INNO-Views Policy Workshop

Emerging Economies (BRIC* Countries) and Innovation

Implications for innovation policies in Europe

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Workshop Output Paper
Workshop Summary

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Introduction

It is commonly accepted that globalisation is an overriding trend for business, research and innovation, and that BRIC countries are increasingly gaining importance in global innovation processes. The 8th INNO-Views workshop on "Emerging Economies (BRIC Countries) and Innovation: Implications for innovation policies in Europe" brought together almost 35 leading experts and policy makers on July 9th and 10th in Brussels in order to discuss the opportunities and challenges the different BRIC countries offer to European innovation policy.

The workshop focused on the innovation collaboration potential with BRIC countries, with a particular focus on defining the key challenges, identifying proven approaches and instruments to these, and defining relevant policy recommendations for the European innovation policy. It was organised in four sessions:

- Session 1: Innovation collaboration beyond Europe - Outlining relevant policy areas
- Session 2: Challenges and opportunities with specific BRIC economies
- Session 3: Approaches and practices in innovation collaboration with BRIC economies
- Session 4: Implications for European innovation policy

Presentations and workshop conclusions summarising recommendations gathered during the workshop discussions and a follow-up consultation with all participants can be downloaded from the PRO INNO Europe Portal.[1]

The workshop was hosted by the representation of the State of Baden-Württemberg to the EU. Baden-Württemberg has already a long tradition in innovation policy but the export-oriented region has to find new governance structures in order to fit in European activities and face the challenges of international competition, as **Joachim Baldermann** (Representation of the State of Baden-Württemberg) outlined in his welcome address.

Globalisation aspects of innovation

The global knowledge and innovation landscape is changing: Developing countries, and in particular BRIC countries become increasingly important knowledge and innovation sources, but also drivers of innovation. Not only R&D and knowledge are internationalizing, but the most dynamic markets can be found increasingly outside

[1] http://www.proinno-europe.eu/index.cfm?fuseaction=workshops.ws_paper&ID=26

Europe and the US. More and more new products are demanded and developed in Asia, Africa, and Latin America.

With view of the changing geography of innovation, the global challenges and the focus on demand-driven innovation, **Peter Dröll** (EC, DG Enterprise & Industry) emphasised in his introduction the importance for Europe to look at the possibility to open up its innovation policy strategy for international cooperation in particular with emerging economies. New policy responses and approaches at national, regional, European level would be needed. The internationalisation of the innovation process leads to increasing complexity with new innovation models and actors and needs new interfaces and integration with science and technology policies, development, trade and other policy areas.

The growing innovation capacity of the BRICs raises crucial questions regarding the nature of innovation and its relation to socio-economic development. Employing a broad definition of innovation that acknowledges its socio-political dimensions, **David Tyfield** (Lancaster University) argued for a 'cosmopolitan innovation' policy regarding international collaboration between the EU and the BRICs which would be contrasted with both a pessimistic techno-blocism and an over-optimistic techno-globalism. The “Cosmopolitan Innovation” view sees international collaboration and the rise of BRICs as an opportunity, but also as a challenge and an “imperative”, which is not without costs. A strong and explicit policy choice in favour of such international collaboration is thus needed to justify such a focus despite these costs.

Most important “imperatives” for collaboration are among others global challenges for EU and BRIC countries, the increasing innovation catch-up of BRICs, maximising the impact of existing science, technology and innovation developments and maximising mutual learning in order to smooth integration of BRIC countries into the heart of global political economy. Nevertheless there are also constraints and costs related to innovation collaboration with BRIC countries like language and cultural barriers or missing incentives and supportive framework conditions especially for SMEs (e.g. related to IPRs and technology transfer).

The emergence of new partners (and competitors) outside Europe leads to an increased competition for consumers and purchasing power and to a competition for skills. Until now Europe’s linkages with (and presence in) new knowledge and innovation hubs are relatively weak. The increasing importance of demand-driven innovation is a further challenge for Europe, because the users of innovation can be found increasingly elsewhere.

Rationale

The changing knowledge and innovation landscape and the shift of economic balance strengthens the need for Europe to cooperate for research excellence, critical mass, competitiveness and growth and the need for a broader view of innovation policy including also education and other policy areas. The most important rationale for cooperation at both sides is to improve competitiveness. **Rainer Walz**

(Fraunhofer Institute for Systems and Innovation Research) classified the motivations of Europe for international collaboration as follows:

- Competitiveness of EU: Increasing competitiveness by global knowledge sourcing and adapting to future markets with new demands
- Demographic challenges: The decline of work force in EU is contrasted by a huge potential of young work force in BRIC countries
- Addressing global challenges: The effect and the driving forces of global challenges like climate change or limited resources are global and need to be tackled at global level.
- Development policy and foreign policy: Innovation collaboration can contribute to promote political cooperation, building mutual trust, understanding and capacities etc.

Building on existing approaches - experiences of R&D policies

R&D policy at European, national and regional level has a longer tradition with view of internationalisation. The internationalisation of innovation policy should therefore build on the existing approaches and learn from success and failures of internationalisation of other policy areas, like R&D.

