - one of which was the neglect of rural industrialization. The author argued that it led to lack of industrial inputs to agriculture and by depressing agricultural productivity led to an aggregate demand problem. The paper analyzed the institutional structure and pointed the major causes of change in the same. It has explored and illustrated evidence of institutional change and pointed out towards the cumulative causation for the same in the Indian context – specifically with reference to technological change and the evolution of S&T in India. In the paper the author discussed the literature on institutions and economic development and related it to the apparent structures and processes of exclusion that exist and have evolved in the Indian economy in a globalizing scenario. She has talked about the neglect of agricultural sector in the country over the years. In this context she elaborated on the role that innovation may play for rural transformation.

The second paper dwelt at length on the theory of Kondratieff cycles and built on arguments of creative destruction of Schumpeter. The author also provided an analysis of long term trends of growth rates of India and rest of the world and the interesting aspect that was brought out was a shift in the relation between growth rates in India and rest of the world over the last two decades. While historically growth trends in India followed with a lag the growth trend in rest of the world (particularly OECD countries), it shows a decoupling from world growth trends over the last few decades as India has actually linked up with the global economy further. The presenter tried to identify the problems for internet connectivity in rural areas. The paper tries to check the viability of the Indian telecentre project that aims to set up 1,00,000 telecentres in rural areas under a PPP arrangement. Work was based on field research conducted in two states – UP and Meghalaya. The paper finds that the telecentres are not commercially viable and not developmentally effective. Their challenges relate to poor perceived need of the internet, lack of content, power shortage and poor connectivity. The paper also indicates towards measures to overcome those challenges. The next paper on Technological Transformation and Long Waves of Economic Development analyzed the importance of long waves of economic development for the comprehension of the spatial spread of industrial production in the world economy along with the model of technological transformation in the globalized world. It concluded that research on long waves can provide the solution to many of the unanswered questions of uneven development and therefore has important implications for formulation of economic policies. The last paper of the session analyzed cases of randomized clinical trials in India. The paper discussed philosophical as well as practical contents that go into the process of clinical trials of drugs and therapies. The author was primarily focused towards the trials conducted in India by the interested parties in the domain of biomedical R&D and pointed out the violation of ethics and rights in the same. The paper also indicated towards the possible policy and institutional safeguards that can be adopted to stop these violations.

The parallel technical session on Interface of sociological/ Innovation studies/industrial structures & changes: public finance/tax incentives & legal form had comparative paper on Complementarities & Potentials of Trade (High Technology between India and Russia). The paper examined complementarities and potentialities in merchandise trade in general and high technology trade in particular between India and Russia. The analysis shows that bilateral trade flow is small even though trade complementarities in the segment of high technology as well as in merchandise trade in general exist. Inefficient trade logistics networks, absence of mutual recognition of standard, lack of bilateral technology and skill transfer and low level of connectivity between private sectors of either country are some of the factors responsible for not realising the potentials of trade. The second paper on How to connect science and market? A Siberian Experience was interesting as it tried to explore who is in charge in the contemporary Russian science – scientists or businessmen? The third paper on Local Producers and Global

Buyers: Innovations and Exclusion in a South Indian Footwear Cluster looked into the fact how economic globalization has essentially attempted engage the local producers into the international markets, even if to a limited extent.

The Technical Session on **Promoting innovation in different economic sectors** had a paper which provided a fairly broad overview of the Biotech sector in India. It has discussed the major structural adjustments and shifts that took place in the industry and its impact on the biopharmaceutical sector. It has indicated towards the basic growth drivers. The paper finally analyses the innovativeness in the biopharmaceutical industry. It has identified the innovative activities of firms depending on several indicators. The second paper discussed different techniques to produce green product. It has identified the supply and demand side obstacles to green product development in India. The paper the discussed how to overcome the supply side obstacles from the perspective of a firm that produces green product and competes with a polluting firm. In doing so the author has used a game theoretic model.

