BRITISH COUNCIL

GED Global Education Dialogues

# GLOBAL EDUCATION DIALOGUES RESEARCH

## HONG KONG
RESEARCH REPORT

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This research was commissioned as part of the British Council's Global Education Dialogue, From Catapults to Commercialisation: How can universities use their knowledge and research more effectively?

9, 10 March 2015, The Crawford School of Public Policy, Australian National University.

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**DISCLAIMER**

*"In general, Hong Kong is in the development stage in terms of university research being spun out. There have been pockets of success but it's an emerging trend. It doesn't compare with the UK – for example, Cambridge or Imperial or Oxford where's there's already an established ecosystem."*

***Interviewee***

# Key Features

Note: While Hong Kong is a Special Administrative Region of the People's Republic of China, in this report, it has been referred to as a 'country' for the purposes of comparison with Brazil, South Korea, the United Kingdom and other relevant countries.

### Research Spending

- Research spending in Hong Kong is very low relative to the OECD median, but it has grown over the last decade.
- 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.
- 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.

### Commercialisation of Research Ecosystem

- Hong Kong's research commercialisation ecosystem tends to be characterised as nascent, at best.
- Government funding to support the ecosystem has been limited.
- 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 are moves afoot to develop the ecosystem, with HK's Chief Executive putting his weight behind a new Innovation and Technology Bureau to drive the commercialisation of research.

### Supply Side

- Hong Kong has a number of highly ranked universities and world-class researchers, but there has been little incentivisation of academics to push their research out.
- The sector has limited experience in how to effectively engage with industry and, in turn, commercialise its research.

### Demand Side

- The local external environment has only minimal experience of using Hong Kong universities' output.
- As mentioned, Hong Kong's predominantly service-oriented economy has had little need for traditional R&D outputs of universities.
- While there are substantial levels of investment funds in Hong Kong, they have had little appetite or interest in helping commercialise research produced by the universities for many reasons, including the typically longer-term nature of the investment, the lack of any real need (the economy is service oriented) and the potentially larger opportunities in other markets.

## Policy

- Funding of research commercialisation activities is relatively straightforward:
  - The Research Grants Council (RGC) funds academic-related research based on traditional criteria, including a very small component that goes towards knowledge transfer; and
  - The Innovation Technology Council funds schemes to get the research out of the university and commercialised.
- The Science Park provides facilities and also incubator services, however, its effectiveness/impact to date has been queried.
- While there does not appear to be a government agenda to build industries within Hong Kong on the back of the commercialisation of research, there is a hope/expectation that employment opportunities will come from being the creators/business people.

## Key Talking Points

- Could Hong Kong establish itself as a commercialisation hub or a base for applied research activities? A place where ideas are generated and developed but then prototyped/manufactured elsewhere (i.e. on the Mainland)?
- What other opportunities does Hong Kong's proximity to China present in terms of the commercialisation of research?
- What opportunities could this, in turn, present for other countries?
- Does Hong Kong even really need to commercialise its research given the successful performance of its economy?
- Given the high value of venture capital circulating in Hong Kong, how can the different timelines of investors and universities be better matched?
- To what extent should government be taking a more interventionist approach in terms of research commercialisation?

# Table of Contents



## List of Figures

# 1 Introduction

## Background of this research project

In December 2014, the British Council (BC) engaged EduWorld to conduct a research project with the following objective:

- **To examine how national policies, as a sub-set of national pre-conditions, affect commercialisation outputs of research.**

This was to support the British Council's Global Education Dialogue (GED), a high-level discussion between higher education professionals and policymakers from Australia, the UK and the East Asia Region, held in Canberra, Australia in March 2015.

The Council identified four regions[1] on which to focus: the **United Kingdom** (primarily England and, to a lesser extent, Scotland), **South Korea**, **Brazil** and **Hong Kong**, each of which is actively looking at the commercialisation outputs of research, albeit at very different stages of development and, of course, within a different set of national conditions.

Following an initial consultation involving interviews with senior stakeholders in universities in the UK and Australia to direct and refine the focus of the research in line with the objectives of the GED, the research comprised two components conducted concurrently over the 10 weeks of the project.

1. Primary research in the form of in-depth interviews with between five and eight stakeholders in each of the four countries.[2]
2. Secondary research, namely a review of a wide range of publications from many sources including government departments, parliamentary reviews, universities, funding agencies, non-government organisations, businesses, consultancies and media relating to the commercialisation of research.

This report focuses on the findings in relation to Hong Kong.

Hong Kong does not have a long history of significant research activity and funding and, in turn, commercialisation. Consequently, while there is a body of literature about this subject, it is limited compared to that available on the other three countries we reviewed. In addition, Hong Kong is a much smaller country with significantly fewer universities than the other countries reviewed. (While Hong Kong is a Special Administrative Region of the People's Republic of China, in this report, it has been referred to as a 'country' for the purposes of comparison with Brazil, South Korea, the United Kingdom and other relevant countries.)

For the objectives of this paper, we have tried to synthesise the most appropriate documents and data to inform the audience and stimulate discussion. To achieve this, we have reviewed a wide range of publications from sources including government ministries, the OECD, universities, funding bodies, non-government organisations, businesses, consultancies and media. A full bibliography is provided at Appendix 1 of this report.

[1] While Hong Kong is a Special Administrative Region of the People's Republic of China, it is referred to as a 'country' in this report for the purposes of comparison with the relevant countries.
[2] A list of the job titles and organisations of participants is provided within this report. Participants were assured that their names would not be used and that any comments would not be attributed to individuals.

To supplement the secondary research, we undertook primary research comprising interviews with key senior stakeholders involved in the commercialisation of research in Hong Kong. We would like to thank the interviewees for their time, insightful input and their recommendations of other relevant individuals for us to interview and/or suggestions regarding sources of further information.

This report is in three sections.

- The first section provides information about Hong Kong's performance in the latest Global Innovation Index.

- In the next section, we provide our overview of the Hong Kong Government's policies relating to the commercialisation of research, including an overview of the government's strategy in this area. We then outline some of the key funding schemes relating to the commercialisation of research.

- The final section is built around the more subjective findings of our primary research where we have included the interviewees' opinions and insights, together with additional relevant content from our literature review.

## Report Limitations

EduWorld has taken all reasonable care in researching and preparing this report. EduWorld has necessarily had to rely and base its opinions upon various external third party data and information sources when preparing this report and reaching the opinions, views and assumptions expressed in this report.

To the extent that such reliance on third party source data and information has occurred, EduWorld has assumed the accuracy, reasonableness and reliability of the source data and information without independent verification.

While at the date of this report, EduWorld is not aware of any reason why any of the third party source data and information referred to or used in this report is not accurate, reasonable or reliable for the purposes for which this report has been prepared, EduWorld does not and is unable to represent that such third party information and data is accurate, reasonable or reliable and the report is released upon this basis.

# 2 Hong Kong and the Global Innovation Index (GII)

The Global Innovation Index (GII)[3] recognises the key role of innovation as a driver of economic growth and well-being. It aims to capture the multi-dimensional facets of innovation to be applicable to developed and emerging economies alike. In doing so, it sets out to help policymakers and business leaders move beyond one-dimensional innovation metrics towards a more holistic analysis of innovation drivers and outcomes. The following table summarises some key relevant indicators taken from the GII for Hong Kong.

**Figure 1: Hong Kong GII Key Indicators 2013 and 2014**

| Hong Kong Statistics | | | | |
|---|---|---|---|---|
| **Key Indicators** | | | | |
| Population (millions) | **7.2** | | | |
| GDP (US$ billions) | **273.7** | | | |
| GDP per capita, PPP$ | **52,772** | | | |
| | **2014** | | **2013** | |
| **GII Indicator** | **Value or score (0 - 100)** | **GII Rank** | **Value or score (0 - 100)** | **GII Rank** |
| Global Innovation Index (out of 143) | **56.8** | **10** | 59.4 | 7 |
| Researchers, headcounts/mn pop | 3,471.2 | 29 | 3,293 | 26 |
| Gross expenditure on R&D, % GDP | 0.7 | 45 | 0.8 | 40 |
| GERD performed by business, % GDP | 0.3 | 42 | 0.3 | 38 |
| GERD financed by business, % | 43.3 | 42 | 45.8 | 28 |
| University/industry collaboration^ | 64.0 | 20 | 64.1 | 23 |
| GERD financed by abroad, % | 4.9 | 63 | 6.1 | 54 |

Hong Kong sits in 10th spot in the 2014 GII ranking, a small decline from its 2013 ranking.

