UK-China Higher Education Forum

"Innovation and Collaboration"

25th March 2014, Bristol

Forum Report

University of BRISTOL

Global opportunities for UK higher education international unit

BRITISH COUNCIL

UK-China Higher Education Forum report

The University of Bristol played host on 25 March to an international conference on university research and collaboration. The UK-China Higher Education Forum 2014, jointly arranged by the University of Bristol, the British Council and the UK Higher Education International Unit, brought together Chinese and UK university professionals to discuss current best practice. The theme of the Forum was 'Innovation and Collaboration', chosen because universities today recognise the need to work closely with non-academic partners to ensure the practical application of their research and to make available the best opportunities for their students. The Forum was attended by senior delegates from UK and Chinese universities as well as representatives from the British Council China, the Chinese Embassy in the UK and selected industrial partners.

Nick Lieven, Pro Vice-Chancellor (International) of the University of Bristol, opened the day by welcoming delegates to Bristol. "The role of universities has always been about education and research but increasingly it's about developing the economy, it's not just what our students do at university but how they engage with society and the economy," he said. "If you have come away with one good idea or a link that can be developed over the years then it is a success."

"We are very honoured to have prestigious presidents, vice presidents and senior leaders from Chinese universities that are equivalent of the Russell group in China and although many are well travelled and have partnerships with the UK we hope this will be the beginning of deeper partnerships," said Susan Milner, Education Director of the British Council China. "This is the fifth in a series of forums we have hosted with UK institutions to make deeper connections. Increasingly of interest has been the focus on innovation and business collaboration with institutions. There's still a drive in our economies to smooth that connection between research outcomes and development into products and services."

"As well as looking at the business links, our systems use different structures and different frameworks to enable that collaboration and I think in that sense we have much to debate and share," she said.

Front Cover Images:

China - Xi'an Bell Tower - By eviltomthai (www.flickr.com/photos/eviltomthai/)
Dragon Emporor - by Bernt Rostad (www.flickr.com/photos/brostad/)

Government, Industry and Universities, a Chinese Perspective

“It is extremely important to the group of university vice presidents from China and this occasion will definitely be a highlight of their past three weeks,” said Minister Counsellor Shen Yang of the Chinese Embassy in London during his opening remarks. “This is a place where industry has emerged and the University of Bristol works closely with industries such as Airbus. The links with industry are truly a universal topic. We are all thrilled with the success of Silicon Valley in the USA and the Cambridge phenomenon in the UK and in China there have been enormous efforts to replicate and emulate this. It is difficult to say whether we have always been successful, but in terms of government policy there have been tremendous efforts to say the least.”

“The latest statistics from 2010 show we have 86 university science and technology parks in China, spread over 24 provinces and accommodating 134 universities. We know in that particular year 6000 enterprises were in those science parks and more than 4300 had completed their incubation and graduated. There was a great deal of activity with 4600 technology transfers successfully made and 5600 applications for patents made, which included 2300 inventions.”

He identified the Programme 2011 initiative on collaborative innovation as “totally different” from any of the previous programmes such as the 211 and 985 programmes. “These tend to focus on building a cake and slicing the cake, distributing the funding to each individual university,” he said “For 2011 the model has changed and the essence is on collaborative innovation. It does not bar any application from any types of university and anyone willing to work with universities, industry, government departments or research institutes but its focus is on innovation and encourages all the sectors to bid, although it is initiated by universities. The intention is to bring together the integration of teaching, research and the transfer of technology.”

So far 167 applications have been made for the first round and in 2013 the first group of fourteen projects was identified. “This time there is no specific sum of funding being directly awarded, the intention is to nurture and incubate the centres and hopefully they will work out something meaningful and then there is no shortage of funding – it is a centre to do things, not to distribute the funding, and we hope it can become a good model,” he said.

The projects will be reviewed every four years to encourage new blood, he said in answer to questions. No one is particularly sure at this stage how international collaboration will work out with the programme, he added. “I’m sure there will be an international collaborative element in it. The Ministry of Education has just announced a programme of international joint laboratory arrangements but whether it’s directly related to 2011, that’s a question. At the moment we have more than 270 joint arrangements between academic institutions with a focus in teaching but this time it will include laboratories, that’s my understanding. I think we are going to look forward to working out details with international partners. “

Programme 2011 is separate from the Newton fund announced by UK Prime Minister David Cameron on a recent visit to China. “It is not directly related to 2011 but it’s not impossible that this funding cannot be pooled in similar arrangements if one of the fourteen wants to collaborate with a British partner. The important thing is focussing on innovation,” he said.