Main objective of internationalisation of R&D is to increase the quality and absorption capacity of domestic S&T through international S&T partnerships allowing access to foreign knowledge and S&T resources. The creation of ERA at EU level helps Europe to gain a strong unique position in order to increase the visibility at international level as **Claire Nauwelaers** (UNU-Merit) turned out. A stronger European standing in the international arena contributes also to improved promotion of European standards and ethical principles for the performance of science. Most important for international competitiveness would be to link ERA to knowledge hubs and strategic markets outside Europe through science, technology and innovation co-operation via different programmes at EU level.

Member States and Accession Countries foster a closer cooperation of S&T policies vis-a-vis Third Countries and support progress towards ERA by making good use of existing EU-level instruments. More over opening of national programmes is evolving. Main aim is a more efficient access to R&D (policy)-related information, improved and harmonised legal framework conditions for international collaboration and sharing risks through pooling activities and resources with Third Countries. Nevertheless progress towards the ERA is still limited and comes mainly from bottom-up, grassroots initiatives of agencies and research actors, such as universities; at present gaps between intention of initiatives and actual results have to be stated.

Presented by **Sylvia Schwaag Serger** (Vinnova),the CREST OMC Working Group “Internationalisation of S&T" recommends in the Final Report, joint strategies of the Member States and the European Commission vis-à-vis Third Countries or regions

should focus on joint S&T dialogues, increased brain-circulation, advancing funding schemes, removing still existing barriers and analysis the potential of international agreements of EC with Third Countries. This approach should be enlarged to an policy dialogue focusing not only on research but also on innovation collaboration with Third Countries.

Priority setting needed: Addressing global challenges

Rainer Walz emphasised the need for a tailor-made framework for innovation collaboration and to identify priorities. One main priority area of innovation collaboration with BRIC countries should be global challenges due to their global effects and driving forces. Topics to be addressed include climate change, water availability and quality, urbanisation and transportation as well as a growing demand for materials. In particular in BRIC countries a need for sustainability innovations can be stated, because BRIC economies become major polluter with CO2. Enormous investments in energy infrastructure are planned in the different countries (e.g. China: 4.000 billion $ until 2030).

Moreover sustainability technologies represent a huge fast growing market. The development of environmental strategies is not based on low tech, but includes or triggers system innovations with high dynamics. At present sustainability research is not an explicit priority in some BRIC countries, but numerous links and good starting points for cooperation exist. Thereby state of development, the competency profiles and strategies of the individual BRIC countries have to be taken into account:

- Brazil could be the lead market for biomass based technologies.
- In China, trade shares are much higher than the knowledge base, but there exist high dynamics in many fields, e.g. energy, water and material efficiency
- Russia has a excellent basic knowledge base, but at present only single technologies in this field
- India is focussing more on other priority areas, but has also single technologies in this field

To summarise, a strong strategic and systemic positioning is needed to fully exploit the cooperation potential with BRICs in order to combine strengths in capacity, pressing needs and trends in capacity building. For this an analysis on disaggregated technology level would be necessary including also the social science side and role of demand and regulation in BRIC countries. Most important would be to coordinate and integrate different policy areas related to sustainability which should be treated as “public good”.

Challenges and opportunities with specific BRIC economies

Each of the BRIC economies has a unique profile, offering a set of challenges and opportunities to European innovative companies, whether related for example to their

markets, competencies, regulations or institutional set up. European innovation policies need therefore to be in certain aspects specifically adapted to each BRIC economy's profile.

As **Xielin Liu** (Chinese Academy of Science) outlined, **China** is characterised by impressive economic growth and high speed of development meanwhile reaching a GDP per capita of $3000 in 2008 and showing a fast changing industrial structure. Chinese economy is in the stage of heavy chemical industrialization. Since the 1980s, market reforms aim to strengthen the business sector and to encourage entrepreneurs and private enterprises. In 2005 about 65% of GDP comes from private business which is also responsible for 75% of employment.

Most important innovation actors in China are state owned enterprises (SOE) and private enterprises. Due to increasing openness of China and intensive FDI, joint ventures and multinational enterprises from developed countries are also very important actors in the diffusion of technology especially in high-tech industry in China.

Chinese innovation leaders are primarily non-SOEs, such as Huawei, Lenovo, Haier, TCL, which are becoming globally active in R&D with R&D labs in USA, Asia and Europe, some for getting access to latest technology, and some for being close to the market needs.

With view of R&D, China is catching up the developed countries as e.g. indicators like high-tech exporting, R&D intensity, number of papers and patents show. China is for example world leader in ICT exports and shows increasing presence in nanoscience papers (second after US). Whereas the R&D system was long time dominated by governmental research institutions, it develops since the 1980s to an enterprise-centered system. China has also a huge – and increasing – potential of high-skilled work force. The number of students increased from 3 million to 19 million in 10 years (21% growth per year) and the number of researchers increased by 77%. China expects to produce more S&E (Science & engineering) doctorates than the US by 2010.

As Sylvia Schwaag Serger added in her comment innovation is seen to be as a mean to reduce dependence on 'cheap labour', reduce pollution and increase resource efficiency, tackle China's social problems (healthcare, inequality, etc.) and reduce dependence on foreign technology. Therefore a variety of innovation policy measures have been introduced in order to push forward technology transfer from research institutions to industry, to create supportive framework conditions for business start-

up as well as for IPR and licensing.[2] Other measures aim at supporting the innovation system by public procurement or promoting excellence (High-tech program, The education revitalisation action plan towards 21st century, etc.) and further development of venture capital and SME funds.