Some of the key indicators contributing to the GII, reported here because of their salience to the commercialisation of research, have declined somewhat between 2013 and 2014, most notably:

- Gross expenditure on R&D (GERD), from 0.8 per cent to 0.7 per cent;
- Percentage of GERD financed by business, from 45.8 per cent to 43.3 per cent; and
- Percentage of GERD from abroad, from 6.1 per cent to 4.9 per cent.

At the same time, the number of researchers per million population did increase slightly.

Looking beyond the GII indicators selected above (chosen because of their direct relevance to the commercialisation of research), we find that in the 2014 GII, Hong Kong tops the index in a number of areas: ranked number one for infrastructure (ICT access); foreign direct investment inflows as a percentage of GDP; and the rate of new business creation.

[3] The Global Innovation Index 2014: The Human Factor in Innovation is the result of collaboration between Cornell University, INSEAD, and the World Intellectual Property Organisation (WIPO) as co-publishers, and their knowledge partners.

# 3 Hong Kong Background

## 3.1 Country Overview

Hong Kong, the former British colony, became a Special Administrative Region (SAR) of China in 1997, when Britain's 99-year lease of the New Territories, north of Hong Kong Island, expired.

Hong Kong is governed under the principle of 'One Country, Two Systems', under which China has agreed to give the SAR a high degree of autonomy and to preserve its economic and social systems for 50 years from the date of the handover.[4]

Hong Kong's constitution, the Basic Law, provides for the development of democratic processes. However, Beijing can veto changes to the political system and pro-democracy forces have been frustrated by what they see as the slow pace of political reform.[5]

Hong Kong's has, what is characterised as, an open economy that has moved away from manufacturing and is now predominantly services-based. Hong Kong has emerged as a major corporate and banking centre, as well as a conduit for China's burgeoning exports. Its deepwater port is one of the world's busiest.

Testament to its importance within the region, as of 2014, there were 1,389 foreign corporations whose regional headquarters were located in Hong Kong.[6]

Today Hong Kong is one of the most globally connected economies with free trade, and free flow of information and capital, as well as unrestricted access to the territory. In 2012, the value of Hong Kong's total merchandise trade was more than triple the value of GDP.

Apart from trade in goods, as mentioned, Hong Kong also has a large trade in services. In 2012, the value of exports and imports of services amounted to HK$997.9 billion and HK$448.1 billion respectively. The percentage of trade in services to GDP stood at 70.8 per cent.[7]

Hong Kong today is one of the world's leading international financial centres. It ranks 10$^{th}$ according to the GII and even higher in other world rankings, e.g. 7$^{th}$ in the Global Competitiveness Report in 2014–15, reflecting universal acknowledgement of Hong Kong as a leader in innovation and technology.[8]

However, Hong Kong does not have a long history of significant research activity and funding. Consequently, it is not surprising that many of the demonstrable impacts of the creation of new knowledge have not been widely reported and, therefore, largely go unnoticed by society in general. Increasing public awareness about this is in an issue the government is aware of and addressing.[9]

[4] Hong Kong Profile: BBC, http://www.bbc.co.uk/news/world-asia-pacific-16517764
[5] *ibid*
[6] Census and Statistics Department, HKSAR (2013), Hong Kong
[7] Census and Statistics Department, HKSAR (2013), Hong Kong as a Knowledge-based Economy A Statistical Perspective
[8] 'Innovation and Technology Bureau vital for Hong Kong', *China Daily* 23 January 2015, http://www.chinadaily.com.cn/Hong Kongedition/2015-01/23/content_19382649.htm
[9] Hong Kong University Grants Committee (2013), Research and Knowledge Transfer in *Annual Report 2012–2013*, http://www.ugc.edu.hk/eng/ugc/publication/report/AnnualRpt_2012-13.htm

## 3.2 Research Spending

- Hong Kong's gross domestic expenditure on R&D (GERD) increased from HK$7.1 billion[10] in 2001 to HK$15.6 billion in 2013, an average annual growth of 7 per cent.[11]

- GERD as a ratio to GDP increased from 0.54 per cent in 2001 to 0.73 per cent in 2013. However, this is still very low by OECD standards, which in 2013 was 2.4 per cent across the OECD countries.[12]

- The number of R&D personnel has more than doubled over the same period (2001–2013)[13] and now stands at 26,045.[14]

- There is a growing propensity for businesses to invest in R&D, with R&D expenditure performed in the business sector at 44 per cent of GERD in 2011 (markedly up from 29 per cent in 2001).[15] That said, this is still considerably lower than across other OECD countries where in the same year across the OECD member countries, the figure for business investment was closer to 70 per cent.[16]

- According to a survey by the Census and Statistics Department, there were 4,499 Hong Kong companies involved in R&D activities in 2012. Total R&D expenditure in the business sector amounted to US$852 million, up 7.3 per cent compared to the preceding year.[17]

The HK Census and Statistics Department reports that as Hong Kong is predominantly a service-oriented economy, business establishments have been keen to carry out various other **innovation activities** that are not directly related to R&D, but are still conducive to enhancing business performance. Of all business establishments in 2011, more than a fifth (22 per cent) had undertaken one or more types of innovation activities, as defined by the Census and Statistics Department below.

Broadly speaking, innovation activities include: all scientific, technological, organisational and commercial steps which lead to the implementation of innovations. There are essentially four types of innovation: product innovation, process innovation, organisational innovation and marketing innovation. The first two categories relate to the development of new or significantly improved products and processes and are collectively referred to as technological innovation (TI).

- **Technological innovation** covers not only research and development (R&D) activities but also activities required for implementation and commercialisation of R&D output into products of commercial values and practical production and delivery processes to be adopted by business establishments.

[10] At current rates, on 14 February 2015, US$1 is equivalent to HK$6.24
[11] CY Leung (2015) http://www.policyaddress.gov.Hong Kong/2015/eng/p41.html
[12] OECD (2015), Gross domestic spending on R&D (indicator). doi: 10.1787/d8b068b4-en
[13] CY Leung, *Op. Cit.*
[14] Science and Technology Indicators, http://www.censtatd.gov.hk/hkstat/sub/so120.jsp
[15] Census and Statistics Department, 2013, *Op. Cit.*
[16] http://www.oecd-ilibrary.org/sites/sti_scoreboard-2011-en/02/05/index.html?itemId=/content/chapter/sti_scoreboard-2011-16-en
[17] http://hong-kong-economy-research.Hong Kongtdc.com/business-news/article/Hong-Kong-Industry-Profiles/Technology-Industry-in-Hong-Kong/Hong Kongip/en/1/1X000000/1X09U6YK.htm#sthash.3ZsxDlNc.dpuf

- **Organisational innovation** covers change in organisational structure, implementation of new corporate strategy, use of advanced management techniques, etc..
- **Marketing innovation** covers change in aesthetic appearance of products, adoption of different marketing strategies, etc. These are collectively referred to as non-technological innovation.[18]

Official reporting indicates growth in these types of innovation activities, with total innovation expenditure of the business sector growing to US $2.0 billion in 2012, up 6.4 per cent on the previous year, with a total of 7,360 companies engaging in such activities.[19]

## 3.3 Hong Kong's Government Strategy

The Hong Kong Government has traditionally played a mostly passive role in the economy, with little by way of industrial policy and almost no import or export controls. Market forces and the private sector were allowed to determine Hong Kong's development. Under the official policy of "positive non-interventionism", Hong Kong is often cited as an example of *laissez-faire* capitalism. In the context of this environment, the issue of the extent to which the Hong Kong Government can, and should, make decisions about how to direct funding to support the commercialisation of research is of particular interest. Indeed, there have been objections to the interference in the market that the activities of a body such as the proposed Information and Technology Bureau (explored later in this report) might undertake, on the basis that it is contrary to Hong Kong's *laissez-faire* approach.[20]

However, recently the government appears to be taking a more proactive role to further develop an innovative economy and support innovation and technological development.