Bringing UK Research and Innovation Together

In a plenary session Debbie Buckley-Golder, Head of Research Engagement at the Technology Strategy Board, presented the work of the TSB across the UK in driving innovation. “We are driven by the needs of the UK business community for innovation and new ideas that contribute to the economic growth of the country and wealth creation,” she said. “At the moment we have about 200 staff mostly drawn from the business community but all with strong academic experience and each year we commit £440m to support innovation in the UK.”

“By and large business investment in innovation is too little too late. Business recognises that new ideas are risky, not technically proven or the market is not well known, one of the key things we always ask is will the projects we back bring new ideas and technologies to market more quickly.”

- 56% of investment is in projects with the research base, ie universities
- 36% of total investment goes into the research base (including co-funding)
- 76% of the total grant to the research base goes to 25 organisations

“We often try to describe what we do as an escalator, helping the business move from a very early stage from a microcompany through innovation vouchers to start to understand what the academic has been researching and build the initial relationship, moving up the escalator using different schemes right to the top with demonstration projects,” she said.

“For example we’ve had a very successful demonstrator of low carbon vehicles with hundreds of electric vehicles being used around the UK in real situations to test and demonstrate the practicalities of that solution and the challenges,” she said.

The Knowledge Transfer Partnership (KTP) is a key part of the TSB activity. “The KTP has been running in the UK for nearly forty years now and builds very effective partnerships between individual academics and individual businesses,” she said.

The Catapults Scheme establishes individual ‘catapults’ that sit between academia and business, helping small and supply chain companies to get involved. There is a £1bn investment in the first seven catapult centres and subsequent catapults are bidding for funding.

University-Industry Links Case Study: Tongji University

Founded in 1907, Tongji University is working towards its second hundred year target to be a world-class sustainability university. “Now we develop totally for sustainability,” said Zhiqiang Wu, Vice President of Tongji, in his plenary session. “We cover almost every subject but with a focus on engineering, with eight campuses in Shanghai.”

He pointed to the growth of the Knowledge Economy annual output of the university, growing from 3.3bn yuan in 2006 to 20bn yuan in 2012. In the last ten years the creative knowledge industry in Shanghai has grown 25% each year and is already bigger than London, moving from an industrial Shanghai to a creative Shanghai with 1000 design service-oriented and supporting enterprises, he said. He pointed to the Jiading campus, home to the biggest automotive innovation centre in China, where sustainable ideas are implemented on campus first. “We use the whole campus as the experiment and then afterwards the whole city and then the whole of China,” he said.

“We are working very hard on Programme 2011,” said Professor Wu. The previous programme 211 had 112 universities while programme 985 had thirty-nine universities. Tongji University is also working very intensively with the European Union on Horizon 2020 for smart city projects. “So I hope through this occasion we can also build a very strong alliance for the smart city.”

Workshops

Delegates at the UK-China Higher Education Forum 2014 took the opportunity to break into small workgroups. They heard from expert speakers on contemporary topics which were then discussed.

The **"Creative Industries"** session discussed how partnerships between academia and business, typically seen as most relevant in the technology sector, can also be instrumental in arts and humanities research. Andrew Wray, Knowledge Exchange Development Manager at the University of Bristol, demonstrated how the organisation Research & Enterprise in Arts & Creative Technology (REACT) is working to bring academics and creative companies together. The Watershed, Bristol's award-winning media hub and cultural centre, was represented by Managing Director Dick Penny who led discussion on skills in the creative industries and how Bristol has maintained its position as a national cultural hub. Delegates considered Lord Sainsbury's suggestion that "Bristol is unique in combining excellence in new technologies and creative content. It is this cross over which marks it out."

"The Eight Great Technologies" took into consideration the eight sectors identified by David Willetts, UK Minister of State for Universities and Science, as future areas of significant growth and development:

- Big data
- Space & satellites
- Robotics and autonomous systems
- Synthetic biology
- Regenerative medicine
- Agri-science
- Advanced materials
- Energy (storage)

James Lancaster, of the University of Bristol and Bristol City Council, talked about the 'Gigabit Bristol' project in which small and medium businesses are supported with high speed, high grade broadband. Bristol has a unique capacity for connectivity as it is the only local authority in the UK to own its fibre infrastructure. This capability is creating the world's first open programmable city with seamless connectivity; as you move around the city you can transfer between devices and enjoy the illusion of unlimited bandwidth with an immersive, pervasive, adaptive network. This builds on the leading research group in software-defined networks at the University of Bristol.

