**UK Academic – Hong Kong Industry Collaboration**

**Matthew Dutton and Robert Raeside**

**Employment Research Institute, Edinburgh Napier University, UK**

**Fiona Donnelly**

**Red Links Ltd, Hong Kong**

**October 2015**

**Preface**

Global universities are being encouraged to increase collaboration with the business and commercial sectors to enhance international competitiveness. Hong Kong is well-positioned to be an international hub of innovation and business incubator start-ups conducting cutting-edge scientific research; and so one would expect it to be leading in forming collaborations. However, a survey in August 2013 by Times Higher Education ranked Hong Kong universities behind those in Korea, Singapore, China and Turkey in terms of collaborating with business in research efforts. Also, concern has grown in Hong Kong about recent falls in two aspects of global competitiveness: higher education and innovation. The World Economic Forum has pointed out that Hong Kong should note that the quality of its research organisations is declining and that there is unmet demand for science and engineering skills. To improve this, it is recognised that there is a need to develop the quantity and quality of academic-industry collaborative research. Many UK universities are recognised as having strengths in scientific and engineering research. Because of the historical ties between Hong Kong and the UK, one might hypothesise that there would be a number of collaborations between Hong Kong industry and UK universities. The purpose of this report is to investigate this hypothesis.

This report has been commissioned by the British Council in Hong Kong to investigate one aspect of academic-industry collaboration, that of collaboration between Hong Kong industrialists and UK academics. Specifically the research objectives are:

* To identify examples of UK university- HK industry collaboration within the fields of science and engineering.
* To explore the issues and challenges of establishing and maintaining such collaboration.
* To examine the funding models behind such collaboration.
* To study the management and governance structure of such collaboration.
* To explore how the issue of intellectual property is addressed in these collaboration.
* To uncover model case studies and highlight best practices of such collaborations.

The work was conducted in the first half of 2015 by the Employment Research Institute at Edinburgh Napier University based in Edinburgh, Scotland in collaboration with Red Links Ltd based in Hong Kong.

**Acknowledgements**

We wish to thank Sophia Chan-Combrink and Cissy Lo of the British Council in Hong Kong for their guidance and patience in this project and those who gave up their time to be interviewed. Our thanks also go to Anna Angus-Smyth of the Engineering and Physical Sciences Research Council for her help in identifying contacts for this work.

**Contact**

Robert Raeside: r.raeside@napier.ac.uk

Table of Contents

UK Academic – Hong Kong Industry collaboration 7

Method 13

Findings 18

**Conclusions** 26

**Executive Summary**

*Aims*

This report presents findings from research on science and engineering partnerships between UK universities and Hong Kong based industry. The research was conducted by the Employment Research Institute, Edinburgh Napier University in partnership with Red Links Limited, a Hong Kong based business.

The research had 6 aims. These were:

1. Identify examples of UK university-HK industry collaboration within the fields of science and engineering – this collaboration may be in research and development, applied research to improve processes, training of employees, student placement, joint PhD work, academic including post-doctoral staff support and collaborative degree programmes. Collaboration may also be involvement in science parks and Catapult centres.
2. Explore the issues and challenges of establishing and maintaining collaboration.
3. Identify and understand the funding models involved in the collaboration
4. Gain an understanding of the management and governance structures involved in these collaborations
5. Expose how intellectual property rights are addressed.
6. Uncover model case studies and highlight best practices of such collaborations.

*Method*

To address the research aims, researchers undertook interviews with academics working in science and engineering based partnerships between UK universities and HK based industry. Researchers also disseminated an online questionnaire to UK based academic research administrators and searched for information on HK collaboration that was publicly available through UK university websites.

A collaboration was defined as any relationship between a UK academic institution and Hong Kong industry. This would include joint working relationships, prototype development, teaching, academic placements, sharing of PhD students and internships.

The online questionnaire was distributed via the Research Administrators Association who emailed their membership. The questionnaire was also sent directly to university research and technology transfer offices. Only four completed questionnaires were returned which indicated collaboration activity with Hong Kong industry. Eight replies were received stating that the university did not engage in collaboration with Hong Kong industry. The possible reasons for such a disappointing response rate are that research offices and technology transfer and technology licensing offices (TTOs/TLOs) are not well connected internally and have a more outward facing role. The culture of academic staff engaged in research is only to engage with research offices and only to do so when required.

The websites of all 133 UK universities and Institutes of Higher Education were searched for mentions of collaboration with Hong Kong Industry. Information is very patchy on collaborations which do not involve an academic award. Reporting strategies of universities mean that Hong Kong is not generally differentiated from China on university webpages and access to deeper information on web pages is restricted by the need for staff/student log-in. Where there was any information given about Hong Kong, it was mainly about student exchanges between universities or study opportunities in the UK or to a lesser extent in Hong Kong. 20 individuals representing various institutions in Hong Kong and 18 Hong Kong academics were emailed to find if there was any awareness of collaboration from the Hong Kong side. None of the institutional representatives responded that they knew of any collaboration between UK academics and Hong Kong industry.

*Findings and Recommendations*

The British Council was not evident in relation to brokering partnerships between UK universities and HK industry. The role of the British Council was not perceived as being relevant – rather it was thought that the British Council was concerned only with higher level principals rather than “on the ground academics”. If funding and support for local administration of projects could be provided by the British Council then academics thought there might be some advantage in working with the British Council. Further key findings were that:

1. Very few collaborations with UK academia and Hong Kong industry in the area of science and engineering could be identified.
2. There are a number of academic contacts in scientific research between UK and Hong Kong universities. Many of these are maintained by former Hong Kong PhD students who are now employed in the United Kingdom.
3. Joint and collaborative research work between the United Kingdom and Hong Kong is much more vibrant in the area of social sciences. This possibly reflects the economic base of Hong Kong.

Although some of the UK academic Hong Kong industry collaborations may have gone undetected, partly because academics can be reluctant to reveal and share their networks and partly because activity is dominated in Hong Kong by teaching relations, there are several key reasons for the relative absence of collaboration. These include:

1. The structure and nature of the Hong Kong economy is by far more service, trade and finance orientated rather than being based on manufacturing which means that demand is not large for cutting edge science and engineering. Rather it is in mainland China where opportunities for collaboration in Science and engineering arise.
2. Universities in Hong Kong have an enviable strength in theoretical approaches to science and engineering but need to develop an applied approach to fit with industry.but there may be too few to meet demand. In addition there is a tendency in Hong Kong for the default mind-set to be counter to the notion of academic-industry collaboration. In terms of funding on contracted-out research & development activities in the business sector in 2013, higher education institutions accounted for less than 8%, (Hong Kong Innovation Statistics, Census and Statistics Department, 2013).
3. Once Hong Kong would have been attractive to UK academics as a springboard to forge relationships with mainland Chinese universities and industry, but this seems no longer to be the case as making links with mainland China has become much easier and more open. Indeed many academic centres are now joint owners of companies on the mainland where technology developed in universities is “spun out” and commercialised.
4. UK academics interviewed reported little encouragement to work with Hong Kong industry – there is little funding from research councils and university research strategies often direct them to seek partners in Europe. Funding is seen as “softer” in Europe – easier to get and can have more demonstrable impact.
5. Most of the UK academics who had established research collaborations did so because of previous personal contacts or experience of studying and working in Hong Kong and were not aware of the services offered by the British Council in Hong Kong. Some of those interviewed requested that the British Council become more active and offer funding streams especially for speculative visits. There was criticism of the British Council as academics perceived it as elitist and concerned more with politics than funding projects.
6. There seems a profusion of agencies operating to foster relations between UK academics and Hong Kong. However, these primarily operate at a high level in UK universities rather than by obtaining active participation from researchers especially early career researchers, at. At the high level the feeling was that the focus is on undergraduate and postgraduate student exchanges between academic institutions and franchising teaching to Hong Kong, rather than promoting research.

Based on the research findings, the report makes several recommendations:

1. Increase incentives for UK academics to work with Hong Kong industry.
2. Exploration of the barriers as to why the various collaborations are not more common across the different types of collaborations. A deeper and systematic understanding of the specific issues as to why collaborations are not more prevalent will guide efforts to smooth the process and encourage more.
3. Offer sources of funding so that UK academics have an alternative to national research councils and the European Union.
4. Centralise and simplify understanding of the various funding sources available from the various agencies in UK and HK, so that there is ready understanding of all eligible financial support. Just now, information about financial support is very fragmented and difficult to obtain; it is also difficult to evaluate eligibility.
5. The British Council needs to be more proactive in introducing UK academics to Hong Kong industry. Perhaps technology can play a part. For example, an online platform could be developed facilitating the match-making of experts/research teams to projects seeking expertise. The present ecosystem relies heavily on chance meetings in person by interested individuals.
6. Given the greater volume of activity in the social sciences, the British Council should not forget this and support for the social sciences should be assured.
7. Agencies promoting links between Hong Kong and UK academics should consider trying to get more participation from lower level academics especially early career researchers.