### Policy Address

Hong Kong's Chief Executive, CY Leung, has taken an active interest in the opportunities for Hong Kong to take advantage of its standing as an innovative economy and to further develop innovation and technology within the Special Administrative Region. His most recent policy address included a separate section on Innovation and Technology.[21]

The policy address outlined a strategic environment for innovation and technology development through five core strategies.

1. Providing world-class technology infrastructure for enterprises, research institutions and universities.
2. Offering financial support to stakeholders in the industry, academia and research sector to commercialise their R&D deliverables.
3. Nurturing talent.
4. Strengthening collaboration with the Mainland and other places in science and technology.
5. Fostering a vibrant culture of innovation.

[18] Census and Statistics Department, 2013, *Op. Cit.*
[19] HKTDC, Technology Industry in Hong Kong, http://hong-kong-economy-research.hktdc.com/business-news/article/Hong-Kong-Industry-Profiles/Technology-Industry-in-Hong-Kong/hkip/en/1/1X000000/1X09U6YK.htm
[20] Leung, *Op. Cit.*
[21] Census and Statistics Department, *Op. Cit.*

The policy address included sections on the government's current core strategies to increase innovation within the SAR: in particular **the Science Park** and the **Innovation Technology Fund or ITF** (both explored later in this report).

The policy address also referred to the 16 Partner State Key Laboratories in Hong Kong, covering a spectrum of scientific and technological disciplines. It stated that the first round of applications for Hong Kong branches of Chinese National Engineering Research Centres to invite participation of universities and research centres in Hong Kong had commenced.

## 3.4 Hong Kong Universities

Hong Kong has 17 degree-awarding higher education institutions, of which eight are publicly funded. All eight public universities in Hong Kong use English as the medium of instruction for the majority of courses.

In the 2013/14 QS World University Rankings, Hong Kong has three universities in the top 50 – the University of Hong Kong, ranked 26th in the world, Hong Kong University of Science and Technology (HKUST) in 34th place and the Chinese University of Hong Kong in 39th place. Further exploration of these rankings by subject area shows that engineering and technology is a particularly strong discipline area for many universities in Hong Kong. In the 2014 edition, the University of Hong Kong is ranked 10th in the world for civil engineering, while HKUST places 11th for both electrical engineering and computer science.[22]

## 3.5 Government Schemes to Support Commercialisation

There are two key sources of funding in Hong Kong for schemes that work to commercialise research:

- **The Innovation and Technology Fund (ITF)** – supports applied R&D and promotes technology transfer and commercialisation activities.
- **The Research Grants Council (RGC)** – which primarily supports basic research.

Information about both is provided below.

### 3.5.1 The Innovation and Technology Fund (ITF)

The ITF is administered by the Innovation and Technology Commission (ITC). The fund aims to assist local companies to upgrade their technological level and introduce innovative ideas to their businesses.[23]

The ITF was established in 1999 and supports projects that contribute to the promotion and upgrading of the industries in Hong Kong.

In 2013–14, the majority (64 per cent) of the projects were undertaken by universities, accounting for 50 per cent of funding approved.

[22] QS: Top Universities 2013/14 Top University Rankings
[23] http://www.itf.gov.Hong Kong/l-eng/about.asp

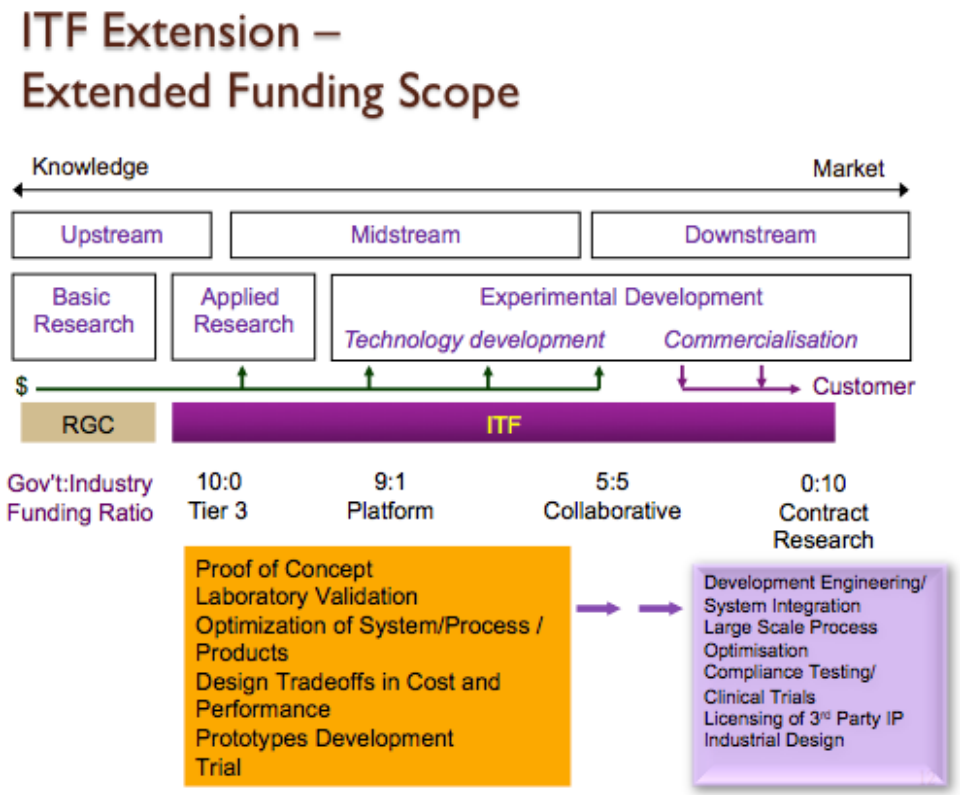
The ITF's stated mission is to spearhead Hong Kong's drive to become a world-class, knowledge-based economy.[24] To this end, ITF aims to:

- Promote and support applied R&D and technology transfer and application;
- Foster an innovation and technology culture in the community and promote technological entrepreneurship;
- Facilitate the provision of infrastructure and development of human resources to support innovation and technology;
- Formulate, develop and implement the government's policies, programmes and measures to promote innovation and technology;
- Promote internationally accepted standards and conformity assessment services to underpin technological development and international trade; and
- Develop high calibre and motivated staff to contribute to Hong Kong's technological advancement.

## Funding scope

The following chart shows the funding scope of the ITF and how it relates to the role of the Research Grants Council (RGC). The scope was extended in 2014 to include the promotion of R&D outcomes in the private sector and more downstream R&D and commercialisation activities.[25]

**Figure 2: ITF Extended Funding Scope**




[24] http://www.itc.gov.Hong Kong/en/welcome.htm
[25] Innovation and Technology Council, 20 June 2014: RGC Town Hall Meeting on Collaborative Research Promoting Applied R&D through the Innovation and Technology Fund, Presentation

## Funding programmes

In summary, the ITF comprises four main funding programmes, which are discussed below:

1. Innovation and Technology Support Programme (ITSP)
2. General Support Programme (GSP)
3. University–Industry Collaboration Programme (UICP)
4. Small Entrepreneur Research Assistance Programme (SERAP).

### 1. Innovation and Technology Support Programme (ITSP)

ITSP supports midstream/downstream research and development (R&D) projects undertaken mainly by universities, R&D centres, industry support organisations, professional bodies and trade and industry associations. ITSP invites applications for funding every six months or so.

The Guangdong–Hong Kong Technology Cooperation Funding Scheme (TCFS), which falls within the ITSP, aims to enhance the level of collaboration on R&D between organisations in Hong Kong and Guangdong Province. Projects funded by the TCFS have to demonstrate an element of Guangdong/Hong Kong cooperation (e.g. collaboration between research institutes and enterprises in Guangdong, Shenzhen and Hong Kong).

### 2. General Support Programme (GSP)

The GSP is a programme under the ITF catering for non-R&D projects contributing to the upgrading and development of the Region's industries as well as fostering an innovation and technology culture in Hong Kong. Projects to be supported under GSP may include conferences, exhibitions, workshops, promotional events, studies and surveys, youth activities, events or projects to support platform building / upgrading of industry, etc. In general, the GSP will not support projects for promotion of products/services of a specific commercial entity. There are two sub-programmes: the GSP Internship Programme and the GSP Patent Application Grant.

### 3. University–Industry Collaboration Programme (UICP)

Of particular relevance to this report, the UICP 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 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.