In general the Chinese innovation system is characterised by a large market size and dynamics, low labour cost and a focus on market-oriented innovation. Innovation policy aims to improve the education system as well as the innovation capability and existing S&T strength. Target technologies include among others general CPU, new broad wireless mobile telecommunication, nuclear station, new drugs, etc.

Nevertheless, private economy has still limited access to resources and the market and innovation capabilities of Chinese enterprises are still limited compared to other countries. These and other challenges need to be taken into account for innovation collaboration of EU and China. Corruption often damages the culture for business innovation. But the globalization trend will increasingly make Chinese economy adopt international regulation of trade, IPR and green manufacturing in the long run, which is at present also one main barrier. Moreover China needs to transform its way of development from resources using to sustainable development and needs political reforms to regulate the market competition. A huge potential for collaboration can be stated especially for sectors of new energy and low carbon economy to strengthen the knowledge-intensive industry both of EU and China.

India is characterised by a massive growth of GDP in this decade, e.g. 9,7% in 2006-2007 or 9,0% in 2007-2008 as **Venni Venkata Krishna** (Jawaharlal Nehru University) outlined. The service sector accounts for about 50% of GPD and is expanding driven by ICT software. Already since the period 1940-1960, science is seen as a mean to solve the problems of India like hunger, poverty, insanitation and illiteracy. This resulted in a massive growth of universities, which increased 3 times between 1940s and 1980s. This was also related to a massive growth of higher education and S&T personnel (e.g. 2007-08: 420.000 R&D personnel, 67% R&D labs and HEI; 33% Private Sector). Also with view of S&T outputs India dominated Asia till late 1990s, now it ranks second behind China (scientific publications, patents etc.)

Until 1990 Indian policy strategy focused mainly on S&T e.g. with setting up a first S&T Plan in 1974 by an expansion of HEIs and S&T institutions. In 1991 new economic reforms aimed to liberalise Indian economy, opened for FDI, strengthened

[2] For example technology inventors can get more than 20% of royalty after the technology licensed to the company or 20% of equity share in the new company. The researcher can keep their position in institute for two years if they start up their new company.

higher education and private business with a focus on ICT, pharmacy and biotechnology. The following elements of reforms can be distinguished with different focus:

- Focus on linking S&T to innovation: Commercialisation of R&D in national labs are fostered by establishing a number of technology intermediaries or technology transfer schemes, promotion of venture capital and tax incentives, network and cluster development programmes.
- Focus of science, technology and innovation policies in 3 sectors, software, pharmacy and biotechnology. Policies aim to create an enabling innovation 'ecology' e.g. via innovation clusters and focussed support programmes
- Shift from internationalisation of R&D to globalisation of innovation: Main activities focused on facilitating global networks, opening up in PPP mode, creating an enabling environment for global TNCs R&D. Emerging trends include the development from one way to two way technology transfer between home and host country R&D units, collaborative R&D structures, a growing innovation base of Indian firms and R&D institutions, the rise of Indian firms at global level and globally dispersed networked innovation. Indian firms become globally active, e.g. mergers and acquisition lead to enhanced technological capabilities[3].
- Focus on higher education and developing skills: The number of university graduates increased significantly from 4.811.600 in 1991 to 8.025.100 in 2004 and estimated 12.000.000 in 2008. Human resources and skills are one main competitive advantage of India therefore higher education is one main policy focus. The current XIth Five Year Plan has given a big boost to education with an overall increase of 400% for science, technology and education expenditures from 10th to 11th plan. As **Rajnish Tiwari** (University of Hamburg) added, still bottlenecks have to be stated for the higher education system, like a more theoretical focus of education, missing self-initiative and about 40 % of people in R&D institutions who are engaged only in administrative tasks.
- Focus of STI Policies, Taking advantage of Demographic Dividend: India has a population of over 1 billion, from which 52% are below the age of 25. India's workforce (20-59 age group) would go up by around 263 million by 2050. The

[3] 2007–09 Indian companies made 143 acquisitions across various sectors in the US and Europe

youth will drive Indian economy in future, provided skills and education are expanded.

To conclude, European co-operation with India is no longer driven only by cheap skilled labour force and a huge market, but also as (technological) knowledge source and because of the human resources. The increasing global orientation of SMEs and globalised innovation in open networks offer many opportunities by the huge market and the higher acceptance for new solutions in India especially in the ICT sector (e.g. mobile internet). Cooperation of European and Indian partners (especially SMEs) could be facilitated by agencies in order to widen possibilities for (distant) technology transfer or benchmark and enter lead markets. Because of the size of its population and fast growth India can be considered as a lead market for robust and cheap products, the best example being the new TATA nano car. 'First comer' advantages in varying forms should thereby not be neglected. Policy should contribute to foster collaboration by creating supportive framework conditions and developing a common understanding in particular with view of democracy, transparency, standards and IPR.