# UK Academic – Hong Kong Industry collaboration

In the spring of 2015 the Employment Research Institute (ERI) was contracted to research the partnering relationships between UK academic institutions and Hong Kong industry in the area of science and engineering. The ERI sub-contracted the Hong Kong-based elements of the project to Red Links Limited. Specifically the aims of the research were to:

1. Identify examples of UK university-HK industry collaboration within the fields of science and engineering – this collaboration may be in research and development, applied research to improve processes, training of employees, student placement, joint PhD work, academic including post-doctoral staff support, and collaborative degree programmes; it may also be involvement in science parks and Catapult centres.
2. Explore the issues and challenges of establishing and maintaining collaboration.
3. Identify and understand the funding models involved in the collaboration
4. Gain an understanding of the management and governance structures involved in these collaborations
5. Expose how intellectual property rights are addressed.
6. Uncover model case studies and highlight the best practices of such collaborations.

**Background**

Hong Kong is a dynamic Special Administrative Region of the Peoples Republic of China. The region has long historical and deep cultural links with the United Kingdom and it is expected that these links will translate into business and academic relationships. In Hong Kong there are nineteen institutes of higher education that award degrees in Hong Kong (Information Services Department, 2015). Overall Hong Kong Universities have a very strong and good reputation with two being in the top one hundred ranked universities in the world according to the Times Higher Education Supplement (2015). In the 2015 edition, the University of Hong Kong is ranked 9th in the world for civil engineering, while the Hong Kong Polytechnic University is ranked 11th in the world. Because of their success in their recent Research Assessment Exercise, the strength of Hong Kong Universities in the area of research has been recognised

Most of these institutions have links either directly or indirectly with UK universities mainly in student pathways to study in the UK or as franchise partners to the provision of UK courses. These partnerships are governed by institutional partnership agreements and memoranda of understanding. This area is flourishing. The internationalisation of higher education is discussed by Bennell and Pearce (2003).

The importance of higher education in the future development of Hong Kong is recognised in the 2015 Policy Address. In the section referring to Innovation and Technology the Government states that it will provide a

*“world-class technology infrastructure for enterprises, research institutions and universities, offering financial support to stakeholders in the industry, academia and research sector to commercialise their R&D deliverables, nurturing talent, strengthening collaboration with the mainland and other places in science and technology, and fostering a vibrant culture of innovation”*

2015 Policy Address

The structure of the Hong Kong economy by employment is shown in Figure 1.



**Figure 1: The distribution of employment across industrial sectors in Hong Kong (source: Hong Kong Labour Department 2015)**

The economy of Hong Kong is primarily service orientated with an emphasis on finance, logistics, professional services and tourism as assessed by contribution to GDP, (HKTDC Research, 2015). There is an emergent health and medicine sector. This is reported in GED 2015:

“*As one of the World’s leading financial service centres, Hong Kong (HK) has a primarily service-oriented economy and as a consequence traditional R&D activities have been limited”.*

Hong Kong is a world-connected economy with trade amounting to 70.8% of GDP (Census and Statistics Department, 2013). However, research spending in Hong Kong is very low relative to the median in the OECD, but is growing. As stated in the 2015 Policy Address, Hong Kong’s aspirations are to diversify its economy and become more knowledge based.

However, concerns have grown about recent weaknesses in competitiveness. Attention is drawn to the World Economic Forum report that although overall competitiveness ranking had not changed since 2013 there had been a fall in the ranking of two of the key drivers of competitiveness, namely, higher education and innovation (The Hon. Liao, 2015).

The limited research is reflected in Hong Kong’s weak commercial research ecosystem, which according to GED has received little direct investment. Quoting from GED gives insight that the motives to invest in Hong Kong are more related to trying to secure access to mainland China.

*“While there are large amounts of investment cash in Hong Kong, it tends to be invested in financial vehicles/assets and/or property and Venture Capital (VC) funds and other investors appear more interested in the Chinese mainland than in Hong Kong.”*

There has been success in attracting investment from mainland China which was reported to be 31.9% of total inward investment to Hong Kong (HKTDC Research June 2015).

To increase investment opportunities in research and technology a new Innovation and Technology Bureau has been suggested in which, according to Williams (2015), UK universities could also have a role in developing research and knowledge transfer in Hong Kong. UK universities come from a position of strength as stated by Williams (2015).

*“UK universities are a world-class resource for business research and innovation*…*The volume and quality of research derives from a highly productive and economically efficient research base, which gives excellent value for money: the UK is ahead of comparable major countries, including all in the G8 group, in terms of published articles, citations, and highly-cited articles per pound spent on R&D and per researcher. The World Economic Forum’s Global Competitiveness Report 2 for 2014/15 ranks the UK in the top four places for the quality of scientific research institutions and for university industry collaboration in R&D (second and fourth respectively).”*

Witty (2013) referring to universities potential as drivers of economic growth stated:

*“Universities have an extraordinary potential to enhance economic growth. The full diversity of institutions have a role to play from local SME support and supply chain creation to primary technology leadership and breakthrough invention”*

It is hoped that with collaboration between UK and other universities and Hong Kong industry, Hong Kong canbecome established as a major hub for applied research by offering the attractions of being a place of idea generation, development and prototyping that allow commercialising in mainland China to be realised.

Regarding commercial relations, there are strong bilateral arrangements between HK industry and UK business. There are arrangements to share research and development, joint production and to allow market access. There is an established body of academic literature, such as Yu (1998), Humphreys et al (2001) and Liu and Jiang (2001) and public reports.

However there is little evidence of UK academic/ HK industry collaboration especially in the area of science and engineering. There is work reporting the successful transfer of technology to industry but this is confined to Hong Kong universities. For example the work by Shariff and Baark (2008) reported on case studies from City University (HK) and Hong Kong University of Technology and Science on the role of technology transfer offices. This is surprising as it is recognised that universities provide a service to the diffusion of innovation into industry (see Rothwell and Dodgson (1991), Muller (2001), Poon and Dhan (2007) and Yam et al (2011)). Patchell, and Easthamd (2003) discuss governance relationships between Hong Kong universities and industry but no mention was made of collaboration outside Hong Kong.

Sources of funding for research are mainly from the Hong Kong government and the Innovation and Technology Fund (ITF) which in particular supports academic industry collaboration. In 2014 this scheme approved 4,266 projects with funding of HK$8,751.6 million. In 2006, the ITF set up five R&D centres to drive and co-ordinate applied R&D in five focus areas, namely automotive parts and accessory systems; information and communications technologies; logistics and supply chain management enabling technologies; nanotechnology and advanced materials; and textiles and clothing. By the end of January 2015, 728 projects from the R&D Centres were approved at a total project cost of HK$4 billion. A particularly relevant scheme is the **University Industry Collaboration Programme (UICP)** which aims to stimulate private sector interest in R&D through leveraging the knowledge and resources of universities with an emphasis on close collaboration between private companies and Hong Kong universities. It comprises of three schemes:

***Teaching Company Scheme:*** aims to foster university-industry partnership by supporting local companies to take on graduate students from local universities to assist in proprietary R&D work.

***Matching Grant for Joint Research:*** aims to foster private companies to collaborate with universities in proprietary R&D projects.

***Industrial Research Chair Scheme:*** aims to assist universities and industry to develop research efforts in the natural science or engineering fields that respond to industrial needs that are not yet developed in Hong Kong but for which there is good development potential in the longer term.

260 projects were approved under this scheme accessing HK$295.1 million in 2014.

The Research Grants Council which is responsible for distributing research funding to Hong Kong universities awarded over HK $52 million to Hong Kong universities with the expectations of increased capacity building in research, knowledge transfer and knowledge generation and that this would lead to direct involvement with Hong Kong industry.

Some universities, notably the Hong Kong University of Science and Technology, developed innovation centres and commercial venture centres to involve industry directly. For example the Polytechnic University of Hong Kong has an enviable reputation for its applied research work (see www.polyu.edu.hk). Science and Technology Parks are also important for commercialising research and promote any research and spin offs in the area of electronics, information communication technology, green technology, bio-medical technology, materials and precision engineering.

There are initiatives to promote collaboration between research institutions and industry in Hong Kong and the neighbouring regions of Guangdong and Shenzhen notably the Guangdong-Hong Kong Technology Cooperation Funding Scheme and the Shenzhen/Hong Kong Innovation Circle. These initiatives provided project funding of almost US$ 1 billion to collaborative projects.