## 4. Small Entrepreneur Research Assistance Programme (SERAP)

The SERAP is a programme that provides funding support to technology entrepreneurs and small enterprises to carry out research and development on innovation and technology. Funding support is provided on a dollar-for-dollar matching basis. The recipient company will hold all intellectual property rights arising from the project. The funding will be recouped if the project is able to generate revenue or the recipient company is able to attract third-party investment.

The total value of ITF approved funds in 2014 was HK$8,751 million, as illustrated in Figure 3. Interestingly, as highlighted in the table, the funding allocated to the University–Industry Collaboration Programme was the lowest of the four funding allocations.

**Figure 3: Total Value of ITF Approved Funds as of 30/11/14**

| Programme | Approved Projects | Funds Approved HK $ mn |
|---|---|---|
| Innovation & Technology Support Programme | 1,764 | 7,319.3 |
| General Support Programme | 1,844 | 656.5 |
| University – Industry Collaboration Programme | 260 | 295.1 |
| Small Entrepreneur Research Assistance Programme | 398 | 480.7 |
| **Total** | **4,266** | **8,751.6** |

The funding scope of the ITF was expanded in mid-2014, providing stronger support for downstream R&D projects and universities.

In September 2014, the ITC launched a new scheme – the Technology Start-up Support Scheme for Universities – to encourage university students and teaching staff to start their own technology business and commercialise their R&D deliverables.

In his 2015 Policy Address, the Chief Executive[26] proposed to inject HK$5 billion into the ITF and to subsume the Research and Development Cash Rebate Scheme under the fund. He indicated the government would set up an Enterprise Support Scheme to further enhance funding support for R&D projects in the private sector.

### The Research and Development Cash Rebate Scheme

The ITF also manages the Research and Development (R&D) Cash Rebate Scheme, which aims to reinforce the research culture among business enterprises and encourage them to establish stronger partnerships with designated local public research institutions. Under the scheme, a company will receive a cash rebate equivalent to 30 per cent of its expenditure in R&D projects.

[26] Leung, *Op. Cit.*

### 3.5.2 The Research Grants Council (RGC)

**The RGC distributed a total of HK$1,108 million to universities in 2014.**

The other key source of government funding relating to the commercialisation of research in Hong Kong is the Research Grants Council (RGC). Established in 1991, it operates under the aegis of the University Grants Committee (UGC) and functions as an advisory body on research matters within the organisational structure of the committee.

It is a non-statutory advisory body responsible for advising the Government of the HK Special Administrative Region of the People's Republic of China, through the (UGC) on:

- The needs of Hong Kong's higher education institutions in the field of academic research; and
- The distribution of funding for academic research projects undertaken by academic staff of those UGC–funded institutions.

In the year 2012/13, HK$52.8 million was directed to knowledge transfer activities in higher education institutions, split between the Hong Kong institutions as shown in Figure 4.

**Figure 4: Allocation of Knowledge Transfer Recurrent Funding to Institutions 2012/13**

| Institution | Amount (HK $) |
|---|---|
| City University | 5.82 |
| Hong Kong Baptist University | 2.80 |
| Lingnan University | 1.0 |
| Chinese University of Hong Kong | 13.41 |
| Hong Kong Institute of Education | 1.53 |
| Hong Kong Polytechnic University | 7.43 |
| Hong Kong University of Science and Technology | 7.11 |
| Hong Kong University | 13.61 |
| **Total** | **52.8** |

As a natural extension of institutions' teaching and research activities, the UGC indicates that knowledge transfer has become the third core function – the 'third mission' – of Hong Kong's higher education institutions.[27]

The UGC states that it strongly believes that the transfer of knowledge between institutions and the society will help bring about socio-economic impact and improvements to the community and businesses. This, in turn, will help enrich institutions' research mission, thereby enhancing the international competitiveness of the local higher education sector.

It is acknowledged that, given institutions have distinctive roles and missions, and areas of strength, and that they are at different stages of development in knowledge transfer, the strategies of institutions vary in terms of their aims and approaches. However, by and large, it is expected that the funding will be used to build up institutional capacity and to broaden an institution's endeavours in knowledge transfer, specifically on three aspects.[28]

[27] HKUGC, *Op. Cit.*
[28] http://www.ugc.edu.hk/eng/ugc/activity/kt/kt.htm

1. Capacity Building (e.g. dedicated knowledge transfer staff, databases, staff training, internal reach-out, process management).
2. Front-line Knowledge Transfer Activities (e.g. patent filing, publicity, seed or matching funds for bidding by faculties, incubating spin-off companies).
3. Knowledge Generation (e.g. proof-of-concept or other pump-priming funds).

The UGC reports that:

- Knowledge transfer (KT) activities have taken roots in multiple disciplines, including health sciences, arts and humanities and the social sciences, architecture, business and economics, city planning and the environment, science and technology and engineering.

- Funding received by all the institutions has been well used.

- All institutions have now included KT in their mission statements and strategic documents, while academic staff has also manifested a higher degree of commitment to the initiative.

- All institutions have engaged to some degree in consultancy, research contracts and collaborative research, spin-out companies and licensing.

- Institutions have also employed a variety of other mechanisms to particularly cater for KT in the arts, humanities and social sciences. These include the setting up of websites for dissemination of knowledge, organisation of seminars, workshops, conferences, exhibitions and other public events.

- Much of the UGC funding was intended to be used for building institutions' capacity for knowledge transfer and that has indeed been the case with all of them having established or reinforced their knowledge transfer offices for better coordination and promotion.

- There has also been increased recognition of the importance of enterprise and entrepreneurship as an integral element of knowledge transfer. UGC is hopeful that the promotion of entrepreneurship will occur with the new four-year academic structure and students being given more opportunities to work with startups.

- As noted earlier, the history of significant research activity and funding in Hong Kong institutions is comparatively short. Therefore, it is not surprising that many of the demonstrable impacts of the creation of new knowledge have not been widely reported and thus unnoticed by society in general. In order to increase public awareness of the good work that has been done by institutions in this area, the UGC will deploy additional funding to carry out more extensive communication activities in the coming year.

The UGC makes available all universities' submissions on their usage of knowledge transfer funding, further details of which can be found on the UGC's website.[29]

[29] *Ibid.*

**Case Study**
**Hong Kong University of Science and Technology (HKUST)**
**R&D Corporation Ltd (RDC)**

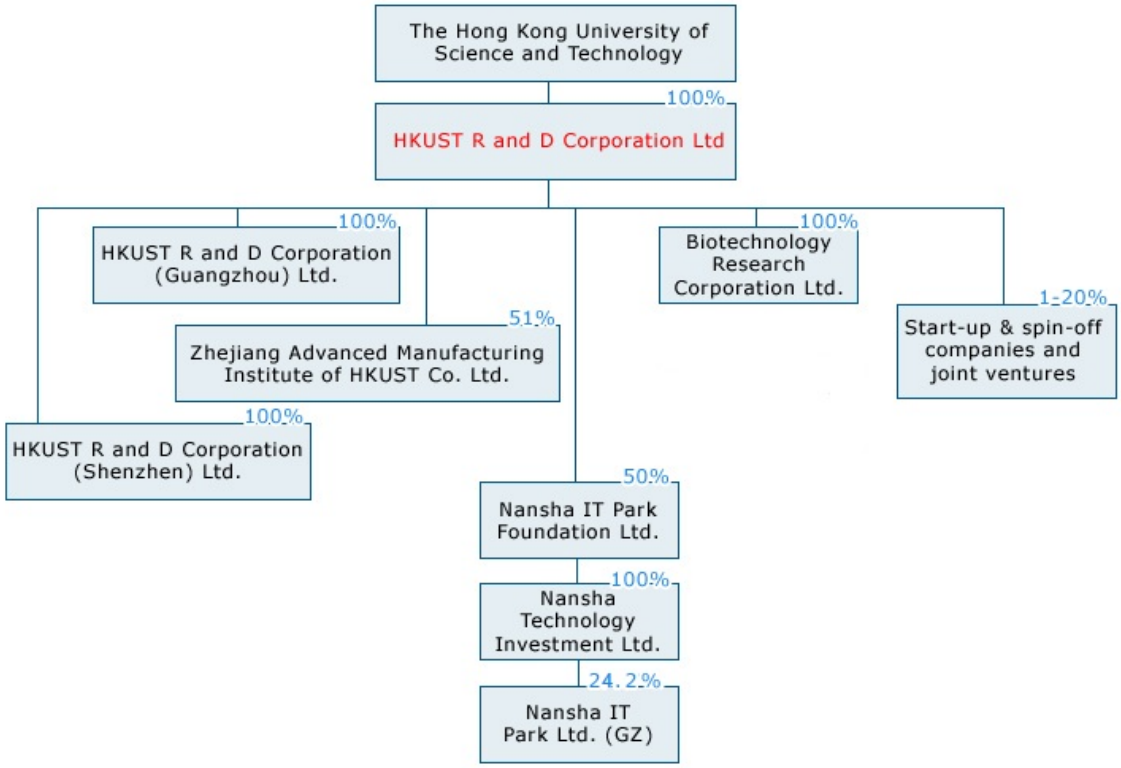
RDC is a wholly owned subsidiary of HKUST. Incorporated in 1992 and designated to serve as the business arm of the university, RDC has the right to commercialise technologies developed by HKUST and utilise the excess capabilities of the university's central facilities. RDC teams up with university department faculties to conduct contract research and consultancy works. Through partnership and technology transfer with industry, the company assists HKUST to achieve that part of its mission which relates to the economic development of Hong Kong and the region.