Tim Leeder, of the University of Bristol's Centre for Quantum Photonics, took discussions further and included "the ninth great technology" - quantum technology. This exchange focussed on photonic circuit quantum computing. Bristol's quantum computing centre is bidding to be the computing hub for the UK's £270m investment in quantum technologies, to be launched later in the year if successful.

The final workshop explored the role of **"Catapults"** in accelerating the impact of research collaboration in the UK. Graham Harrison of the cutting-edge National Composites Centre and Neil Bradshaw of the University of Bristol discussed how the UK's Technology Strategy Board uses centres of technology and innovation ("catapults") to bring together businesses, researchers and engineers and to improve the results of their cooperation.

The City Region and the Role of Local Enterprise Partnerships

Local Enterprise Partnerships (LEPs) are locally-owned partnerships between UK local authorities and businesses. They play a central role in determining local economic priorities and undertaking activities to drive economic growth and the creation of local jobs. In a plenary session, the Forum heard about the West of England LEP and how its work is supporting innovation and collaboration.

Martin Boddy, Pro Vice-Chancellor (Research and Business Engagement) at the University of the West of England, gave a university view. Four universities fall within the region: the University of Bristol, the University of the West of England, the University of Bath and Bath Spa University. Professor Boddy said of the WoE LEP:

“It is a business-led partnership so the chair is the head of one of our big regional utilities with representatives of companies you would have heard of, Airbus, Aardman Animations, Bristol Airport and Toshiba, along with universities plus a representative for small business. They plan for the development of the city region over the next three to five years, focussing on a number of key sectors - high tech, aerospace, low-carbon industries (particularly around energy), creative and media and finally professional and legal services where, outside of London, we are one of the big regions.”

He explained that the LEP’s aim is to ensure that the West of England is the sort of place that businesses will find it easy to grow, with good transport, good broadband and good working/living conditions so that a business in this city region can attract people from Europe, the US, China and the rest of the world. The LEP is increasingly a flow of funding to support business development, growth and innovation. There is a coming together of the agenda of the LEPs and local universities that means that the universities are taking a role in the leadership of the LEP and are informing and advising the strategic economic plan. The four universities in the region are major providers of the skilled labour that business needs to drive growth with over 30,000 graduates finding work every year in the region.

An industry view of the LEP was given by Joe McGeehan, who sits on the board of the LEP and represents Toshiba and the High Tech sector. “We’ve really now got a new research partnership for industry,” he said. “It is a two-way partnership between business and local authorities to drive economic development and create growth. In the past the UK has been excellent at doing innovative work but we haven’t been as good as we should have been at exploiting our innovation. We are a very attractive region – we have the third highest GDP per head, and this is a region that makes money and grows – if you are investing in the region it’s good to know that if you recruit people they stay.”

“Anyone can do research – really if you are an academic it’s easy to publish papers - what is hard is to do outstanding research in a fundamental field that will translate over five to seven years into products that will shape new industries. The thing we have to do is spot those areas that are going to grow and that will be the new base for growth,” he said.

“If you think about the future what do we need for future cities? What do we need for e-healthcare, energy, machine-to-machine communications with lots of small packets or streaming big packets? Those traffic flows are not really understood so we are providing a testbed for looking at the development of the internet of the future. We now have over 100 miles of networks and when we bring in the rest of the region we will have a massive test bed on a city scale that no one else has been able to do,” he said. “What we are doing here with the broadband network is to underpin all the major areas we have identified, whether that’s robotics, e-healthcare or e-energy.”

Developing the Science and Research Base in Chinese Universities

Jinshui Liu, Vice President of Hunan University, spoke in a plenary session about research collaboration in China. His university, which has around 34,000 students, is greatly involved.

“In China we are in the process of building our country into an innovative nation and more collaboration between university and industry is essential in this process,” he said. “There are three types of laboratory – the first is government-supported such as research institutions and we have over 300 key government research laboratories. The second type is initiated by universities and the third type is jointly set up by universities and companies.”

He pointed to the car industry as a key example. “In 2008 China was #3 in car manufacturing and consumption but new data since then shows China has become the #1 in the world in car sales and in 2013 sold 22m vehicles. Due to the size of the China automotive industry all the major car makers have research bases in China and the government encouraged its own car manufacturers to have their own research and development. The universities have carried out some fundamental research and forward looking activities to support the industry.”

The Chinese government has established 6 key laboratories for:

- Automotive safety and energy
- Automotive dynamic simulation
- Advanced design and manufacturing
- New energy vehicle power systems
- Automotive electronics control technology
- Electric vehicles

Four of these laboratories were represented in the audience, with Hunan representing the advanced body design labs.