In the last technical session on Lessons from Policies paper was presented on National Vs. Global approaches to vaccine policywhich highlighted the fact that introducing new vaccines efficacy of the vaccine, risk/cost-benefit analysis, affordability are important concerns. In the initial years India had taken a lead in the development of vaccines but with lot of the vaccine institutions getting closed over the years it started lagging behind though notice of this fact was not made until the major institutions catering to the immunization, mainly of children, were closed down. Lot of private companies entered the market subsequently, though not sufficient in numbers, selling expensive vaccines. This resulted in incomplete immunization and the immunization coverage also dropped along with the increase in government expenditure which now has to procure vaccines from private players at higher cost. The new global alliances put less emphasis on the local conditions or incidence levels and other important factors which brought their effectiveness down. The remaining public sector vaccine manufacturing units also could not make the country self-reliant because of the prevalent international standards as a result of which they had to heavily rely on imports. Therefore this sector needs serious attention. The paper on India's Technology Policy and its influence on technology development divided India's technology policy into various phases: liberalization until mid-sixties, tight regulation until endseventies, relaxation of regulation till end-eighties, another phase of liberalization then on promoting collaboration with other countries and also allowing MNCs to set up their branches in India in consonance with the general liberalization policy of India. It concluded that the S&T Policy should try to address social problems as well and be more comprehensive and it should be reviewed more frequently so as to keep pace with the current need of the society.

The last paper on India's Information Technology Policylaid stress on the fact that the problem with GOI is that it has many policy papers but no basis for estimates and projections and very little discussion goes into framing such policies particularly even when ITT has relevance in various spheres, for example, S&T, economic, development, legal and diplomatic, security and strategic. Two core issues of ITT policy are: how to enlarge information space and how to utilize the space; which can be done through more focus on information and not technology. India is focusing more on the higher levels ignoring the basic levels. The efforts towards addressing the issues should come from Government, Industry, citizens and supra-national agencies taking into account tangible, human and institutional factors. To achieve these goals Google as a telecom

service provider was taken as a case study by the speaker and it was suggested that India should draw lesson from Google.



Concluding Session:

The session was conducted in a panel discussion mode were the panelist were Prof. Svetlana Kirdina, Dr. Nadia Asheolova, Dr. Naresh Kumar and Dr. Kasturi Mandal. Dr. Parthasarathi Banerjee - mentioned that this conference was organized under ILTP project sponsored by DST. He felt studies around socio-politico-economico dynamics of social instability along with S&T through systems dynamics could be very relevant and should be undertaken jointly with NISTADS and other countries. Prof Svetlana Kirdina discussed the possibility of exchange of ideas between Indian and Russian scholars through summer schools and thanked the organizers and their families for the conference. Dr. Nadia Asheolova argued that opportunities like conferences as good means to share experiences and knowledge on S&T related fields but it should not be limited to writing just few papers and presenting them at conferences. She opined that one should concentrate on taking up concrete steps to translate this intent into practical actions. She also informed and invited the participants of the workshop for submitting their contributions by 15 Jan 2011 for an edited book which was planned as a post conference publication. Dr. Naresh Kumar pointed out certain fields of research where India and Russia can collaborate: 1) Measurement of Science and Technology output (2) Scientometric Studies (3) Mathematical Modelling (4) Technical education (5) Higher Education. Dr.M U Khan spoke about the need for regional cooperation for innovation in policy machining. He emphasized on the need for learning from the S&T policies of India, China, Russia, Korea and that India should

concentrate on regional co-operation in SAARC countries and later on should extend it to South-East Asia. Prof. Andrey Korotayev invited papers for the Journal of Globalisation Studies. He urged participants to look at the issues of globalization studies and BRIC Country Studies. He stressed on possibilities of collaboration, India being part of BRICS countries. Possible collaboration areas could be Mathematical modelling of development of Russia and India, demographic dynamics, economic dynamics so that simulations can be made based on those models. He felt it is important to focus and project strategic interactions, study how technologies can be spread in the country. Also expects co-operation from India to study and analyse India. Prof Elena Ivanova considered comparing conditions of work of researchers (their norms and administration) between India and Russia can be studied in detail.



Prof. Pranav Desai (Chair of the session) emphasized on technology forecasting studies and suggested that one should take cues from the work presented in the conference to study technology trend in both nations. He also said that International Co-operation in S&T and how it is transforming innovation process, study aspects relating to biotechnology and nanotechnology could be important. Lastly he stressed that globalization plays an important role in transforming innovation process.





In nutshell the Concluding Session Reported:

- We must maintain a university research data
- The university research data will be helpful to avoid duplicate research

- It is also important to maintain a directory of all projects
- Institutional aspects was the main focus of the conference
- Inter-country study was absent
- We should also focus on the importance of regional co-operation in innovation policy
- Innovation policy guideline template is necessary
- International co-operation in S&T should be a interesting topic to study