Carlos H. de Brito Cruz (FAPESP) presented the innovation system of **Brazil**. Brazil is characterised by a high heterogeneity in wealth, education, interests, needs or state of development. S&T and innovation policy is developed and implemented mainly by the 26 individual states, from which the state of Sao Paulo is the most developed.

Nevertheless Brazil has developed an encompassing innovation system based on several governmental initiatives fostering innovation in particular in the private sector. Some of the most innovative sectors of the economy are agribusiness, energy, aeronautics. An emerging sector is biodiversity based biotechnology. In all of these sectors a strong interaction between the private sector, academic sector and government created expressive economical and social results. For example, in agribusiness a broad network of local research institutes, plus a national R&D company (Embrapa) collaborated with the private sector to make Brazilian agriculture one of the most competitive in the world. In the energy sector, Brazil stands out as the only industrialized nation to have close to half of its energy generated from renewable sources.

The ProAlcohol Program, initiated in 1975 created the only world experience in which gasoline is substituted in large scale by a renewable fuel, Ethanol, produced from Sugarcane. Private sector innovation created flex-fuel vehicles that can use any mixture of gasoline and ethanol and in 2009 95% of the cars sold in Brazil are flex-fuel.

Simultaneously, the state owned oil company, Petrobras, working in conjunction with a large network of university laboratories managed to obtain self sufficiency in oil. More recently, with the new findings in the Tupi oil field, Brazil can become an exporter of oil. To achieve this result several innovations related to oil drilling and extraction in deep sea water have been developed and fostered.

Public policies for innovation focus on education and research in universities and R&D in institutes, but also e.g. on tax incentives, creating supportive framework conditions for innovation (IPR) and support programmes for entrepreneurs and start-ups (Tech and Science Parks, SB incubators and support etc.). One structural challenge for Brazil's R&D is to foster industrial R&D: Only 23% of Brazilian scientists are working in the industry, which leads to limited conversion of knowledge to wealth. At present science in Brazil is strong, but technology development and innovation lags behind (12.000 papers vs. 120 patents).

Innovation cooperation of European and other foreign innovative companies with Brazil is often linked with local R&D activities. As the flex fuel car shows, European companies (e.g. German car manufacturers) do not only offer innovative solutions but look for new opportunities to create innovation. For this it is necessary to develop a local knowledge network and to interact in Brazil. Addressing and understanding the market needs would need direct contacts and dialogue with locals. Major barriers thereby are the different cultures, different languages and missing confidence (IPR).

Nevertheless, innovation collaboration with Brazil offers a variety of opportunities especially in the field of sustainable technologies, e.g. energy (bio / efficiency, environmental / water, transport). Bilateral collaboration e.g. of Germany and Brazil at national and at "grassroot" level are ongoing, e.g. establishing the Center of Excellence in Advanced Technologies of Rio Grande do Sul, which promotes research and technological innovation for the Brazilian industry through the cooperation between the Rio Grande do Sul State and the Fraunhofer Society from Germany.

As **Oleg Luksha** and **Anton Yanovsky** (Russian Technology Transfer Network) stated, **Russia** has a good reputation in producing new knowledge as reflected in winning many Nobel prizes, scientific publications, etc. However, due to funding cuts, knowledge output has declined quite substantially during the 1990s and delayed restructuring of public research organizations has affected efficiency. Low salaries for researchers lead to a high motivation problem.

Regarding the application of new knowledge, Russia has a relatively poor record when it comes to turning knowledge into economic or social benefits. Russia's economy has some important structural problems. Except for aerospace and

defence, the economy has relatively few high-tech industries. In addition, Russia has only a small pool of SMEs from which new industries can emerge.

The business sector is only to a low extent involved in R&D. In most Russian industries the dominant form of innovation is by purchasing equipment and expertise abroad, and not through investment in own R&D capability. Most Russian companies have no clear R&D strategy.

Russia's innovation system is slowly adjusting to a market economy. New modes of operation are needed. The supply of new knowledge should be driven more strongly by the needs of the productive sector.

In recent years, Russia has moved from a narrow "S&T policy perspective" that only looks at the generation of new knowledge to a broader "innovation policy perspective" that looks at both the generation and application of new knowledge. Innovation policies are often hindered by an inherent lack of coordination among the innovation actors and stakeholders, in particular between public research and private industry. Other barriers for innovation include:

- IPR: The question of ownership of publicly funded R&D holds commercialization of public R&D results back.
- Legal barriers of public-private partnerships in innovation
- Funding resources are allocated more on the basis of connections (favouring the status quo), rather than on the basis of the quality and relevance of the research proposals
- Priority setting procedures are generally weak and dominated by researchers rather than users of the knowledge and technology

Current development trends of Russian innovation policy focus therefore on creating high-tech production zones and "technological parks", special state programs for high-tech industries (aircraft, shipbuilding, etc.) and specific technologies (nanotechnology, biotechnology etc), creating innovation institutes for commercialization of technology (State Venture company, Rosnano (nano-technologies)) and tax-related measures to facilitate R&D in industry. In 2009 the President outlined the need to create an intelligent economy in Russia by focussing on key priorities areas, i.e. energy efficiency and conservation, nuclear technology, space technology (related to telecommunications), medical technology and strategic information technology.