Mowery (2014) reported on university-industry collaboration and technology transfer in Hong Kong and knowledge-based economic growth. In this report he drew attention to a systematic approach to developing innovation that has been successful in Hong Kong and barriers to collaboration stating that the old tendency for universities in Hong Kong “to hold themselves aloof from the industrial sector and do not tailor their teaching and research activities closely enough to its needs…” (Berger and Lester, 1997, p. 66) has been overcome. However, Mowery states

*“The HKSAR government has increased financial support for research collaborations involving university and industrial researchers, HK universities have expanded their efforts to support technology transfer to Hong Kong industry through patenting and licensing of faculty inventions, and universities have provided support for the formation of “spinoff” firms to commercialize faculty inventions.”*

The success of these initiatives is reflected in the relative performance of Hong Kong in the Global Innovation Index (2014) where it is now ranked 10th worldwide. The performance of Hong Kong in terms of indicators associated with innovation, relative to the rest of China, the UK, Germany and the USA is shown in Table 1. Although overall innovation and access to ICT is good, Hong Kong does not compare favourably to Western countries with regards to dimensions of the number of researchers, amount of GDP spent on research and university industry collaboration.

 It is observed that the highest demand in Hong Kong regarding research opportunities are likely to be in the areas of information technology, green-technology, nano-technology, new materials and biotechnology and electro-mechanical systems. This should give opportunities to UK universities because of the strong reputation of a number of UK universities in these areas. Also the demand for Graduates and especially Doctorates cannot be met by local supply in Hong Kong. Collaboration with universities is recommended. But there are barriers, notably:

1. Informal collaboration with Hong Kong industry and UK universities is more common than formal agreements. There is, however, a great deal of collaboration between UK and HK universities, industry most of these are governed by formal agreements and memoranda of understanding.
2. Hong Kong industrialists lack knowledge and accessibility to UK universities. Academic conferences give an infrastructure for academics to meet other academics but there is little provision for similar informal meetings between industry and academics.
3. The infrastructure and the environment in Hong Kong are not particularly conducive to young science and engineering entrepreneurs. This is reflected in the case of the “green technopreneur” Frank Wang, a graduate of Hong Kong University of Science and Technology, who founded Dajiang Innovation a manufacturer of consumer drones. He located the business in Shenzhen rather than Hong Kong because of the lack of supporting supply chain infrastructure and relatively high wages in Hong Kong, (sUAS News 2015).
4. Limited common social and network channels (or social space) available for industrialists and academic researchers to meet.
5. Time-zone difference and the long travel distance

However, a number of initiatives between Hong Kong and Scotland have emerged, such asthe Hong Kong – Scotland Partners of Post-Doctoral Research and the SCF/RGC Joint Research Scheme. For examples of the projects and collaborators see Appendix 1. But again these are between academic institutions rather than including industry.

**Table 1: Research and Innovation Performance Indicators**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **HK 2014** | **UK** | **China** | **Germany** | **USA** |
| **Performance Measure** | **Value/Score** | **Rank** | **Value/Score** | **Rank** | **Value/Score** | **Rank** | **Value/Score** | **Rank** | **Value/Score** | **Rank** |
| Global Innovation Index (out of 143) | 56.8 | 10 | 62.4 | 2 | 46.6 | 29 | 56 | 13 | 60.1 | 6 |
| Researchers Headcount/mm pop | 3471.2 | 29 | 6872.2 | 11 | 1392.8 | 50 | 6279.9 | 13 | - | - |
| Gross Expenditure on R&D, %GDP | 0.7 | 45 | 1.7 | 21 | 2 | 19 | 2.9 | 7 | 2.8 | 11 |
| GERD performed by business, % GDP | 0.3 | 42 | 1.1 | 21 | 1.5 | 13 | 2 | 9 | 1.9 | 11 |
| GERD financed by business, % | 43.3 | 42 | 61.4 | 19 | 76.2 | 5 | 66.9 | 15 | 69.8 | 8 |
| University/industry collaboration | 64.0 | 20 | 76.3 | 5 | 5.68 | 32 | 73.2 | 9 | 79 | 3 |
| GERD financed by abroad, % | 4.9 | 63 | 19.7 | 20 | 1 | 81 | 4.2 | 64 | 3.8 | 68 |
| Graduates in science and engineering, % | 34.7 | 8 | 22.3 | 37 | - | - | 26.9 | 19 | 15.5 | 84 |
| ICT access | 91.8 | 1 | 84.6 | 6 | 43.6 | 74 | 85.1 | 5 | 72.4 | 28 |
| ICT use | 66.2 | 15 | 71.9 | 12 | 27 | 64 | 60.5 | 21 | 67.6 | 13 |
| Knowledge- intensive employees, % | 36.2 | 29 | 47.2 | 5 | 7.4 | 101 | 43.5 | 14 | 36.3 | 28 |
| Knowledge workers | 57.2 | 30 | 65 | 20 | 59.4 | 29 | 62.8 | 23 | 73.5 | 7 |

(Source: Global innovation Index 2014 – the human factors in Innovation, Cornell University, INSEAD, and WIPO (2014))

However, obstacles do exist. Venture capitalists - including those in Hong Kong tend to look to mainland China, especially Shanghai. So investment funding for HK industry university collaboration is limited. (This is documented in the Census and Statistics 2013 report on Innovation in Hong Kong).

# Method

To answer the research questions, the aim was to identify collaborations between UK universities and Hong Kong industry in the area of science and engineering. Science and engineering is part of the group of subjects referred to as STEM (science, technology, engineering and mathematics). Collaboration was defined as any relationship between a UK academic institution and Hong Kong industry. This would include joint working relationships, prototype development, teaching, academic placements, sharing of PhD students and internships. The idea was that once collaboration was identified then the UK academics would be interviewed using a structured interview and this would be followed up by interviewing their Hong Kong partner.

To identify collaborations, initially two approaches were taken: one was to distribute an online questionnaire to Research Offices and Technology Transfer/Licensing Offices (TTOs/TLOs) and a contents search of UK university web pages. The questionnaire was developed and piloted at Edinburgh Napier University. The questionnaire was distributed via the Research Administrators Association who emailed their membership. The questionnaire was also sent directly to university research and technology transfer offices. It was thought that these offices were the best place to identify activity and would forward the link to the e-questionnaire to active researchers. No completed questionnaires were returned. Eight replies were received that the university did not engage in collaboration with Hong Kong Industry. The questionnaire and electronic links were checked and all appeared to work correctly. The possible reasons for such a disappointing return are that research offices and TTOs/TLOs are not well connected internally and have a more outward facing role. The culture of academic staff engaged in research is only to engage with research offices and only to do so when required. The ineffective nature of TTOs/TLOs is supported by comments in the GED 2015 summary report.

*“Across all four countries (UK, South Korea, Hong Kong and Brazil), the university TTOs/TLOs (Technology Transfer/Licensing Offices) were seen as potentially hindering the effective transfer and commercialisation of research, due to a range of reasons including: TLO/TTO staff having limited skillsets; the lack of a commercial mind set and culture; the number of staff; and a lack of understanding of the ‘bigger’ picture and potential of relationships with external businesses.”* (GED 2015, p13).

Another reason is that there are very little collaboration between UK academics and Hong Kong industrialists. To pursue the survey further all of the web sites of 133 UK universities and Institutes of Higher Education content was searched for mentions of collaboration with Hong Kong Industry. Information is very patchy on collaborations which do not involve an academic award, reporting policies of universities mean that Hong Kong is not generally differentiated from China on university webpages; access to deeper information on web pages is restricted by the need for staff/student log-in; some collaborations were pre-2010 and out of the scope of the study. Additionally one or two were found where Hong Kong was mentioned as one of many countries in multinational partnership and the size/scale of involvement was not clear and the structures of the websites made searching a long and frustrating task. Where there was information about Hong Kong it was mainly about student exchanges between universities or study opportunities in the UK or to a lesser extent in Hong Kong. Thirteen collaborations were found.

20 individuals representing various institutions in Hong Kong and 18 Hong Kong academics were emailed to find if there was any awareness from the Hong Kong side. None of the institutional representatives responded that they knew of any collaboration between UK academics and Hong Kong industry. The list of institutional contacts is displayed in Table 2.

**Table 2: Hong Kong Institutional Representatives**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Organisation** | **Name** | **Organisation** |
| Dr Paul Man-Lok Kan | A Better Tomorrow | Dr Daniel Lee | Hong Kong Science and Technology Parks |
|  Damian Yip | Chartered Institute of Management Accountants | Ms Ivy Shum | SME Creativity Centre |
| OnChing Yue | Innovation and Technology Commission | Mr Jong Lee | Bonham Strand |
| Andrew Davis | InvestHK | Mr David Docherty | National Centre for Universities and Business |
| Philip Kung | InvestHK | Mr Bjorn Segerblom | Hong Kong Science and Technology Parks |
| Karen Winton | InvestHK | Mr Herman Lam | Hong Kong Cyberport Management Company LTD |
| Mr David Foster | The Croucher Foundation | Mr Henry Fung | Champion Technology |
| Mrs Christina Siu | Manchester Business School East Asia | Dr Jeanne Ng | CLP Holdings LTD. |
| Dr Cecilia Pang | The government of Hong Kong Special Administrative Region | Fuk Ki Lree | GreenPak Biotech LTD. |
| Dr Daniel Lee | Hong Kong Science and Technology Parks | Mr Richard Flood | UK Trade and Investment |

The Hong Kong academics approached are listed in Table 3. No positive information identifying partnerships with Hong Kong Industry was obtained from HK academics.

