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How do Rising Powers Shape Global Innovation?

Key findings

- Understanding the differential growth of capabilities in the innovation systems of China, India and Russia is essential for effective UK national and international policy and business strategies in emerging and advanced technologies.
- In addition, variations in policy and ethical perspectives need to be considered.
- For instance, effective regulation of stem cell therapy and biomedical research in the UK needs to take into account both consumer demand and supply of stem cell therapy in countries such as China and India; different emerging national and international governance approaches for innovation; and data and incentives issues in projects of genomics and health improvement.
- For developing countries, South-South cooperation on renewable energy offers opportunities for technology transfer and cooperation on low-carbon innovation, and its development impact could be further enhanced by strengthening social safeguards and environmental impact assessments.

The emergence of "Rising Powers"as players in global innovation

The Rising Powers, such as China, India, and Russia, represent one of the key drivers of global economic and social change today. Notwithstanding recent short-run fluctuations in economic growth, these Rising Powers are becoming increasingly important players in global innovation. Non-Western models of innovation challenge Western approaches to research and development in some areas, but also offer opportunities for research cooperation and technology transfer. This briefing gives an overview of key findings and policy recommendations on Rising Powers and global innovation that come out of the "Rising Powers and Interdependent Futures" programme, funded by the Economic and Social Research Council (ESRC).

Innovation systems in Rising Powers

- Rising Powers such as China and Russia are making major investments into key emerging technologies like nanotechnology.
- Their innovation systems differ from Western models and from each other.

The emergence of Rising Powers global players in key technologies, but also the need to look more closely at the differences between them, can be seen in China and Russia. Both countries have undergone periods of market reform and developed new strategic goals for their innovation policies that show some parallels. For instance, both China and Russia have seen significant policy attention and government investment in nanotechnology.

Despite these similarities China appears to be more clearly on a path to becoming a world-leading country on innovation than Russia. One reason seems to be that China has been more successful than Russia in overcoming the path dependence on old institutional structures of innovation shaped under central economic planning, such as administrative practices and top-down oversight. Chinese researchers and entrepreneurs are stretching institutional boundaries, for instance through involvement in start-up enterprises, and China has developed greater openness to internationalisation and talent migration. In contrast, state-dominated institutional arrangements continue to characterise the Russian research landscape. Research activities remain strongly centralised in Moscow, the Russian Academy of Sciences retains a powerful yet uncertain position, and interactions between scientists and the private sector are often not well developed. Russia does promote the internationalisation of research, but mainly through cooperation with Russian scientists based abroad, with less return migration of expatriate researchers. All this appears to have limited Russian success in the field of nanotechnology, where the innovation system has lagged in translating scientific outputs into commercial applications.

For the UK, innovation developments in China, as well as in other Rising Powers countries, can present new collaboration opportunities although they also heighten competition for leadership and global market success in emerging and advanced technologies. This applies to Chinese and Russian investment in nanotechnology as well as to other areas of innovation, such as bioinformatics and stem cell therapy in China and India.

READ MORE ON OUR BLOG:

What influences the returns to innovation policies in Rising Power economies? | By Yanchao Li, Maria Karaulova, Oliver Shackleton and Philip Shapira | http://bit.ly/returnsinnovation

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Rising Powers and ethical issues around stem cell therapy and biomedical innovation

- Effective regulation of stem cell therapy in the UK needs to take into account both consumer demand and supply of stem cell therapy in countries such as China and India.
- Different emerging national and inter-national governance approaches for biomedical innovation require consideration.

The emergence of bioinformatics, meaning tools that make biology legible with the help of computer science, is changing the way science works. This opens new opportunities for Rising Power countries to establish themselves in this new territory. Western models of innovation have dominated global research on bioinformatics, but increasing engagement of Rising Powers such as China and India in the area of bioinformatics could challenge established norms and practices of research in Western countries. An example that shows such impact of Rising Powers on Western models of innovation in an increasingly transnational world of science is the field of biomedical innovation.

Taking stem cell science as the empirical case, we observed that health consumers are able to challenge the hegemony of the science-based paradigm of stem cell innovation though the exercise of their demand in a global market of practice-based medical innovation. Today's health consumers are geographically mobile, guided by internet-enabled information and able to choose and purchase new health treatments generated by practice-based medical innovation in ways regarded as illicit by the orthodox paradigm of innovation.