RDC established an Entrepreneurship Programme in 2000 to support HKUST alumni to start up companies with HKUST technologies.

There are a number of ways that RDC promotes and facilitates the collaboration between the university and industry:

- **Research and Development Services:** RDC leverages the core research strengths of HKUST and teams up with university researchers to provide R&D services for these areas.
- **Research Institutes and Centres:** RDC exploits the capabilities of research institutes and centres at HKUST to conduct multi-disciplinary research in order to promote mission-oriented research in areas critical to Hong Kong and the local region's economy.
- **Central Research Facilities**: By working with RDC in contract research, external researchers and engineers in academia and industry can utilise the expertise and capabilities of the central facilities at HKUST to support R&D activities in their projects. Having a close relationship with the university's research units and facilities, RDC is capable of providing a wide spectrum of research and development services to both the private and public sectors in Hong Kong and the region.
- **Subsidiaries and Joint Ventures** To further develop collaboration and partnerships with the private and public sectors in Hong Kong and the region, RDC has established a number of subsidiaries and joint ventures, and has extended its reach into the Pearl River Delta and beyond. (See Figure 5 below.)

**Figure 5: The Subsidiaries and Joint Venture Models in Place for RDC**




## 3.6 Hong Kong Science and Technology Parks

The Hong Kong Science and Technology Parks are a key component in Hong Kong's strategy to commercialise research. They comprise:

- Hong Kong Science Park;
- InnoCentre; and
- Industrial estates at Tai Po, Tseung Kwan O and Yuen Long.

They are managed by the Hong Kong Science and Technology Parks Corporation (HKSTP), a statutory body dedicated to creating a vibrant **innovation and technology ecosystem** to:

- Connect stakeholders;
- Nurture technology talents;
- Facilitate collaboration; and
- Catalyse innovations to deliver social and economic benefits to Hong Kong and the region.[30]

Established in May 2001, HKSTP has been driving the development of Hong Kong into a regional hub for innovation and growth in several focused clusters including: Electronics, Information Communications Technology (ICT), Green Technology, Biomedical Technology, Materials and Precision Engineering.

[30] http://www.Hong Kongstp.org/en-US/News-Media-Events/Fact-Sheet.aspx#.VNMMXsb7o6k

HKSTP states that it "*enables science and technology companies to nurture ideas, innovate and grow, supported by our R&D facilities, infrastructure, and market-led laboratories and technical centres with professional support services"*. It also offers value added services and comprehensive incubation programmes for technology startups to accelerate their growth.

**Hong Kong Science Park Development Updates (as of January 2015)[31]**

- Phase I and II: occupancy of 94 per cent.
- Phase III: opened in September 2014 and to be completed in batches from early 2014 to 2016.
- 508 companies in the park: 341 local (68 per cent) and 161 overseas (32 per cent) technology companies, with an estimated annual turnover of Hong Kong $211 billion.
- Working population: About 11,545 persons, with 7,646 of these involved in R&D related activities.
- By the time Phase III comes into full operation in 2016, the Science Park will accommodate more than 600 partner companies.

Interestingly a number of universities have companies which are tenants of the park. These include City University, Hong Kong Baptist University and Hong Kong Institute of Education.

### 3.6.1 Incubation Programmes at HKSTP

To help local technology startups and entrepreneurs get through the most vulnerable inception stage of their businesses, the HKSTP offers three incubation programmes to startup tenants at the Science Park.

1. Incu-Tech for new technology start-ups (three years).
2. Incu-Bio for those involved in biotechnology (four years).
3. Incu-App for those focused in web- and smartphone-based apps (18 months).

The incubation programmes provide subsidised office space and financial aid packages, as well as a comprehensive range of support services (business consultancy and full-range supporting services, e.g. legal consulting, marketing and promotion, business and talent matching) for the incubatees during the incubation period. Notably, the HKSTP claims that:

- From 1992 until end-December 2014, there have been 342 technology graduates; of these, 268 (78 per cent) are still in business, with four floated as initial public offerings (IPOs) in Hong Kong. Currently, 171 incubatees are in the programme.
- The programmes have raised over HK$935 million angel/ venture capital.
- The programmes have obtained 772 intellectual properties and 291 technical awards.

[31] *Ibid.*

## 3.7 Other Commercialisation Related Activities

Other sources listed on the HK Government website supporting the commercialisation of research are listed below.

| Initiative | Description |
|---|---|
| Hong Kong ICT Awards | Designed to recognise, promote and commend the excellent achievements of ICT professionals and organisations in Hong Kong, supported by the Office of the Government Chief Information Officer (OGCIO), Hong Kong Productivity Council (HKPC) and Hong Kong Trade Development Council (HKTDC). |
| ICT Industry Portal | Provides timely industry news, trade events information, easy sourcing, marketing tools and global business opportunities for the ICT industry. |
| HKTDC International ICT Expo | Organised by the HKTDC, this expo showcases the newest products and solutions in ICT such as telecommunications, multimedia, the Internet, digitainment, computers and peripherals. |
| HKTDC InnoDesign Tech Expo | Organised by the HKTDC, this expo brings design, brand-management, marketing strategy and applied technology companies together to showcase practical technologies and commercial designs. |
| Innovation and Technology Bureau (ITB) | CY Leung recently announced the 're-initiation' of the Innovation and Technology Bureau (formerly the Technology and Communication Bureau). The proposal was approved by The Hong Kong Legislative Council in October 2014. According to the *South China Morning Post*, the government is seeking approval for HK35 million to set up the ITB and annual funding of about HK$20 million to support its operation. But there have been objections by opposition politicians in the Legislative Council, who feel that the bureau is a waste of money, and will serve to create new political posts for CY Leung's supporters. A resolution to establish the bureau was due to expire by 14 February 2015: funding was not approved and the future for the proposed ITB remains unresolved.[32][33] |

[32] 'Hong Kong Lawmaker Reveals Plan to Kill Time and IT Bureau', *SCMP*, 11 February 2015

[33] At the time of writing, the latest news is that a funding request for the proposed ITB has been 'killed off'. 'Leung Chun-ying hits out at pan-dems after filibuster kills off IT bureau…for now', *South China Morning Post*, 15 February 2015, http://www.scmp.com/news/hong-kong/article/1713600/leung-chun-ying-hits-out-pan-dems-after-filibuster-kills-it-bureau

# 4 Perspectives on Commercialisation of Research in Hong Kong

Numerous stakeholders interact with government to advise and influence on policy affecting business-university collaborations and the commercialisation of research. In our primary research for this project, we spoke with senior stakeholders working in the following organisations and institutions to provide insights into the subject.

- Associate Provost, Knowledge Transfer, Hong Kong University of Science and Technology
- Director, Biotechnology, Innovation and Technology Commission
- Commercial Director, Anakata
- Head, Biotechnology Cluster, Hong Kong Science and Technology Park
- Director, Institute for Entrepreneurship, Hong Kong Polytechnic University
- Managing Consultant, ICF International

We have used the insights gleaned from talking to these industry experts and supplemented them with relevant findings from our literature review to provide an additional perspective on how the process of commercialisation of research is proceeding in Hong Kong. This includes identifying any barriers to commercialisation and some commentary on the impact and effectiveness of government policy in this area.