S&T relationship of the European Union with Russia is already broad and deep and covers a wide range of areas. Russia continues to be the most active "third country" in the EU FPs (e.g. Russia was most successful "third-country" in FP6: ~330 signed

FP6 contracts, worth ~€ 2.8 billion).Moreover several EU S&T/innovation policy and management projects have been successfully implemented or are under implementation in Russia like TACIS and “Gate2RuBIN”, as partner in CIP Enterprise Europe Network (EEN).

Nevertheless several weaknesses in EU-Russia S&T cooperation have to be stated, which could be turned into areas of future attention. Language barriers, differences in “working cultures” and weak networking are important barriers of collaboration. The compatibility of standards and methodologies for performance assessment, independent project evaluation should be addressed. A dialogue should be established to identify priority areas for joint activities and develop mechanisms and instruments for joint coordinated actions. Strengthening joint EU-RU business and innovation infrastructure would be essential to support closer links between EU and Russian innovation companies and R&D organisations. The participation of European researchers in Russian S&T programmes is proposed for mutual learning.

As **Manfred Spiesberger** (Centre for Social Innovation) added in his comment, Russia offers various opportunities for collaboration, e.g. a well educated work force, strong excellent science base in basic research, but also competences in applied sciences (nanotechnologies, ICT etc.). At present innovation policy is high on policy agenda and a lot of activities for innovation funding, networking etc. are ongoing. Well established links between Russia and European Member States could help to facilitate collaboration.

Important would be that EC recognises and uses the scientific capacities and the cooperation potential of the Russian regions. For this, increased visibility of Russian R&D and innovation competences in Europe would be needed.

In the general discussion, **Jean Guinet** (OECD) emphasised the need of mutual benefits of collaboration. Different expectations of BRIC countries and Europe and diverging views could limit the impact of the collaboration process. The convergence of BRIC countries to established economies is characterised by three elements:

- Economic integration, i.e. it is not a managed process, but driven by market actors,
- Competition, as most important rationale for any innovation strategy and
- Co-operation

Governments should develop a strategy and provide a framework to combine these three elements effectively and achieve a positive outcome.

Claire Nauwelaers pointed out that tapping in the creativity potential at both sides would offer opportunities for both, EC and BRICs. EC should aim to exploit diversity

from collaboration with BRIC countries. For this brain circulation would be important. BRICs offer new potentials by new markets and new ideas. But there is a need to increase visibility of innovation potential at both sides EU and BRIC countries. Initiatives like networks of excellence or technology platforms could help to exploit excellence.

Approaches and practices in innovation collaboration with BRIC economies

This session provided public and private examples of different approaches and practises to facilitate innovation collaboration with BRIC economies. Such examples include technology transfer networks, foreign R&D establishments of large companies, internationalisation programmes, etc.

As **Jan Sandred** (Vinnova) pointed out in his presentation on the ILP Ministudy: "International aspects of support to innovation", only few solid and coherent strategies for internationalisation can be found. Nevertheless some interesting initiatives are e.g. programmes of the following agencies: VINNOVA in IPR Support (SMINT) and "Global Links", TEKES with FinChi and FinNode, 3-tier Subsidy Schemes of The Netherlands (SI2, SOM, Eurostars), Initiative of Switzerland CTI Start-up etc.

Lessons learnt from these programmes and main recommendations for approaches supporting innovation collaboration with BRIC countries include:

- The Sweden approach builds on functional regions which are assumed to be more important for collaboration then nations or geographical regions. Growth at national level relies on the growth contributions from the nation's regions. Funding of internationalisation activities of regions contributes to strengthen the competitiveness of the regions and leads to mutual benefits.
- In order to increase competitiveness and foster competitive regions, let them compete and invest in the "best".
- Priority areas related to regional strengths and opportunities offered have to be defined. Supporting mechanisms have to be process oriented and targeted.
- Innovation takes place when academy, industry and politics not only talk to each other, but work together. Knowledge is co-developed and not transferred. Innovation collaboration should therefore build on facilitating the cooperation of people and creating good relationships and trust.
- Existing programmes often lack a measurement of impact. Evaluating and monitoring would be essential in order to establish successful and efficient

programmes like the example of Vinnova shows (compare to the Vinnova handbook[4]).

The role of the EEN in the field of transnational technology and knowledge transfer and as potential facilitator to bring people together was emphasised. EEN could help to centralise activities towards BRIC countries and could provide links with professionals in the countries of interest. International business support should thereby in particular focus on IPR and licensing, but also on the development and implementation of new innovation models like user driven innovation.

Ludger Viehoff (EC, DG Research) presented the new approach for international S&T collaboration of the European Commission with the "Strategic European Framework for International Science and Technology Cooperation". A "Strategic forum for international S&T cooperation" was established in December 2008 to facilitate the further development, implementation and monitoring of the international dimension of the European Research Area. A new partnership of Member States and the Commission shall identify common objectives and priorities vis a vis third countries, ensure regular consultation and propose joint initiatives for international S&T cooperation. Special emphasis shall be placed on the cooperation with emerging economies and developing countries. Thematic priorities are not defined in the mandate of the forum; however issues like sustainable development, secure energy supply, health, human security, the grand challenges in general, will certainly be in the focus.