**Table 3. List of Hong Kong Academics who were contacted**

|  |  |  |
| --- | --- | --- |
| **Name** | **Job Title**  | **Institution** |
| Professor Johnny Chan | Dean, School of Energy and Environment | City University of Hong Kong |
| Dr Alfred Keng Tiong Tan | Head, Knowledge Transfer Office | Hong Kong Baptist University  |
| Mr Peter Li | Director of International Office | Hong Kong Baptist University  |
| Michael Fung | Director of Planning and Institutional Research Office of the President | Hong Kong University of Science and Technology |
| Professor Nancy Ip | Dean of Science | Hong Kong University of Science and Technology |
| Professor Paul forester | Program Director (Global Learning) | Hong Kong University of Science and Technology |
| K B Wong | Assistant Dean, Faculty of Science | The Chinese University of Hong Kong  |
| Dr K N Leung | Assistant Professor, School of Biomedical Sciences | The Chinese University of Hong Kong  |
| Mrs Shelly Fan | Director of Academic Links | The Chinese University of Hong Kong  |
| Professor Chi-kin John Lee | Vice President (Academic) | The Hong Kong Institute of Education |
| Dr Peter Bodycroft | Director, Center for International Education | The Hong Kong Institute of Education |
| Dr Alison E Lloyd | Associate Dean(External Relations and Development) | The Hong Kong Polytechnic University  |
| Professor Angelina Yuen | Vice President(Institutional Advancement and Partnership) | The Hong Kong Polytechnic University  |
| Ms Georgina Chan | Director of International Affairs | The Hong Kong Polytechnic University  |
| Iris Benzie | Chair Professor of Biomedical Science | The Hong Kong Polytechnic University  |
| Professor John Spinks | Senior Advisor to the Vice-Chancellor | The University of Hong Kong |
| Dr Steve Cannon | Executive Vice-President (Administration and Finance) | The University of Hong Kong |
| Professor Sun Kwok | [Dean of Science and Chair Professor of Physics](http://www.scifac.hku.hk/page/detail/1109) | The University of Hong Kong |

For other contacts see Appendix 3

Institutions involved in the transfer of Knowledge between the United Kingdom and Hong Kong or in knowledge creation were contacted. The organisations included:

Universities UK, Universities Scotland The Department of Business Innovation and Skills, UK Research Councils notably the Engineering and Physical Sciences Research Council (EPSRC), Economic and Social Science Research Council, Nuffield Foundation, Wellcome Trust, Royal Academy of Engineering, Innovate UK and Catapult Centres, Saltire Foundation and the Scottish Funding Council and UK Universities.

Most of these organisations did offer some support for collaborations in the form of funding staff exchanges, PhD studentships, short visits and joint research funding but on investigation very few provided support for Hong Kong. Mainland China and India were the most popular focus for such collaborations.

The Royal Academy of Engineering offers a scheme to promote international collaboration. See <http://www.raeng.org.uk/grants-and-prizes/international-research-and-collaborations>.

Awards in the period 2010 to 2013 Involving Hong Kong were:

Dr Jinghao Xue, UCL, collaborated with Professor Weichuan Yu Hong Kong University of Science and Technology – area: Stability of marker selection for ultrahigh-dimensional data.

Dr Huiling Zhu, University of Kent collaborated with Professor Lin Dai City University of Hong Kong – area: Energy-efficient radio resource allocation for broadband wireless video transmissions

Dr Wanqing Tu, Robert Gordon’s University collaborated with Professor Qian Zhang the Hong Kong University of Science and Technology – area: Multimedia multicasting in cognitive radio-mesh networks.

Dr Yulan He, Open University collaborated with Professor Kam-Fa Wong, the Chinese University of Hong Kong – area: Seizing the predictive power of online communities.

Professor Brain Mace, then University of Southampton collaborated with Dr Lixi Huang the University of Hong Kong – area: Acoustics, vibration, vibro-acoustics, noise control, structural dynamics, ducts, plates.

All UK holders were contacted. Only Dr Wanqling Tu had any industry contact. All were visits to work with Hong Kong academics. In many cases the Hong Kong academic was a former PhD student who is now working in the United Kingdom.

The ESRC funded a number of projects with Hong Kong: see for example <http://www.esrc.ac.uk/news-and-events/press-releases/21878/East_meets_West_research_transcending_borders.aspx> and Appendix 2.

However, all these projects were in the area of social sciences. In conducting this work a substantial amount of work is occurring between UK universities and Hong Kong universities in the Social Sciences.

From funding awarded by the EPSRC the projects listed in Table 4 were identified by the EPSRC.

**Table 4: Contacts found from EPSRC**

(Source: [http://gtr.rcuk.ac.uk/](https://owa.napier.ac.uk/owa/redir.aspx?C=jNjmYlAbEkmQT4Ks863kmWNFeAO5dNIIGP7-CHhMzMfmXqRBnDQRRbaiNGTImAEd20q-bDTam1U.&URL=http%3a%2f%2fgtr.rcuk.ac.uk%2f" \t "_blank) and [http://gow.epsrc.ac.uk/](https://owa.napier.ac.uk/owa/redir.aspx?C=jNjmYlAbEkmQT4Ks863kmWNFeAO5dNIIGP7-CHhMzMfmXqRBnDQRRbaiNGTImAEd20q-bDTam1U.&URL=http%3a%2f%2fgow.epsrc.ac.uk%2f" \t "_blank))

All UK academics were contacted - these are discussed in the findings section

A structured interview was formed probing the following:

The nature of the collaboration

How the collaboration was initiated?

Outcomes associated with success

The working relations with the companies

Governance and Intellectual Property Rights

Other comments

Role of the British Council in Hong Kong

All the UK Catapult Centres were approached – a few have some connection with UK industry but these were mainly in nascent stages with Memoranda of Understandings being established.

The Association for University Research and Industry Links (AURIL, http://www.auril.org.uk/) was approached and they helpfully circulated the request for information on UK academic – HK industry links around their membership. Unfortunately little was forthcoming other than there is some collaboration ongoing in the energy sector. Members activities were directed elsewhere mainly towards domestic and European industry. PraxisUnico (<https://www.praxisunico.org.uk/>), an organisation to promote best practice in knowledge exchange and research commercialisation. Again little evidence of UK academic – HK industry collaboration was reported. Nicky Warnock, Project Manager for PraxisUnico wrote “It appears that there are various UK/Hong Kong University collaborations, but little information on collaboration with HK industry”. However, PraxisUnico did pass on some links and these were pursued.

An interview was also conducted with Dr Richard ArmourSecretary-General, University Grants Committee of Hong Kong, to obtain his perspective as a representative of a body responsible for promoting research. The empirical research closes with notes of observations made about some potential arrangements to stimulate collaborative research in the near future

# Findings

1. Very little collaboration with UK academia and Hong Kong industry in the area of science and engineering could be identified.
2. There are a number of academic contacts in scientific research between UK and Hong Kong universities. Many of these are maintained by former Hong Kong PhD students who are now employed in the United Kingdom.
3. Joint and collaborative research work between the United Kingdom and Hong Kong is much more vibrant in the area of social sciences. This possibly reflects the economic base of Hong Kong.
4. Of the four replies to the questionnaire, the University of Manchester via its business Engagement Team appears the most active reporting around 20 collaborations in Hong Kong mainly with partners in engineering, power and university sectors. In this, they report that there is sufficient funding to conduct the collaborative work and most collaborations are at least moderately successful and were not difficult to run. No issues about communication difficulties were raised. Formal contracts were established and these were not problematic, however, no formal intellectual property rights agreements were established. Two replies were received from the University of Oxford, one reporting a collaboration in cardiovascular medicine with Fukuda Ltd who provided equipment. This collaboration was adequately funded by a BHF grant. The collaboration was completely successful. However, another collaboration in electronic engineering funded by the “Soft-landing” initiative was not perceived to be at all successful even although funding was sufficient, communication was effective, and an intellectual property rights (IPR) agreement was formed which gave ownership of IPR to the UK researchers.
5. Four interviews were held with UK academics – these academics worked in different areas covering inorganic chemistry, electric motors, retail optimisation to computer networking. The views given in the interviews were remarkably consistent.

***The nature of the collaboration***

All the EPSRC funded collaborations were motivated into collaboration as part of the EPSRC grant application process.