Throughout this section, we have included verbatim comments from the interviews. We believe that this serves to provide authenticity to our reporting, as well as enabling for a subtlety of meaning that might be lost in summarising the comments. The language used by the articulate and highly experienced respondents who took part in the primary research was not always succinct and there seem to be two main reasons: firstly for some of our interviewees, English is not their first language; and secondly (and even for those respondents who do speak native, fluent English), the enormity of the subject matter and its complexities mean it seemed difficult for them to always provide concise responses.

## 4.1 Overall perspective

The overall perspective of the commercialisation of research in Hong Kong is that, as yet, activities are fairly nascent with:

- Only a small proportion of GDP going towards research;
- Academics having few incentives to take their research beyond their universities;
- No established industry in Hong Kong that is in need of research; and
- Large amounts of investment money passing through Hong Kong, very little of which finds its way into supporting the commercialisation of research.

However, Hong Kong's geo-political distinctiveness, in its 'One Country, Two Systems' relationship with China, offers some very interesting opportunities for the Region to develop into a commercialisation hub.

Former Chairman of the RGC, Roland Chin Tai Hong, has said that Hong Kong is unlikely to move ahead of others in technology research until industry funding increases.[34] "*Our talents are not competitive enough, our size is small, rent is high and our labour cost is high*." He also pointed out that that the majority of research graduates in Hong Kong's universities come from the Mainland.

This comment was echoed in our interviews, with many of our respondents saying that the government had not, to date, taken a sufficiently strong lead in the area of the commercialisation of research.

Government reporting on the topic of Hong Kong's current status is fairly positive, but also acknowledges that there is room for improvement.

> *"Generally, Hong Kong positions well on many of the general characteristics of a Knowledge Based Economy. We have excellent ICT infrastructure and our favourable business environment provides confidence to businesses. Our people are increasingly equipped in terms of knowledge and skills. Nevertheless, there is still room for improvement. We need to strengthen our innovation capacity to fully exploit advanced technologies. To sustain the momentum of economic growth and continued vitality, we need to embrace a culture of continuous learning and improvement both at the individual and the organisational levels."*[35]

Combining these factors, it appears as though there is not yet an established ecosystem to support the commercialisation of research in Hong Kong. However, the Hong Kong Government has indicated its desire to build such a system and is in the process of attempting to upgrade the status of the government entity responsible for technology and innovation.[36]

## 4.2 Supply Side Considerations

### 4.2.1 Academic Reward System

One of the key reasons behind Hong Kong's relatively poor record in the commercialisation of research is perceived to be the reward system for academics, which is characterised by many of our respondents as placing too much emphasis upon the publication of papers and not enough on the impact of research.

> *"The focus of the funding in academia prioritises academic merits and the theoretical over the practical."*

In terms of the organisation and management of its academic structures, Hong Kong is described as tending to follow the British system. Hence, any changes in the way that the UK manages, for example, the funding of its institutions are likely to be echoed in Hong Kong, albeit some time afterwards.

[34] 'Research lacks industry support, expert says', *South China Morning Post,* 7 January 2013
[35] Census and Statistics Department, *Op. Cit.*
[36] As per earlier comments, the future of the proposed ITB remains unclear.

*"I would actually blame it 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 HE assessment cycle, comes from the British initiative – so six years after whatever is practised there, it filters through here."*

Currently, according to our respondents, the appraisal system did not incentivise academics to become involved and form links with business and, in turn, commercialise research.

*"How do you assess people that affects their behaviour? How do you reward people? So far, in the universities, the resources provided by the government is based on only two things – number one is the number of students, which is student quotas [allocated] by the government to the individual universities. That comes in for the bulk of the operating fund. The other one is called research excellence or research performance which has been traditionally based upon your papers published. Nothing will change until you change the performance appraisal of the academics to include knowledge transfer and commercialisation, for their funding but also for promotion."*

*"There's a huge gap in understanding. Academics are smart, they know what they want and they do what they want to do. At the moment, they're not taking the commercialisation aspect too seriously. And there's no penalty for not doing so."*

*"The university professors would still be able to come in, present good project proposals that the [ITF] panel or the assessors would consider or 'This is innovative, let's give it a try'. But at the end of the day, they don't really measure commercialisation as a very stringent requirement of the outcome. So if you have some dissemination to the industry, somebody from industry who is willing to take it up and have a look, that would be wonderful. But if not, then that does not act to its detriment of the research team who were granted with all this Information Technology Fund."*

It was acknowledged by a number of our interviewees that that not all academics would or should, in addition to their academic skills, necessarily have an entrepreneurial vision and/or the entrepreneurial drive, even if they are incentivised to do so.

*"[There is a need to] change the performance appraisal system of the academics so you also put in commercialisation and knowledge transfer as 'brownie points' to get promotion. Of course, you can never make it mandatory because academics by their career are not supposed to be good technicians. If they were good technicians, or professional, they wouldn't become academics. Academics should be allowed the academic freedom, so they can remain creative and innovative: they do not have to pack [direct] every output that they can generate to the economic value of society."*

However, it was highlighted by a number of interviewees that, just because academics might lack these entrepreneurial skills, their ideas should not go to waste. And in the absence of entrepreneurial academics, the challenge is how to actually take these ideas and commercialise them.

*"There are scholastic researchers who are really good at doing their research in the lab and so we don't force them to be an entrepreneurs. But what they do, then at least it should be released to someone who can [commercialise it]."*

Overall, there was perceived to be few linkages or relationships between Hong Kong's researchers, particularly those in the Research Institutes, and the business sector.

*"By and large, the 0.7 per cent research money that's part of the GDP gets circulated around the higher education and some of it goes into the Science Park and the Research Institutes established by the government. But these institutes, by themselves, they do not have very, very solid research connections with the industry."*

There have, reportedly, been moves towards reflecting the new REF framework (Research Excellence Framework described in the report on the UK), and changing the grants structure to include an element that assesses impact. More generally, one of our respondents reported that there is increasing recognition amongst academics to consider their output in terms of more than just citations.

*"We go to conferences and are more aware of impact and reputation. They are starting to realise that their success is being judged on how well they are judged on KT not just academic criteria."*

### 4.2.2 Basic versus Applied Research

As we have seen in other countries, there is a concern in Hong Kong that academics (and institutions) should not lose sight of the types of fundamental research that might drive innovation.

Indeed, respondents spoke highly of the quality of the basic research that is currently generated in Hong Kong's institutions.

One respondent was particularly adamant that the universities should not lose their focus on basic research and that it was up to individuals whether they wanted to pursue the application of their findings.

*"Technology must be based on good science. For this we must have a stable and large source of funding. It is good for the UGC to continue to focus on this basic support of science but some of this science must lead to a practical application and to an interface with the industry. That is why we have the ITF – to fill the gap. Some of them are just not interested in application – they want a Nobel Prize and to stay in a uni. Now, in Hong Kong, the RGC are well positioned to do that and we [the ITC] are trying to establish a seamless connection for the major RGC programmes. They have theme-based programmes – and when they are close to application, they can refer to us. We will take over the later stages."*[37]

[37] The Innovation and Technology Council (ITC) distributes the funding from the Innovation and Technology Fund (ITF)

### 4.2.3 Technology Transfer Officer (TTOs)

The role and effectiveness of TTOs was sometimes queried.

> *"In Hong Kong most, if not all, of the TTOs' [staff], I can bet that none of them have worked in the industry. So how would you expect them to be able to guide the professors in terms of what to do? None of them would have a patent that has been produced to market so how can they advise?"*

### 4.2.4 UGC Funding

While there was some money coming from the UGC to help build commercialisation activities, those more closely involved with Technology Transfer Offices said that it was a pittance compared to their overall budget.

> *"In Hong Kong, UGC is giving a only a bit more beyond lip service – for our operating budget of HK$5bn we received all together from the government HK$11m in knowledge transfer funding."*

## 4.3 Demand Side Considerations

Our literature review combined with the insights provided by our interviewees indicated that there are perceived to be various problems from a demand side, but also potentially some great strengths.

### 4.3.1 Local and Cross-border Absorptive Capacity

Perhaps the greatest distinguishing feature of Hong Kong's current and potential role as a commercialiser of research is its location on the border of Mainland China, right next to one of the world's most intensive manufacturing regions.