The EC has already established strong collaborative links in S&T with the BRICS countries. The Framework Programme has been opened to participation of Third Countries. Actual data show a strong involvement of partners in the BRICS countries collaborating with European institutions in S&T. Strategies of S&T cooperation have been developed with Brazil, China, India and Russia in bilateral dialogues; implementation takes place on the basis of roadmaps which are carried forward annually by joint steering committees. At present only a framework for co-operation exists and priorities are discussed with the different countries.

With its "2020 vision for the European Research Area" the European Union has developed a strategy to address the major global challenges. S&T play a key role in responding to the needs of citizens and business through world-class cutting-edge research. The ERA is open to the world and provides opportunities for partners in the emerging economies and the developing countries. This outward looking approach will be pursued by joint initiatives of Member States and the EC.

[4] http://www.proinno-europe.eu/extranet/upload/deliverables/Focus_on_impact-VINNOVA8050.pdf

This vision helps to deal with global challenges within the context of global responsibility. Open circulation of knowledge and researchers across national borders and transnational funding are key elements of this strategy. Partnership with Member States will increase the efforts in the collaboration especially with the BRIC countries.

Ludmilla Schlageter (EPO) presented examples of EPO cooperation projects with emerging economies aiming to promote the European patent culture (harmonisation, data exchange, classification) and help countries in building a quality patent system (search, examination, grant, opposition and appeal procedures, patent profession). A high quality patent system in third countries will reduce long-term incoming workload to the Office, benefit European users of the system and help European industry to acquire patent protection abroad. Moreover it contributes also to promote international trade programmes with the EU and raise visibility of Europe.

With BRIC countries bilateral cooperation with national Patent Offices as well as different projects have been implemented. Bilateral cooperation should build on mutual benefits. Basic elements include depending on country, i.e. its culture and state of development, among others human resources (training and development, harmonisation of the procedures), office operations (patent granting procedures, automation, data exchange, classification issues), etc. Most important is to develop IP systems that maintain standards of quality and service, and to facilitate a possible utilisation of search and examination results by other offices in the future. The use of common tools plays thereby a crucial role.

A project example is the EU-China Co-operation Project IPR2 where the EPO offers technical assistance to support China in stepping-up IP protection through efficient and effective enforcement with the full attention of the international community. “Cloning” of the data base and automatic translation helps to facilitate the access to Chinese patents.

As experiences show, mutual benefits are important for an effective collaboration. Different views limit innovation collaboration between Europe and BRIC countries: In all countries the legal patent systems are well elaborated, but the implementation i.e. patent litigation and market access differ. But also a harmonisation across Europe and of the European Patent Convention would be essential in order to create a similar legal framework and facilitate collaboration within Europe but also with BRIC countries.

Tom Hultin (Lappeenranta City Holding Company) presented the Finnish Innovation Centre Approach with view of the Russia-Finland innovation collaboration. A variety of “FinNode Centres” exist to foster cooperation with emerging markets important for Finland like FinNode China or FinNode Russia etc. Main aim is to support

internationalisation activities of national innovation actors, foresight new innovation trends, understand new demand trends and technologies and monitor “cross industry developments”

The regional partnership in the “St. Petersburg Corridor” was set up as a more strategic and systematic cooperation between South-East Finland, St. Petersburg and Leningrad Region as an official part of cooperation between Finland and Russia. The future aim is to widen Finland St. Petersburg cooperation to an EU-Russia cooperation. Most important would be to find common goals and common strategies. Pilot actions like the St. Petersburg Corridor could be used as test beds and could be further develop step by step.

The Finnish-Russian Innovation Centre in St. Petersburg was established as international innovation centre by FinNode Russia Group, Lappeenranta Group and Technopolis. Beside facilities like an InnoCafé, meeting rooms and a conference hall, a wide range of services is offered: Innovation promotion, commercialisation, IPR services, business services, investment opportunities in EU and Russia, recruiting, education and R&D, projects and lobbying. Moreover links are provided to a service provider network and funding. Clients include European and Russian companies, research institutions, educational institutions, innovation centers, employees and employers as well as cities, regions and governments.

Moreover projects have been initiated at European level to foster innovation collaboration with Russia, like the European-Russian InnoPartnership ERIP offering business development services in St. Petersburg.

As the Finnish experiences show, most important for the success of international collaboration with BRIC countries is to find at first a common language and to establish an innovation dialogue. Based on a cooperation agreement, common innovation strategies, goals and structures have to be developed. The mechanisms should be tested in a “piloting system”, i.e. in a defined area to test new forms of joint activities and to achieve a common understanding.

At practical level a cooperation programme financed by both sides is needed. Support packages for innovation activities should be offered and tested in the piloting system. This could include support for networking, public-private partnerships, matching events or training (IPR, project management etc.).