Professor Mawby from the University of Warwick is the principal investigator of a team of ten professors working on a project to develop vehicle electrical systems integration. This project has twenty industrial partners only one of which is based in Hong Kong (Scorpion Precision Industry Company). Scorpion Precision LTD designs, develops and manufactures high density energy conversion electric motors. While they are a small company, they are ranked number 1 in the world in their niche area, including motors for drones for markets other than consumer markets. Scorpion has a history of undertaking R&D and design with their teams in Germany (for electrical engineering) and Russia (electronics), with manufacture happening in mainland China. The value of this grant is £3,154,532. The collaboration entails Scorpion Precision as a supplier of advanced electric motors. Scorpion has the ability and reputation to produce very fine tolerance electric motors and was chosen and approached from the knowledge of one of the academic partners (Professor P C Luk, University of Cambridge) who initially studied in Hong Kong and is an immigrant from Hong Kong and worked with Scorpion previously. Scorpion Precision LTD has worked as part of this partnership on a small scale –

*“being the university’s workshop, manufacturing 1-2 units per batch to their designs*”

Georges van Gansen, Director of Scorpion Precision LTD

This project is a four year project with the first two years developing the underpinning research and the last two years establishing three “demonstrator” projects of which the work with Scorpion will form the basis of one of these.

Professor Mawby stated that Scorpion was recruited not because they were based in Hong Kong but due to personal knowledge by one of his team and their technical ability to produce the motors and do fine machining at a price commensurate with the project funding levels.

Professor K Li, of Queen’s University Belfast, is principal investigator of a project entitled Intelligent grid interfaced vehicle eco-charging. This is funded by a grant valued at £855,111 and the partnership contains 4 professors and six industrial partners one of which is Scorpion Power Systems LTD of Hong Kong. Professor Luk from Cranfield University is one of the partners in this project.

Dr Crean, of the University of Surrey, is principal investigator of a project to investigate advanced fibre-based energy storage for wearable applications. This project valued at £96,656 involved three partnering universities and the industrial partner which is Fibretronic LTD. Fibretronic has a strong reputation in the field of smart clothing. The project suffered a delayed start due to administrative difficulties in awarding and then the PI going on maternity leave.

Professor Smith of the University of Nottingham is the principal investigator of a project entitled “Neo-demographics: Opening Developing World markets by Using Personal Data and Collaboration. This project funded to the value of £612,744 involves a team of four investigators and eight industrial partners one of whom is the holding company Dairy Farm Group in Hong Kong. The Hong Kong collaborator is allowing access to small retail units held as part of Dairy Farm Group’s operation and is helping to evaluate the findings.

Dr Wanqing Tu is a computing lecturer who was awarded funding by the Royal Academy of Engineering research exchange scheme to develop her research in the area of computer networks and communication systems. She joined the Hong Kong University of Science and Technology’s Innovation Lab, which is funded by the Huawei Corporation and gave her some exposure to industry.

***How the collaboration was initiated***

The University of Warwick – Scorpion partnership arose because of an engineering need, in that for the project a manufacturer of a particular form of advanced electric motors was required and Scorpion had the required skills and capacity. Key to forming the partnership was initial contact with one of the academic partners Professor P C Luk, (University of Cambridge) who initially studied in Hong Kong and had prior contact with Scorpion Precision LTD. According to Georges van Gansen, the director of the industry partner with Warwick, he met Dr Luk of Cranfield University by chance at a conference organised by Hong Kong Science and Technology Park and Hong Kong Polytechnic University in Hong Kong some 3-4 years ago.

“*their meeting was very random”.*

The above also applies to the collaboration between Queen’s University Belfast and Scorpion Precision LTD, as Professor Luk was also involved as a UK sub partner in this research.

The University of Surrey – Fibretronics LTD was initiated by Dr Crean who required a manufacturer to make prototypes to show how her research could be commercialised. Fibretronics was chosen after an internet search as the most suitable company with capacity to collaborate with. Dr Crean reported:

*“I was not specifically targeting Hong Kong companies – rather did an internet search to find companies involved with fabric spinning or companies that had wearable electric products as part of their portfolio - it was luck that they (Fibretronics) replied quickly and positively”,*

Fibretronics stated that:

*“they could contribute engineering resources to assist with the developing and testing of post type devices and provide advice regarding end use specifications, performance and other commercialisation issues”.*

Dairy Farm Group was also chosen by the academic partner but for their strategic position which acted as a holding company for many small Hong Kong retailers. The company was selected as a consequence of previous knowledge and involvement of one of the research partners (Professor Sparks, University of Stirling).

Finally Dr Tu’s involvement came from encouragement by her former PhD supervisor (from Hong Kong) to apply to the Royal Academy of Engineering to facilitate continuation of the research undertaken by her to continue her research from her PhD. She had also met collaborators at a conference.

***Outcomes associated with success***

All the academics said that key outcomes were the successful completion of stated project objectives and the production of academic papers. Future collaboration and learning from the partnering industry were less strongly stated and more second order outcomes. Both sides were interested in developing the technology. However, the view of the academics was that they had more to gain than the partnering company.

For the collaboration with Dairy Farm Group, access to field data was seen as crucial by the academic partner.

The University of Nottingham academic stated that important outcomes were also to attract further funding and that this work would make a good Impact Case for REA 2020. He also said that the collaboration was important evidence of Nottingham’s internationalisation agenda and its quest to gain international accreditation for its MBA.

The director from Scorpion stated that he was keen to explore working with Cranfield University (part of the Warwick led research consortium) in the hope that there would be technology transfer and learnings for people in Scorpion. However, he stated that this

*“has not materialized, largely because the respective teams have moved in different directions”.*

This was a consequence of the university focussing on larger applications with lower power density for example whereas Scorpion’s focus is on motors for flight such as radio controlled drones and military applications not land based vehicles. The director of Scorpion reported that they:

*“have had a relationship with Cranfield University for about three years, but it has not been profitable for Scorpion”*

Professor Mawby from the University of Warwick referring to the knowledge exchange in the

Project he manages stated that:

“*both sides gain – enormously*”

Dr Crean, University of Surrey, commented that the Hong Kong company did not have specific expectations – they are “*just interested in the research*”. Dr Crean went on to state that:

*“the main outcomes are to advance the science and get publications to reflect that”.*

Dr Crean reported that although the contribution from Fibretronics is in kind *– “it is very valuable”.*

***Working relations with the companies.***

All reported these to be good with simple and efficient communications. In all cases the exchanges were perceived as beneficial, especially from the side of the academic who benefited from the companies engineering expertise in three of the projects and commercial expertise in The University of Nottingham/Dairy Farm Group collaboration. When asking about any cultural difficulties, none were reported. Relationships were professional.

The collaboration between the University of Nottingham and Dairy Farm Group commented that setting up the partnership was difficult and meetings were required. The academic reported that the Dairy Farm Group:

 *“had to be convinced that we (the academics) were not charlatans who would run off with the data”. The need to keep confidentiality and ensure data on customers was anonymised was stressed - this had to be done at “more than a legal level”.*

Progress could have been quicker with face to face meetings - but funds pre-grant award were not available and working to give reassurances at a distance was difficult.

*“re-assurance can’t be done at a distance”*

***Governance and Intellectual Property Rights***

The University of Surrey does all the governance for the Wearable Energy project. Intellectual property rights are being specified in a Memorandum of Understanding that IPR will be jointly owned.

Similarly the academic from the University of Warwick reported that his university did all the project management. A project manager visits all the partners or conducts telephone calls monthly. As part of the project set up all parties had to agree to a collaboration agreement recognising that exploitation of knowledge generated has to be negotiated with those who generated it.

Governance is jointly conducted with the University of Nottingham reporting to the EPSRC and to the Dairy Farm Group. Regarding IPR the University of Nottingham is in the process of signing a Non-disclosure agreement with the Dairy Farm Group.

The academic from Warwick did not perceive that a close working relationship with the company was important – there was a preference for strong academic links. IPR is to be negotiated, and can be shared. However, the Hong Kong Company was not perceived to be so significant - merely a supplier - but if benefits are realised then there would be further negotiation on IPR. Georges van Gansen, a director from the industry partner Scorpion, reported:-

*“There is no collaboration vehicle, it is more a supplier relationship and services are paid for on a contract basis. IP for the designs remains with the university. “*

***Other comments***

The University of Nottingham academic saw Hong Kong as a

“Landing Strip to mainland China. Although there are lots of big companies in mainland China they were very suspicious – backed up by legal restrictions. Hong Kong had more of a can do attitude”

Thus proving oneself in Hong Kong made moving to China easier.

“It can act as an introduction to the supply chain in China”.

Others said that their main focus was in China, and Hong Kong was not needed as a stepping stone. The academic from Belfast reported having personal ties in Szechuan so did not think Hong Kong had any advantage to attract projects and that companies on the mainland are possibly preferred.