The University and Regional Development

“The university needs to reach out to serve the local community. This is one of the four roles the state gives to the university, alongside to nurture talent, carry on with heritage and promote economic growth,” said Lianjun Wang, Vice President of Nanjing University of Science and Technology. He spoke in a plenary session about how universities in China are expected to contribute to regional development. He identified the mutual benefits of a close relationship between a university and its region.

“We are in great need of innovation and we need to translate our innovation into products and that’s why the university needs to reach out to serve the local economy,” he said. This is happening through technology advice, commission and collaborative research, co-construction of R&D platforms, technology transfer and technology partnerships.

BAE Systems - Universities and Collaboration Case Study

“We need access to new ideas – all of our products have large gestation times,” said Steven Harris, University and Collaborative Programmes Manager at BAE Systems. “It’s not unusual to take 25 years to develop, design and build a new aircraft for the UK government and it’s quite a challenge. The way to do that is work with the universities and we tap into that at every opportunity.”

BAE Systems is a global defence, aerospace and security company employing around 88,200 people worldwide. Their products and services cover air, land and naval forces, as well as advanced electronics, security, information technology, and support services. Steven Harris spoke to the Forum about how collaboration with universities is crucial to the innovative products that BAE can develop.

“We also need foresight so we can be aware of discriminating technologies that can make our products redundant before we deliver them,” he said. “Quantum technologies for example can have a profound impact on the way we design, use and build our platforms.”

BAE currently works with sixty UK universities but is looking to reduce that number. “Sixty universities is a lot so we are trying to work more strategically with fewer – 75% of the money goes to the front fifteen universities,” he said. “We have also mapped where we get technology from in the various universities and we could get 90% of what we need from our front five universities.” Alongside the physical sciences, BAE Systems is also engaging with economics and social sciences researchers for work on simulation and training.

Conclusion

“We all play in our own ways into the mission of education and research, increasingly delivering innovation and impact as the consequences of the knowledge we share with our students and the knowledge we generate from research,” said Guy Orpen, Pro Vice-Chancellor (Research and Enterprise) at the University of Bristol, in his closing remarks.

“The old way [of innovating] was not very sophisticated, with published research. Then we moved to protect it by creating intellectual property and licensing and spinning out new companies and increasingly we are active players in the bridge between the knowledge that’s generated in universities and in companies. This means we talk more about knowledge exchange rather than knowledge transfer in many other walks of society,” he said.

“The University of Bristol’s unique advantage is the city of Bristol and that’s a very rich environment to partner with other elements of society where we co-design the research and co-deliver elements to create value.”

Further Information and Final Thanks

The UK-China Higher Education Forum aims to promote cooperation between partners across the UK and China. It is hoped that the Forum played a meaningful part in the furthering of good relations between academic and professional colleagues in the UK and China. The organisers of the Forum would like to thank all those who attended the Forum, gave presentations, submitted information or otherwise contributed to its success.

We would welcome your further contact on any of the topics outlined above. Likewise, should you wish to get in touch with any of the delegates at the 2014 Forum please don't hesitate to communicate with the British Council, the University of Bristol or the Higher Education International Unit. Please see below for further information and contact details for some of the organisations involved in the 2014 Forum.

University of Bristol www.bristol.ac.uk

British Council China http://www.britishcouncil.cn

UK Higher Education International Unit http://www.international.ac.uk

Embassy of the People's Republic of China in the UK http://www.chinese-embassy.org.uk

Technology Strategy Board https://www.innovateuk.org

Tongji University http://www.tongji.edu.cn

Research & Enterprise in Arts & Creative Technology http://www.react-hub.org.uk

Watershed http://www.watershed.co.uk

Bristol City Council Business Team http://www.bristol.gov.uk/nav/business-bristol

Gigabit Bristol http://www.connectingbristol.org/gigabit-bristol

Speech: The Eight Great Technologies, The Rt Hon David Willetts MP, UK Minister of State for Universities and Science https://www.gov.uk/government/speeches/eight-great-technologies

University of Bristol Centre for Quantum Photonics http://www.bristol.ac.uk/physics/research/quantum

'Catapult' Technology & Innovation Centres https://www.catapult.org.uk

National Composites Centre http://www.nccuk.com

University of the West of England http://uwe.ac.uk

West of England Local Enterprise Partnership http://www.westofenglandlep.co.uk

Hunan University http://www-en.hnu.edu.cn

Nanjing University of Science and Technology http://www.njust.edu.cn

BAE Systems http://www.baesystems.com

Participating Institutions

Aberystwyth University

Anglia Ruskin University

Arts University Bournemouth

Aston University

British Council - China

Cardiff University

China Pharmaceutical University

Cranfield University

Donghua University
East China University of Science and Technology
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