With the example of the EU funded FP 6 research project “Collaboration@Rural – C@R” applying open innovation mechanisms based on Living Lab principle and end user driven development in South Africa **Christian Merz** (SAP) presented the Co-

innovation approach of SAP in emerging BRICS markets from an (software) industrial perspective.[5]

As of today the BRIC countries provide one of SAP's biggest growth markets. This kind of emerging market is very complex to understand as there is no common cultural base. Consequently an end user centric development process being followed has many advantages in such environments. The local presence and interaction with end users and stakeholders is able to cope with rapidly changing policy and business conditions due to the sometimes high growth rates of the national economy. Socioeconomic processes are extremely dynamic causing rapidly changing requirements. Additionally societal structures are very heterogeneous reflecting social and cultural diversity. The Living Lab approach addresses these aspects at its core and enables to trace these changing requirements in real time.

Living Labs provide great value for validating technology advancements in an environment that does not allow to simply extrapolate from state of the art (European) technology. Particularly Living Labs in developing countries or emerging economies such as the BRIC countries provide data on the applicability and acceptance of "European" technology paradigms based on an understanding of local markets and user requirements.

FP7 Living Lab Networks should therefore aim at increasing the use of Living Labs as a methodology in Third countries to guide the design and development of appropriate and relevant technologies (in Europe) for deployment in emerging economies. Most importantly – FP7 WP2010 should also provide in the urgent need to increase technology research (in contrast to road-mapping and dissemination) in emerging economies to build up human research capacity and a sound technology skills base in these regions. Further recommendations include:

- Open innovation environments allow flexible, dynamic and accelerated commercialization of research results but require joint IP regulations that are of great importance in particular for private companies.

[5] SAP Research is the global technology research unit of SAP, with a network of 14 research centers on five continents. The group significantly contributes to SAP's product portfolio and extends its leading position in the market by identifying and shaping emerging IT trends and generating breakthrough technologies through applied research. The researchers explore opportunities that haven't yet been developed into products. The business model of SAP Research is based on co-innovation through collaborative research. In collaboration with leading universities, partners, customers, and SAP product groups, SAP Research drives the development of promising ideas and prototypes into market-ready software for maximum customer value.

- Real life experimentation and piloting (CIP) help to bridge pre-commercialization phases but should follow the same funding principles than R&D, e.g. CIP OH rates.
- Dedicated calls addressing needs of BRIC countries minimize the risk of European multinationals missing emerging markets
- Coordination between funding schemes and programmes should be facilitated, supported, maybe even enforced (e.g. EU-African energy partnership -> ICT)
- Research result up taking (pre-commercialization) should follow the same funding principles than R&D (e.g. CIP OH rates)
- Policy environment should support bi-directional know how transfer (i.e. learning from national initiatives in BRICs)
- There are prominent examples of how know how gained in BRIC countries during the development of dedicated products influence European technology providers. Policy should therefore support bi-directional know how transfer (i.e. learning from national initiatives in BRICS) to the extent possible.

Implications for European innovation policy

In the closing session with two working groups, participants emphasised the importance of innovation collaboration of BRIC countries with EC and to include the external dimension in innovation policy. The most important rationale for cooperation at both sides is therefore to improve competitiveness.

International co-operation (in particular wit BRIC countries) in science, technology and innovation would contribute to facilitate access to world-leading knowledge resources, to access important markets and users, to address global challenges and to attract human capital / talent to Europe (“brain circulation”).

Representatives from the BRIC countries called for cooperation on a par with Europe. Because collaboration is reciprocal, mutual benefits for Europe as well as for BRIC countries would be essential and opportunities offered by Europe for BRIC countries need to become more visible. In general, the focus of discussion should build more on opportunities (“let’s happen”) and matching different skills, competencies and capacities but not too much on the “balance of interest”.

Specific priority areas/ themes and objectives

Instead of establishing generic solutions for innovation collaboration with BRIC countries definition of priorities at regional level would be needed with view of markets, technologies and services. Differentiated regional solutions would be

essential to use most effectively the regional potential in the related countries, i.e. the collaboration should take place more between regions instead of EC or national level.

One main focus of co-operation should be on addressing the “Grand Challenges” including global warming, limited resources (water), increasing material demand and sustainability, as all participants agreed. At present joint priorities for cooperation are missing.

Multilateral as well as bilateral cooperation should be established depending on the topic addressed and the depth of cooperation (in-depth cooperation needs bilateral instruments). Most important would be to identify the most relevant partners and stakeholders both to develop strategies and for collaboration at operational level.

“Bridging the knowledge gap” between BRIC countries and increasing the visibility at both sides would be essential for improved cooperation. Innovation collaboration is related to exploring, creativity, co-learning and listening to ideas in order to identify new demands and markets. Effective collaboration has therefore to build on a common understanding, awareness and trust. This includes understanding of the different needs and cultures, but also of the innovation systems and innovation approaches (including relevant actors) at both sides.

Instruments and measures

The European Commission should not enter the operative cooperation level which would be better allocated to the regional or grassroot level (driven by opportunities and needs. EC should take a role as facilitator and coordinator, prepare the framework and create visibility (e.g. by promotion activities).

Measures to foster activities should aim to promote Europe as an attractive market and knowledge source for BRIC activities (including investments) and create supportive framework conditions also within Europe.

To increase the visibility and raise awareness of the attractiveness of European HEIs, research institutions and SMEs for BRIC and other developing countries would need improved promotion and better communication activities (e.g. via European innovation centers in BRIC countries). BRIC countries could serve Europe as reference points for globalization in general. To strengthen collaboration, cooperation with third markets could be jointly addressed by Europe together with BRIC countries.