Dr Crean found no cultural nor communication problems in working with the company in Hong Kong but commented that this was true of mainland Chinese companies. Certainly there were no barriers to communication:-

*“most speak English perfectly well, especially those educated to PhD level and since science is carried out mainly in English at least papers are that communication does not seem a problem and the Chinese are willing to exchange emails and discuss co-operation.”*

This lessens the benefit of Hong Kong as a stepping stone to mainland China*.*

Georges van Gansen (Scorpion) reported that he works with many universities, designing the university’s specification and providing manufacturing support. While this is not lucrative, and can be costly in terms of time and investment, he stated that Scorpion Precision LTD commits to these initiatives to give back/part of CSR and to open doors to new opportunities as he feels it reflects well on the Scorpion brand and is good for recognition, enhancing their reputation for flexibility and openness. Georges van Gansen said that he had explored co-funding projects with universities, but it was found to be too expensive. Scorpion Precision LTD works with universities from many countries and Georges van Gansen stated that there was *“no bias and focus”* to the choice of university. He did however, note that he is never approached by universities from Hong Kong perhaps because there are no teams working in this area.

Professor Mawby the UK academic partner of Scorpion thought that in general there was little demand in Hong Kong industry for UK academic collaborators as many manufacturing companies are fairly small.

***Role of the British Council in Hong Kong***

None of the partners approached the British Council (nor thought to do so) before entering into the arrangements. They all thought that the British Council could offer help – or make clearer that they have a role in cultural orientation and help in convincing partners in Hong Kong about the credibility of UK academic institutions.

The academic from the University of Belfast reported having no contact with the British Council in Hong Kong but thought that it would be good for organising events. However, he did think that the British Council was the natural link to businesses in Hong Kong. He stated that the British Council can act as social capital to link into higher echelons. However, he reported you need to be in the higher echelons to be recognised by the British Council.

The British Council needs to become more active – give funding for speculative visits and

“set-up funding schemes like the Newton fund”

Academics perceive the British Council as somewhat elitist and concerned more with politics than funding projects.

“The British Council is not close to funding opportunities - very top down”.

Dr Crean suggested that it would be helpful if the British council could maintain and make available lists of companies interested in collaborating with UK academics and the area they work in. This would make searching for partners much easier and save a lot of search time.

Dr Crean also advocated that the British Council should offer or facilitate travel grants to allow academics to visit Hong Kong industry and a funding stream should be developed to fund UK students to conduct work, (supervised by UK academics), in Hong Kong industry. This would help in achieving PhD learning outcomes and become “global graduates” by helping with:-

*“training of students to make PhD students more “industry ready” and more applicable to industry”.*

All expressed a desire to continue to work with Hong Kong industrialists after completion of the current project. Speaking of the nature of the current collaboration Dr Crean stated:

*“It is really beneficial – to see the other side – what the industrial world is like, what their business cases are like and why you would go down a certain path towards commercialisation – because this is so far removed from what we do – all lab based, done out of interest to develop the materials”****,***

1. ***Interview with Dr Richard Armour,*** Secretary-General, University Grants Committee (UGC) of Hong Kong

The University Grants Committee (UGC) of Hong Kong is a non-statutory advisory committee responsible for advising the government of the Special Administrative Region (SAR) of the People's Republic of China on the development and funding needs of higher education institutions in the SAR.

Dr Armour reported three broad concerns:

5.1 There are not stronger connections between HEI and business/enterprise in HK and it is an area that they (UGC) are keen to expand.

5.2 That the current R&D set up, involving HK Science and Technology Park, Innovation and Technology Commission etc., is not converting enough research outputs into impact.

5.3 There are overlaps in current research players in HK e.g. ITC’s University Industry Collaborative Programme and some of the UGC’s funding programmes.

He suggests that these concerns are understandable as he feels It is important to remember that ‘a research culture’ in HK universities is relatively new as proper funding only started about 20 years ago so there is no full generation with that understanding and outlook yet*.*

Dr Armour went on to comment that although Hong Kong universities did well in the recent Research Assessment Exercise, students who graduate do not look for careers in science and engineering preferring to seek employment in banking. He suggested that a reason for lack of opportunities might lie in a gap, between basic research (funded by UGC) and the point at which Innovation and Technology Fund want to pick up projects, which limits the “midstream” research. Hence funding for areas of applied research, in which PhD are typically employed is limited.

 Dr Armour commented from his experience of Hong Kong academia that despite doing well in their Research Assessment Exercise Hong Kong academics do not have commercialisation as a priority. It is not part of routine thinking in HK.

Dr Armour also commented on Hong Kong industry that industrialists perceive universities to be ***“****impenetrable”* and that the risk profile of research does not appeal to companies most believing that there are easier ways to make money than through investing in R&D.

He went on to suggest that most companies look for research outside the university sectorand that it’s not unusual for them to acquire the company that undertakes the research they seek, rather than commission particular research projects*.*

From this interview it emerges that the focus of research is fundamental rather than applied and that an understanding gap exists between Hong Kong industrialists and Hong Kong academics. Furthermore, it seems that industry does not value research and perceives it as too risky to engage in*.*

1. ***The Immediate Future***

In the responses to the strategy alluded to in the 2015 Policy Address in the section referring to Innovation and Technology, the Government state that they will provide a

*“world-class technology infrastructure for enterprises, research institutions and universities, offering financial support to stakeholders in the industry, academia and research sector to commercialise their R&D deliverables, nurturing talent, strengthening collaboration with the mainland and other places in science and technology, and fostering a vibrant culture of innovation”*

This combined with the recognition amongst policy makers that higher education should become more commercially orientated and support industry to innovate, will begin to alter the mind-set of Hong Kong industry and make the environment of Hong Kong more appealing and open to UK academics in the area of science and engineering.

Some initiatives have been found which suggests that despite the low current level of involvement between UK academics and Hong Kong industry, there is likely to be flourishing of activity in the next five years as a consequence of nascent work and initiatives taken.

In the emerging low carbon sector a Memorandum of Understanding has been signed by the Scottish Government and Hong Kong Science and Technology Parks Corporation to develop Hong Kong as a Hub for low carbon technology, (Scottish Government 2013, ECCI 2014). In May 2015 the Hong Kong Centre for Carbon Innovation (HKCCI) was established with lead partner University of Edinburgh and key service level agreements/ Memoranda of Understanding withEdinburgh Napier University, BRE Scotland and Scottish Development International. This will facilitate UK academic/ HK industry collaborations and the partnership came in to operation due to funding of £120,000 provided by Scottish Development International.      Edinburgh Napier University as a founding partner of the ECCI will support Scottish companies via the HKCCI venture to engage with HK and southern China businesses. First focus will be construction, waste and low carbon. Separate to this the Construction Scotland Innovation Centre based at Edinburgh Napier University (£9.7 million) funded by Scottish Funding Council – is one of eight Scottish Innovation Centres established in 2013/14. One of the KPIs is exports and international partnerships. HK, China and East Asia will be one of the geographies the new Innovation Centre will engage with in future.

There are also a number of fledgling projects that it is hoped will soon develop that involve cross national research. Examples of these are the work of Dr Susan Brown at Edinburgh Napier University. Dr Brown has undertaken a pilot survey with Hong Kong’s Rugby 7’s to evaluate a wellbeing and healthcare programme. The programme was developed with Scottish Rugby and transferred to Hong Kong and had no British Council involvement. There is an idea to take this further but to develop a course with Hong Kong Polytechnic University that will allow elite athletes to have their wellbeing and health provided for in Hong Kong rather than having to leave and be based overseas. Thus there would be collaboration between universities which would serve the needs of elite sports bodies.

Professor Thanos Karatzias, of Edinburgh Napier University, has being working for over two and a half years with medical researchers at Hong Kong University, Chinese University and Hong Kong Polytechnic University where he is an honorary professor. His work does involve medical workers in in non-university sector and there are opportunities for expansion in this area. The British Council has not been involved in this emerging work but perhaps there is a role in fostering links with the non-university sector.

Edinburgh Napier University’s Biofuel Research Centre

(<http://www.napier.ac.uk/ISHIsite/centres/biofuel/Pages/Home.aspx>) under the directorship of Professor Martin Tangney has developed strong links in Hong Kong biofuels sector and has advised the Hong Kong government on biofuel trials of its transport fleet. Again, the British Council in Hong Kong could have a role in commercialising this work in Hong Kong.

# **Conclusions**

1. Collaborations between UK academics and Hong Kong industry in the area of science and engineering are not common.
2. The British Council was not mentioned in any brokering. The role of the British Council was not perceived as being relevant – rather it was thought that the British Council busies itself with higher level principals rather than “on the ground academics”.
3. Most of the respondents stated they did not see Hong Kong as an entry platform to mainland China.
4. Personal social networks are important, but not essential, in forming collaborations.
5. If funding and support for local administration could be provided by the British Council then academics thought there might be an advantage in working with the British Council.