As the consumer-base gains strength, the collision in biomedical innovation between the logic of consumer choice and the logic of orthodox science becomes ever more apparent. Countries such as China and India, lacking fully-developed systems of governance predicated on the values of the science-based hegemony of innovation, have adopted a 'dualistic' approach that allows them to retain the benefits of membership of the transnational biomedical community whilst at the same time accessing the wealth of the growing market of stem cell treatments generated by the mobile health consumer. Thus, judicious but limited biomedical innovation governance becomes a means for simultaneously exercising control and creating market opportunities. Policymakers may want to pay more attention to: improving national and transnational regulation of patient care, safety and informed choice of patients around cell therapy, taking account of both consumer demand and supply of stem cell therapy in countries such as China and India; different emerging national and inter-national organisational forms and governance approaches for innovation; and data and incentives issues in projects of genomics and health improvement.

READ MORE ON OUR BLOG:

Bioinformatics in the UK, China and India | By Brian Salter, Yinhua Zhou and Saheli Datta | http://bit.ly/binformatics

The global market of stem cell research and therapies, 'stem cell tourism', and models of innovation – Western and non-Western models | By Brian Salter, Yinhua Zhou and Saheli Datta | http://bit.ly/stemcelltourism

Synthetic biology in China: An update from the field | By Yanchao Li and Philip Shapira | http://bit.ly/synbiology

Rising Powers, Technology Transfer and Development

- Chinese investment into low carbon energy in developing countries offers opportunities for technology transfer and mitigation of climate change
- Its development impact could be further enhanced by strengthening social safeguards and environmental impact assessments

Looking beyond the Rising Powers' impact on developed country innovation systems, their investment in innovation offers opportunities for South-South technology transfer and addressing key global development challenges such as climate change. One of our projects explores these dynamics in the area of Chinese investment in hydropower dams. Chinese companies and banks are reported to be involved in more than 300 Chinese overseas dams. These open up opportunities for low and middle income countries in Africa and Southeast Asia to attract large investments to build up energy and water management infrastructure, which in turn may contribute to national development goals and economic growth. However, local communities around three Chinese dam projects in Malaysia, Ghana and Cambodia that were examined as case studies also experienced adverse impacts on their livelihoods and access to natural resources.

Large dams tend to disproportionally affect the rural poor, including indigenous people. At the same time, national institutions and Chinese dam-builders and financiers are often unaware of the full extent of the local social and environmental impacts of these dams. In order to address these issues, policymakers and dam-builders may wish to consider the following measures:

- Social safeguards around dam projects could include offering education, training and employment (for example as technicians or dam engineers) to people affected by dams. In addition, rather than receiving one lump sum, compensation payments could be paid out over a longer period of time as smaller sums or partly paid out as food subsidies. Further, affected people could directly participate in decision-making as negotiating partners.
- National governments may wish to have strict environmental impact assessment (EIA) legislations in place, in addition to robust impact mitigation and ecological protection measures for large dams e.g. wildlife rescue operations, afforestation schemes.
- Having a national governing body in place for managing the dam and monitoring its impacts can be beneficial, such as at the Bui Power Authority in Ghana.
- Dam-builders may wish to ensure that their projects adhere to international guidelines, standards, policies and assessment tools to increase the sustainability of the hydropower sector.

READ MORE IN OUR PROJECT BRIEF:

Chinese dams go global: opportunities for more sustainable hydropower | CeDEP, SOAS, University of London
http://bit.ly/Chinesedamsgoglobal

Implications

As a collection, our projects show that the Rising Powers' engagement in innovation has a profound impact beyond their borders, both in the UK and globally. Within the UK, policies on research and innovation need to take innovation dynamics in countries such as China, Russia, and India into account to be effective. Globally, innovation and technology transfer from the Rising Powers has the potential to address key policy challenges such as climate change, provided that social and economic side effects of South-South investment projects are dealt with effectively.

More details from our research projects:

State strategies of governance in global biomedical innovation, King's College London
http://www.risingpowers.net/publications/statestrategies/

Innovation systems development in China and Russia, University of Manchester
http://www.risingpowers.net/publications/innovationsystems/

China goes global, School of Oriental and African Studies
http://www.risingpowers.net/projects/chinaglobal/

About this briefing:

This briefing comes out of the 'Rising Powers and Interdependent Futures' network, comprised of 12 research projects that address the emergence of the Rising Powers from a variety of disciplinary approaches across the social sciences. Financed under the Economic and Social Research Council's (ESRC) Rising Powers Research Programme, our projects explore ongoing changes within the Rising Powers as well as their impact on other countries, including the UK. In addition, we are looking at the implications of Rising Powers on processes of global governance to address current economic, social and environmental challenges.

More details can be found here:

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