Locally, within Hong Kong, we were told, there was very little in the way of manufacturing, instead Hong Kong has tended to rely on using the demand for innovation combined with the manufacturing capacity over the border, in Shenzhen and the rest of the Pearl River Delta.

We understand from our interviews that Hong Kong residents are likely to own up to 60,000 around businesses in the Pearl River Delta.

> *"The interesting thing is that you have a technology in Hong Kong, you partner with a manufacturer in China: you see more and more of those cases – mainly because there is already an industrial partner to do the translation."*

### 4.3.2 Unique Geo-Political Position

Overall, its geo-political position was considered to be a great advantage for Hong Kong in the commercialisation of its research.

> *"I think the clear uniqueness of Hong Kong is that it belongs to China and yet it's not China. We understand the attitude and the atmosphere and the psychology here: 'One Country, Two Systems'. That makes it distinct."*

> *"We are in a lucky situation in that we are close the Mainland and we are also encouraging local researchers to look at technology transfer with the Mainland pharma companies. There's a larger number and many of them are going out to seek and buy projects."*

The suggestion is that, with a coordinated economic development policy and through providing business facilitation, part of the Hong Kong economy could be turned into the kind of commercialisation seen in Silicon Valley, Boston and the 'Research Triangle' of North Carolina.[38]

> *"What Hong Kong technology entrepreneurs really need is improved access to starting and owning technology businesses on the Mainland. That is the bridge to the Mainland that Leung is really seeking. Foreign investment laws should be changed so that Hong Kong permanent residents do not need a Mainland partner and will be considered domestic entities when conducting technology business on the Mainland. This would represent the single most important breakthrough for allowing Hong Kong technologists to flourish."*[39]

Indeed, a number of our respondents referred to the recent news that the Swedish Karolinska Institutet will be establishing a research base in Hong Kong after a US$50 million donation was made by a Hong-Kong based businessman.[40] The Ming Wai Lau Centre for Regenerative Medicine will comprise two nodes, one in Stockholm and one in Hong Kong, allowing scientists from Hong Kong, China and around the world to work together in an independent research environment under the auspices of the Institutet.

More specifically, Hong Kong is also interesting from an intellectual property (IP) perspective, based as it is upon the British conventions in such matters, a system that is for many multinational businesses more familiar and reassuring than its Chinese counterpart.

> *"One of the advantages we enjoy as 'One Country, Two Systems', we follow the British Common Law. We don't follow Chinese Law. It means that you're being protected by a system that is more palatable to the Western countries. On the other hand, because for the IP in China, all applications would only count if executed in Chinese and that's a disadvantage for a lot of outsiders. Here in Hong Kong, with a bilingual system, this sort of legal document putting in place is very common. And because we are kind of China and yet not China, you find a lot [of businesses] can put in a statement where the litigation place can be and they choose Hong Kong."*

[38] Alan Lung (2011) Hong Kong's Innovation and Technology Role in Mainland China's 12th Five Year Plan, Asia Pacific Intellectual Capital Centre Whitepaper #7, March 2011
[39] 'Hong Kong's tech dreams tied to unrestricted mainland access', Peter Guy, *South China Morning Post*, 22 February 2015, http://www.scmp.com/business/economy/article/1721249/hong-kongs-tech-dreams-tied-unrestricted-mainland-access
[40] http://www.sciencebusiness.net/news/76893/Karolinska-Institutet-establishes-research-base-in-Hong-Kong-and-China-after-record-donation

### 4.3.3 Venture Capital (VC)

As one of the world's leading international financial centres, Hong Kong is well known for the significant and growing amount of investment money that flows through its markets. For example, the amount of money flowing into Hong Kong rose 47 per cent to $640 billion during 2012 to 2014.[41] However, our research suggests that only a very small proportion of these funds is invested in local businesses and initiatives.

> *"There is lots of money swilling around and most of it goes into property. It lacks that community of angel investors, early stage venture capital. It's an area that is likely to need a publicly funded kickstart."*

Reasons suggested by our respondents included:

- Businesses based in Hong Kong tend to be multinationals that are not involved in technology and innovation;
- The returns are not perceived to be high or fast enough; and
- Without a critical mass of startups, VC tends to look elsewhere.

Despite having perhaps the large number of funds in Asia, a paper by Au and White on the topic of venture capital in Hong Kong shows that its performance in terms of financing new technology-based firms in Hong Kong has been low.[42] This supports what we were told in our interviews that, in effect, Hong Kong investors have a short-term orientation towards investment.

> *"The money in Hong Kong is smart money. It's looking for high returns and fast returns. That doesn't go well with venture investment in university research."*

> *"What is more needed is the capital pool that is willing to invest in early stage and, to be honest, a more riskier class of asset: venture investment and capital. The difficulty is that there are not so many investment startup opportunities, so they tend not to look too hard at the startup environment in Hong Kong."*

One respondent we interviewed compared the short-term perspective of investors and government in Hong Kong with the situation in the US, where so much technological development had come from military R&D and is undertaken with a long-term view to its impact.

> *"The investment has to be long-term and it has to be significantly higher. This is why policy and government determination to create this is important, because if you look at the high tech industries in the US, a lot of the technologies were initially developed for military application and those came from the defence budget. There is no real measure on what is the return on investment upfront. It was a long-term investment for the entire society. And that view, frankly speaking, needs to align with the political system in Hong Kong as well, because if you invest in something long-term, you're not in office anymore by the time the return comes."*

[41] Asian cities attract more overseas money than Switzerland, Jeremy Grant, *Financial Times*, February 2015
[42] Au and White (2009), *Hong Kong's Venture Capital System and the Commercialisation of New Technology*

As Au and White describe, in stark contrast to the so-called ‘classic’ model that emerged around Silicon Valley in the US, venture capitalists in Hong Kong tend to avoid early-stage investments and seldom nurture early-stage ventures that are commercialising new technologies. Instead, they embrace a relatively short investment horizon and much lower risk threshold.

While such proclivity is apparently common among VCs in Asian countries, Hong Kong being a financial centre, creates a subtle but powerful tendency for local VCs to see investments as financial ‘pure plays’.

However, a range of factors have obstructed the emergence of a new paradigm of technology-focused investing, including missing links and mismatched features of the institutional structure, investor cynicism towards technology investment, and a lack of mutual collaboration among key stakeholders (for example, between angel investors and the VC community).

The Au and White study outlines the factors that inhibit the effectiveness of VC in supporting the commercialisation of new technology in Hong Kong. Some of these factors are listed below.

- Government policies have been formulated with banks and traders in mind, embedding a short-term, quick return attitude across society.
- Most venture capitalists have accounting or finance backgrounds and adopt the attitude that they are “out to make money”, rather than to nurture new technology and ventures that could have a major impact on an industry or even the world.
- Many of Hong Kong’s new firms are family businesses. These first-generation entrepreneurs are happy with the local market and business practices. They veer away from transparency, guard their ownership very carefully, and tend to use insiders, rather than professional managers (who were not available in the past).
- While some second generation leaders of family businesses and the new generation of entrepreneurs may be more open to new ideas and transparent practices, the small local market, high costs, lack of advanced technology, scarce startup capital and a shortage of capable entrepreneurial teams make technology ventures more difficult to establish than non-tech ventures. In sum, although Hong Kong is famous for its entrepreneurial spirit, high-quality technology startups are rare.

Au and White propose various policy options to address these shortcomings.

> **Stimulate more VC funds with a longer time horizon and greater focus on new technology commercialisation.** One way is to encourage long-term investors to become limited partners of VC funds. The government should channel university endowment funds and other government funds to VC funds since their longer time horizons are compatible. This should also attract more foreign funds and, at the same time, reinforce Hong Kong’s position as a financial hub. The government may learn from overseas experiences and sponsor investors to form new VC funds that focus on technology startups, incorporating features such as:
>
> - Employing technology experts to administer the funds;
> - Giving full autonomy to the VC companies on investment decisions; and

- Providing strong incentive on the 'upside' for the funded companies (i.e., the possibility of within a median period, of purchasing the government's share) but no downside 'guarantee' of losses.