**Why is there so little apparent involvement?**

Undoubtedly, some UK Academic Hong Kong Industry collaborations are undetected; partly because academics can be reluctant to reveal and share their networks and partly because activity is dominated in Hong Kong by teaching relations. Also university websites are difficult to search as many aspects of a university are promoted and given different emphasis depending on the strategic goals of the university. Nevertheless, UK Academic collaborating with Hong Kong industry appears uncommon. We did not have any difficulty in identifying intra university research collaborations especially in the social sciences, see for example the South East Asia network based at the London school of Tropical Hygiene and Medicine (<http://www.searn.org/>), South East Asia Research based at the University of London (<http://www.searn.org/>) and the East Asia Research Network centred at the University of Hull

(<http://www2.hull.ac.uk/ifl/international/internationalnews/eastasiaresearchnetwork.aspx>). From the work undertaken in this investigation, we forward some reasons:

* 1. The structure and nature of the Hong Kong economy is now by far more service, trade and finance orientated rather than being based on manufacturing which means that demand is not large for cutting edge science and engineering. Rather it is mainland China where opportunities for collaboration in science and engineering arise. There are a number of collaborations occurring between UK academics and mainland Chinese academics and industrialists.
	2. Universities in Hong Kong have an enviable strength in Science and Engineering so can mostly satisfy local demand. In addition there is a tendency in Hong Kong for the default mind-set to be counter to the notion of academic-industry collaboration. In terms of funding on contracted-out R&D activities in the business sector in 2013, higher education institutions accounted for less than 8%, (Hong Kong Innovation Statistics, Census and Statistics Department, 2013).
	3. Once Hong Kong would have been attractive to UK academics as a springboard to forge relationships with mainland Chinese universities and industry. This seems no longer to be the case as making links with mainland China has become much easier and more open. The statement that “there is a growing propensity for businesses to invest in R&D. Hong Kong with its distinct “One Country, Two Systems” situation, is in a position to exploit certain advantages” is no longer true. Indeed, it seems that even academics in Hong Kong turn to mainland China, especially the Guangdong region to, collaborate with industry. As one academic put it:

*“there is just a lot more going on in the mainland, more opportunity”*

*“the main opportunities are mainland China not Hong Kong”*

Indeed many academic centres are now joint owners of companies on the mainland where technology developed in universities as “spun out” and commercialised. The relation between the Huawei Corporation and Hong Kong University of Science and Technology (HKUST) gives further insight. Huawei Corporation, which is based in Shenzhen, supports the innovation lab in HKUST but field-testing of ideas developed is conducted in Huawei plants on the mainland of China.

* 1. UK academics interviewed reported little encouragement to work with Hong Kong industry – there is little funding from research councils and university research strategies often direct them to seek partners in Europe. Funding is seen as “softer” in Europe – easier to get and can have more demonstrable impact. One academic with strong links in Hong Kong felt that unless funding was available, she could not maintain her links stating:

*“I am under pressure to focus on Europe and to apply to the Horizon 20:20 programme”.*

This point is supported from quotes given in the British Councils Global Education Debate:

*“I would actually blame it (lack of UK research in HK) on the RAE (Research Assessment Exercise) system – the British system in which the professors are only attuned to gaining grants from the government and it’s only based on publication. There’s not enough emphasis on the commercial application.”*

*“The focus of the funding in academia prioritises academic merits and the*

*theoretical over the practical.”*

GED (2015).

* 1. Most of the UK academics who had established research collaborations did so because of previous personal contacts or experience of studying and working in Hong Kong and were not aware of the services offered by the British Council in Hong Kong such as provision of local intelligence and organising meetings .Some of those interviewed requested that the British Council become more active and offer funding streams especially for speculative visits

*“set up funding schemes like the Newton fund”*

There was criticism of the British Councils as academics perceived the British Council as somewhat elitist and concerned more with politics than funding projects.

*“The British Council is not close to funding opportunities - very top down”.*

* 1. From the interview with Dr Armour of the UGC in Hong Kong it emerges that Hong Kong might not have a mind-set which values research and as such are unlikely to engage in collaborative projects. He also made some additional points notably that:
		1. HK has very little manufacturing, so there are few opportunities for product research in the territory.
		2. Cross-border financing of university research projects is not possible. UGC funds have to be spent in HK, and cannot be spent in the mainland of China. The same applies for mainland universities with mainland sourced funds. This is another reason why HK universities set up campuses on the mainland, so they can access that funding.
		3. In assessing the impact of research, a broader approach than economic return is considered which might act to devalue applied research.
	2. There seems a profusion of agencies operating to foster relations between UK academics and Hong Kong. However, these primarily operate at a high academic level in UK universities rather than by obtaining active participation by researchers especially early career researchers. At the high level the feeling was that the focus is on undergraduate and postgraduate student exchanges between academic institutions and franchising teaching to Hong Kong rather than on promoting research.

**Recommendations**

1. Increase incentives for UK academics to work with Hong Kong Industry.
2. Exploration of the barriers as to why the various collaborations are not more common is needed. This will allow a deeper and systematic understanding of the specific issues as to why collaborations are not more prevalent. This in turn will guide efforts to encourage more collaboration.
3. Offer sources of funding so that UK academics have an alternative to national research councils and the European Union.
4. Centralise and simplify understanding of the various funding sources available from the various agencies in UK and HK, so that there is ready understanding of all eligible financial support. At present, information is very fragmented and difficult to obtain; and it is difficult to evaluate eligibility.
5. The British Council needs to be more proactive in introducing UK academics to Hong Kong Industry. Perhaps technology can play a part. For example, an online platform could be developed facilitating the match-making of experts/research teams to projects seeking expertise. The present ecosystem leaves a lot to chance meetings in person by interested individuals.
6. Given the greater volume of activity in the social sciences, the British Council should not forget this and support for the social sciences should be assured.
7. Agencies promoting links between Hong Kong and UK academics should consider trying to get more participation from lower level academics especially, early career researchers.

**References**

2015 Policy Address, (2015). The 2015 Policy Address, <http://www.policyaddress.gov.hk/2015/eng/pdf/PA2015.pdf>, [Accessed June 2015].

Bennell, P. and Pearce, T., (2003). The internationalisation of higher education: exporting education to developing and transitional economies, International journal of Educational Development, 23 (2): 215-232.

Berger, S., and R. Lester, (1997). *Made by Hong Kong,* Hong Kong: Oxford University Press.

British Council (2015). British Council Services for Education Marketing, <https://siem.britishcouncil.org/>, [Accessed 20th June 2015].

Census and Statistics Department, (2013). Hong Kong as a Knowledge-based Economy A Statistical Perspective, HKSAR Government.

Cornell University, INSEAD, and WIPO (2014): The Global Innovation Index 2014: The Human Factor In innovation, Fontainebleau, Ithaca, and Geneva, <https://www.globalinnovationindex.org/content.aspx?page=GII-Home>, [Accessed May 2015].

GED (2015). Global Education Dialogues Research, Government Policy and the Commercialisation of Research Summary Paper, British Council, [www.britishcouncil.org.au](http://www.britishcouncil.org.au)

Global innovation Index 2014: the human factor in innovation <http://www.globalinnovationindex.org/content.aspx?page=gii-full-report-2014#pdfopener> [Accessed May 2015].

HKTDC Research, (2015). Research, <http://research.hktdc.com/>, [Accessed 20th June 2015].

Hong Kong Labour Department, (2015). Hong Kong: The facts, Hong Kong Special Administrative Region Government http://www.labour.gov.hk GovHK Website: [Accessed 2nd June 2015].

Humphreys, P. K., Shiu, W. K. and Chan, F. T. S., (201). Collaborative buyer-supplier relationships in Hong Kong manufacturing firms, Supply Chain Management: An International Journal, 6 (4): 152 – 162.

Information Services Department, (2015). Education Bureau Home Page address: http://www.edb.gov.hk Hong Kong Special Administrative Region Government Vocational Training Council Home Page address: http://www.vtc.edu.hk GovHK Website: http://www.gov.hk, [Accessed 10th June 2015]

Liu, H. and Jiang, Y., (2001). Technology transfer from higher education institutions to industry in China: nature and implications, Technovation, 21 (3):175-188.

Mowery, D., (2014). Hong Kong Innovations Project Report No. 1, Haas School of business, University of California, Berkley & NIBER

Muller, E., (2001). Innovation Interaction between Knowledge-Intensive Business Services and Small-and-Medium-sized Enterprises—Analysis in Terms of Evolution, Knowledge and Territories. Physcia, Heidelberg.

Patchell, J. and Eastham, T., (2003). Governance for university-industry collaboration in Hong Kong, 42-68 in Economic Geography of Higher Education edited by Rutten, R., Boekema, F. and Kuijpers, E., published by Routledge, London.

Poon, P. S. and Chan, K. S., (2007). University - Industry Technology Transfer in Hong Kong, International Journal of Learning and Change, 2 (1): 109-125.

Rothwell, R., Dodgson, M., (1991). External linkages and innovation in small and medium-sized enterprises. R&D Management 2: 125–137.