Bilateral dialogues (EU – Russia, EU - China etc.) are seen as important mean to develop joint collaboration strategies as well as to build trust and understanding. This dialogue should involve a broad set of stakeholders (participatory process) instead of being a top-down process.

Establishing (joint) European Business Innovation Centers in BRIC countries could provide direct innovation collaboration support and increase visibility. Supporting technology transfer would be useful to fully exploit the innovation potential of cooperation. Establishing Innovation Centers should be a two-way model, i.e. there should be the possibility to develop Innovation Centers in Europe for companies from BRIC countries as well. Building a network of such national/regional innovation centers would contribute to increase effectiveness of collaboration and support the dialogue. It should be explored whether links of such a network to EEN would be useful and how they could be managed.

At EC and national level a variety of programmes to support R&D collaboration exist, which partially open up for international co-operation (e.g. FP7, Inco). Fewer examples for innovation support measures focusing on international collaboration can be found, but nevertheless a range of promising examples of funding measures at MS level and multilateral level (e.g. Eureka) exist including also multi-stakeholder (PPP) projects. Expanding the ERA concept to better cover innovation issues (enlarge to “EIRA”) and the cooperation with BRIC countries and analysing which of the existing instruments could or should be opened to BRIC countries, like the CIP programme, was recommended. With view of policy support measures participants mentioned the following ideas:

- The appropriateness of dedicated calls to BRIC countries needs to be analysed (e.g. living labs, co-innovation).
- Existing approaches to address innovation collaboration with BRIC countries should be explored and further developed. Beside R&D, topics like commercialisation, venture capital, cluster support etc. need to be addressed.
- Incentive schemes for innovation collaboration could be useful
- Programmes that seek missing/ complementary competencies would help to foster cooperation. A common platform for matching competencies and opportunities should be discussed.
- The mobility of competence would be important. This includes not only programmes for students, but also establishing exchange programmes for employees.
- The shortage of highly skilled work force and the need for people able for cross-cooperation needs training and education programmes including the cultural dimension and intercultural communication. Existing programmes and approaches (e.g. ERASMUS) should be used.

- Selecting flagship projects can be used to raise awareness and interest and to increase visibility.
- Most important would be measures allowing people to meet (dismantle administrative mobility barriers including e.g. problems to get visa) and to organise matchmaking of interests
- Much of the visible collaboration with BRIC countries is driven by MNEs, direct support measures should therefore focus on collaboration opportunities for SMEs.
- Costs related to internationalisation should be seen as an investment to increase competitiveness. In this context, incentives could play a role to lower costs and foster collaboration.

In general a need for better horizontal as well as vertical coordination of actions has to be stated. This includes also the integration and coordination of different policy areas affected, like foreign policy, economic policy, labour policy.

Moreover framework conditions play an important role to facilitate or hinder innovation collaboration. A dialogue would be needed to develop a common understanding and harmonize framework conditions where appropriate. Topics to be addressed include: IPR, social and technical standards, regulation, but also demand-led policy, public procurement, education, entrepreneurship or culture would be important. Moreover making Europe an attractive place to innovate (not only focusing on R&D) and to live would help to attract companies and skilled work-force from emerging countries in order to foster and strengthen innovation cooperation. Framework conditions should aim to enable transnational mobility of workforce and transnational cooperation between companies, R&D institutions and other partners. This includes the removal of administrative barriers for co-operation between BRIC countries and Europe but also within Europe (e.g. tax system, IPR, employment rules). Participants mentioned cutting red tape in administration (e.g. Visa facilitation) as an important mean to effectively facilitate international cooperation.

Next steps

The following activities have been recommended as first steps towards a common innovation collaboration strategy of EC with BRIC countries:

1. To set up the policy dialogue in order to define mutual interest, priorities, etc involving all stakeholders in a participatory process. Listening to the European industry, their needs and views would be essential for this dialogue. Main objective would be to develop bilateral innovation strategies with individual BRIC countries (joint priority setting) to provide an appropriate framework for collaboration

2. Promotion measures to increase the visibility and raise awareness of the attractiveness of European HEIs, research institutions and SMEs for BRIC and other developing countries. European Business Innovation Centers in BRIC countries could help to increase visibility and additionally support European companies, in particular SMEs to get access to global knowledge sources and new markets
3. Critical framework conditions need to be addressed in appropriate fora, in particular regulation, IPR and social as well as technical standards both between BRIC countries and EC, but also within EC.
4. Launching a study to collect the current innovation collaboration activities with BRICs in order to develop common and most effective approaches and a strategy to make most efficient use of existing approaches.

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INNO-Views

INNO-Views policy workshops establish a dialogue between public authorities, analysts, industry and academia to explore new or better innovation policy instruments for Europe. The workshops have the objective to explore innovation themes related to actual and forthcoming needs of European innovation policies. On average, 4 workshops are organised per year. The workshops bring together 30-40 relevant professionals and are organised on the basis of personal invitations only. Workshop results are published on the PRO INNO Europe website (http://www.proinno-europe.eu).

Any requests, recommendations and suggestions of themes, experts and locations for further workshops are welcome and should be directly addressed to INNO-Views:

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