Sharif, N. and Baark, E., (2008). Mobilizing technology transfer from university to industry. The experience of Hong Kong universities, Journal of technology Management in China, 3 (1): 47-65.

sUAS News, (2015). Why drone maker picked Shenzhen over HK, <http://www.suasnews.com/2015/04/35119/why-drone-maker-picked-shenzhen-over-hk/>, [Accessed June 2015].

THE (2015). World University Rankings, Times Higher Education, <https://www.timeshighereducation.co.uk/world-university-rankings/>, [Accessed 31st May 2015].

The Hon Martin Liao, (2015). **LCQ1: Measures to enhance competitiveness of Hong Kong, Press release,** <http://www.cedb.gov.hk/ctb/eng/press/2015/pr25022015.htm>**, [Accessed 1st June 2015].**

Williams, D., (2015). The best of both worlds: A guide to university-business collaboration, CBI employment and skills*,* Middlesex University, [www.cbi.org.uk](http://www.cbi.org.uk)

Witty, A, Sir (2013). https://www.gov.uk/government/uploads/system/uploads/attachment\_data/

file/249720/bis-13-1241-encouraging-a-british-invention-revolution-andrew-wittyreview-

R1.pdf

Yam, R. C., Lo, W., Tang, E, P. Y. and Lau, A. W. (2011). Analysis of sources of innovation, technological innovation capabilities, and performance: An empirical study of Hong Kong manufacturing industries, Research Policy, 40: 391-402.

Yu, T. F. L. (1998). Adaptive entrepreneurship and the economic development of Hong Kong, World Development, 26 (5): 897-911.

**Appendix 1: Examples of Funding Collaborative Projects between Hong Kong and Scotland**

**Table A1.1: Hong Kong – Scotland Partners of Post Doctoral Research 2013/4 (source:** <http://www.gov.hk/en/about/abouthk/factsheets/docs/technology.pdf>)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Project No.** | **Name / Institution** | **Approved Length of Fellowship** | **Host Institution** | **Research Area** | **Award** |
| S-HKUST601/13 | Dr Ryan Tsz Kin Kwok | 6 months | The University of Strathclyde | Healthcare and life sciences | HK$62,500 |
| The Hong Kong University of Science and Technology |
| S-HKU701/13 | Dr Daniel Yet Fhang Lo | 7 months | University of Aberdeen | Economics and finance | HK$72,917 |
| The University of Hong Kong |
| S-HKU702/13 | Dr Subin Liao | 6 months | The University of Edinburgh | Healthcare and life sciences | HK$62,500 |
| The University of Hong Kong |

**Table A1.2: Recent Scottish Funding Council/RGC Joint Research Scheme 2014/15 (Source:  <http://www.ugc.edu.hk/eng/rgc/result/hksppdr/hksppdr1314.htm>)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **RGC Project No.** | **Project Title** | **Field of Research** | **HK Principal Investigator / Institution** | **Scottish Principal Investigator / Institution** | **Project Duration (month)** | **RGC Project Grant** | **SFC Funding** |
| **(HK$)** | **(£)** |
| X-CityU105/14 | MESO-ENERGY: Mesoscience for Energy Materials | Energy | Dr Michael Kwok Hi Leung / CityU | Dr Jin Xuan / Heriot-Watt University | 12 | 94,000 | 10,000 |
| X-CUHK404/14 | Laterality and neurodevelopmental disorders | Life Science | Prof Catherine McBride / CUHK | Dr Silvia Paracchini / School of Medicine, University of St. Andrews | 12 | 118,000 | 10,000 |
| X-PolyU501/14 | Development of Nanostructured Solid Oxide Cell for Steam-carbon Dioxide Co-electrolysis | Energy | Dr Meng Ni / PolyU | Prof John Thomas Sir Irvine / University of St. Andrews | 12 | 125,000 | 10,000 |
| X-HKUST601/14 | The impact of marine renewable energy devices on marine environment | Energy | Dr Limin Zhang / HKUST | Dr Yakun Guo / University of Aberdeen | 12 | 125,000 | 10,000 |
| X-HKUST602/14 | Application of an ion-sensitive microprobe to investigate and compare the contribution to homeostatic Ca2+ regulation by the scales of diadromous sea trout (Salmo trutta) and freshwater zebrafish (Danio rerio) | Life Science | Prof Andrew Leitch Miller / HKUST | Dr Chevonne Hazel Angus / University of the Highlands and Islands | 12 | 120,060 | 10,000 |
| X-HKUST603/14 | 3D graphene-nanotube hybrid for charge storage | Energy | Prof Zhengtang Luo / HKUST | Dr Paul Alexander Connor / University of St Andrews | 12 | 125,000 | 10,000 |
| X-HKU701/14 | Advancing cell-based therapies for Parkinson's through Surfaceome Analyses | Life Science | Prof Kenneth Richard Boheler / HKU | Dr Tilo Kunath / University of Edinburgh | 12 | 125,000 | 10,000 |
| X-HKU702/14 | In vivo delivery and expression of shRNA targeting SK1 and SK2 by Salmonella to tumours | Life Science | Prof Jiandong Huang / HKU | Prof Nigel Pyne / University of Strathclyde | 12 | 125,000 | 10,000 |
| X-HKU704/14 | Biomineralization response of shellfish to global change: biomaterial aspects and applications | Life Science | Dr Thiyagarajan Vengatesen / HKU | Prof Maggie Cusack / University of Glasgow | 12 | 125,000 | 10,000 |
| X-HKU708/14 | Single-cell transcriptomics in Sertoli cells and neural crest cells | Life Science | Dr Chi Hang Martin Cheung / HKU | Dr Ryohei Sekido / University of Aberdeen | 12 | 125,000 | 10,000 |
| X-HKU710/14 | Development of novel electrochemical cells for high-efficiency conversion of carbon dioxide to carbon monoxide fuel | Energy | Prof Yiu Cheong Leung / HKU | Prof Mercedes Maroto-Vato / Heriot Watt University | 12 | 125,000 | 10,000 |
| X-HKU711/14 | Carbon Emission Modelling of Energy Systems for Retrofit Office Buildings | Energy | Dr Wei Pan / HKU | Dr Xi Liang / University of Edinburgh | 12 | 124,200 | 10,000 |
|  | Total: | 1,456,260 | 120,000 |

Appendix 2: Examples of ESRC/RGC Joint Research Scheme

**Table A2.1: ESRC/RGC joint funded research projects - fifth round funding (source:** [**http://www.ugc.edu.hk/eng/rgc/result/other/sfc1415.htm**](http://www.ugc.edu.hk/eng/rgc/result/other/sfc1415.htm)**)**



**Appendix 3: Contacts**

|  |  |
| --- | --- |
| **Contact** | **Organisation** |
| Tamarin Adshed | High Value Manufacturing Catapult |
| Anna Angus-Smyth | EPSRC |
| Amanda Baxendale | Head of Knowledge Transfer University of Derby |
| Katherine Benson | University of Oxford |
| Dr Carol Crean | University of Surrey |
| Tom Hockaday | Managing Director of Isis |
| Professor K Li | Queen's University Belfast |
| Professor W Luk | Imperial College |
| Professor Brian Mace | EU and International Innovation Policy Manager, Department for Business, Innovation and Skills  |
| Professor Paul Mawby | University of Warwick |
| Nick Rousseau | EU and International Innovation Policy Manager, Department for Business, Innovation and Skills  |
| Barrie Shepherd | University of Strathclyde |
| Debbie Shields | Royal Society |
| Sue Smart | EPSRC |
| Professor Andrew Smith | University of Nottingham |
| Dr Wanqing Tu |  Robert Gordon's University |
| Professor Nick Veck | Satellite Applications Catapult |

|  |  |
| --- | --- |
|  |  |
| **Name** | **Organisation** |
| Dr Richard Armour  | UGC |
| Prof Johnny Chan | City U |
| Paulina Chan | Global Mutual  |
| Mark Clift | Cyberport |
| Andrew Davis | InvestHK |
| Jim Dick  | Johnson Electric  |
| Emily Ferrary/Jessie Yip | BritCham – ITC and Edu  |
| Robert Gibson  | HKUST |
| Jo Hawley/Heidi Cheung | UKTI  |
| Dr Stephen Ho |   |
| Stephen Lam/Daisy Cheung | HKSTP |
| Alison Lloyd | PolyU – Business school  |
| Wynne Kam/Stephen Williams | University of Warwick |
| Sandy Kennedy | Saltire Foundation  |
| C C Ngan  | CLP Research Institute |
| Dr King Pang | VTech |
| Dr Alfred Tan | HK Baptist Uni |
| Dr Joseph Tsui | lighting |
| Gray Williams | Swire Marine Institute |
| Jeremy Woodall | University of Oxford |
| Janet Wong/David Loo | ITC |
| Yan-Yan Yip | Civic Exchange |
| Shirley Yuen  | HKGCC |