**Develop professional training and qualifications for investment advisors in the VC and private equity industry, angel funds, and private companies.**

**Stimulate angel investments.** Expand and professionalise angel investment by developing guidelines, successful/failure case studies and templates for documents, such as term sheets.

**Establish Small Business Investment Companies (SBIC)-like programme to stimulate investments in small technology businesses and help to fill the equity gap.** The Enterprise Capital Funds of the UK was modelled on the US experience and has been considered a success. A similar programme should be implemented in Hong Kong. In essence, the government will solicit competitive bids from qualified individuals (or companies) for plans to invest in small private companies (range HK$1M to HK$15M). The government will match up to twice the amount raised by the bidder to form a fund, but will take a smaller share of the profits and an equal share of the losses. The investment period must be longer than two years.

**Diversify the backgrounds of the general partners of VC firms.** Encourage the VC/private equity firms to recruit special partners who are retired or cashed-out entrepreneurs to complement the jobs of general partners who tend to have an accounting or financial background.

**Create attractive exit points for investors such as new Initial Public Offerings (IPOs).**

## 4.4 The Need to Develop an Ecosystem

### 4.4.1 The Current Situation

Overall, the research points to Hong Kong currently lacking the kind of well-funded and developed ecosystem that leads to the maximum value being exploited from good ideas and nurtures the effective commercialisation of research.

*"There is the ITF: it promotes collaborative university business efforts – and as I say, we're at the start of the process…when you compare the funding for the basic research through the UGC and then you look at the funding for more downstream activities, it just doesn't compare with what's being spent in say the UK, Korea and Finland."*

*"Hong Kong is not very good at commercialisation. There's no lack of creative ideas. But if it wants to take on a pipeline to make it into an actual business, it doesn't have a very good system to start with."*

*"In addition to the scale of the funding through ITC being quite small, it's quite piecemeal. And in some other economies, you see much more proactive and collaborative attempts by industry and universities to agree research agendas in particular areas. So that kind of strategic approach to developing these applied research agendas, it's still in the early stages, we don't have the formal processes in place yet."*

A contrast was drawn with what was perceived to be happening in South Korea. (We report in greater depth on the situation in South Korea in another section of this report.)

*"In Korea, you see that the government body that is the equivalent of ITF, it has a long-range technology forecast. They devote massive resources to it – for each of the areas they have identified, they have a whole research centre taking care of it, investigating what will be emerging and how their own industry will fit into that technology trend. They are taking a 3, 5, 10-year technology perspective. So the Samsungs and the others know what is coming up and will have it mapped out. It's that kind of approach that has transformed Korea and enabled it to catch up so quickly to the Japanese."*

Another issue raised in the interviews was the lack of a track record in terms of university-business collaboration. Even the institutions which did have relationships found that businesses tended to approach them to help with incremental, rather than fundamental, changes.

*"The Hong Kong Poly U is actually the forerunner in terms of tech transfer and commercialisation. Not that it has a lot of better technologies; it's just because of the heritage, that we work inside with the community. But the people are actually coming to the university to look for problem-solving or some kind of enabler, so they can make their conventional business model more competitive rather than looking for something disruptive or that could jump start a new business idea."*

With neither the supply nor the demand side being particularly strongly developed, respondents are unsure whether the focus of efforts should be upon the demand side, i.e. taking steps to facilitate business involvement – or the supply side in getting universities to push out their ideas. One respondent thought it was likely that if the universities were more proactive, then it might be the trigger to get businesses involved.

*"It's a bit chicken and egg…The impression we get is that with a more proactive and strategic research agenda coming form the universities, there would be that demand from industries."*

Others disagreed, believing that it was up to the demand side to be more involved.

*"It is a push and pull. Unis they push, they always have these ideas – whether it is a feasible idea, whether it can be realised, it's a pulling from the industry – we have to strengthen the links between them. I'm not worried about the pushing part – academics don't realise that many of their ideas are not feasible. But to make it work, we have to collaborate and facilitate more interaction, so there are more ideas and we get early contact between them – so that the users can provide the input, so they can polish the ideas…The earlier participation – some uni professors they admit to us that they welcome the early participation of industry – helps them refine their idea. Make it more practical from the beginning."*

A few people were of the opinion that it was better for outsiders – be they businesses or intermediaries – to make links with academics and to help them consider how their ideas might have practical application.

> *"We need to be persuasive of academics that this a doable route. If we can commit time and resources into a company venture, then the next step is to find the first bucket of seed funding, whether it's from government or from a private angel – whereas these academics would only be amenable to the classic grant system."*

Sometimes, it was not just one idea but rather the combination of a few good ideas that presented the most opportunities. Ideally, a commercialisation ecosystem would provide the mechanisms to bring those ideas to come together.

> *"Recently I met with two startups. Each, on their own, has low to mediocre appeal to companies. But if you could combine the two, if you could have the right entrepreneur to put into a grand idea ambition – it's that which is most important. And the other is execution, of course. But you need the visionary to put them together."*

Local media reports that potential investors see Hong Kong as lacking in attractive investment opportunities, with investors preferring instead to look for opportunities on the Mainland with perceived much larger returns.

> *"For the past few years, many venture-capital fund friends have complained that they cannot find good companies to invest in. Hong Kong is already the regional home of many of the world's largest venture-capital firms, but ironically dealmakers from those firms rarely want to spend their time in the city for work. Instead, they travel around the Mainland looking for what they hope will become the next Alibaba. Many venture-capital professionals do not see Hong Kong startups having the potential to grow their business to a market size that would be big enough to generate a decent profit."*[43]

### 4.4.2 What Could and Should Hong Kong be Doing?

The question naturally arose in some of our interviews: if Hong Kong is really so lacking in the ecosystem required to commercialise research and has a successful economy why does it need to build one?

Respondents provided various reasons including:

- The need to develop technologies that would be useful to Hong Kong;
- The need to ensure social mobility and/or employment opportunities in the future; and
- The need to encourage smart people to come to/stay in Hong Kong.

[43] 'Can Hong Kong be a dream city for start-ups to scale up?' George Chen, *South China Morning Post*, 22 February 2015, http://www.scmp.com/business/companies/article/1721246/can-hong-kong-be-dream-city-start-ups-scale

*"To improve the social mobility of the young people…there is an issue about the frustration of the people, whether you are highly educated or you are just like the people with secondary education, the upward social mobility is very limited."*

*"Hong Kong is a small place with only 7 million population. We don't have a large manufacturing base. We do need science and technology, otherwise we are only relying upon our financial base. We do have a high standard in the university. But then, without the industry to keep them here, some of the smart people go away – it's a brain drain – so we are trying to encourage more international collaboration and especially with the Mainland."*

The question still remains though as to whether Hong Kong has the critical mass to become a technology hub and/or the expertise and drive to develop the ecosystem required to effectively commercialise research. As one commentator characterises it:

*"University-based researchers keep using government money to invent and develop technologies and end up selling the results cheaply to Mainland and international companies. Hong Kong must be proactive – identify and design an appropriate strategy and the supporting implementation policy and measures to make things happen. Hong Kong must also focus on its core strengths – the essential attributes and competitive differences that Mainland China and the rest of the world cannot duplicate easily."*[44]

### 4.4.3 Kick-starting an Ecosystem

Some respondents described measures already taken by the Hong Kong Government to kick-start the commercialisation process (and outlined in our review of Hong Kong's current policy offerings).

*"The ITC has a new one called the Techno Start-Up Fund. It's up to the uni to identify startup companies that each uni would like to help and they can use the funds to nurture these startups. It just kicked into gear this year. This year, we are definitely seeing a move to kick into base some of the all-important steps. But in terms of a real ecosystem, if you were to measure what a real ecosystem was, then you know we still have a long way to go."*

One of the problems is perceived to be that there has been no Minister, Department or official with sufficient clout to head up the kinds of changes required to build an ecosystem.

*"There's no one in the government with an innovation hat on…beating the drum."*

However, with a recognition that other parts of the world are moving ahead (Singapore and Korea were most likely to be mentioned in Hong Kong), steps are being taken to address this shortfall – see the following section, as well as other initiatives mentioned throughout the report.

[44] Lung, *Op. Cit.*

### 4.4.4 The Innovation and Technology Bureau (ITB)

In order to address the lack of linkages, as reported earlier, the Hong Kong Government is attempting to establish an Innovation and Technology Bureau (ITB).

Compared with the current Innovation and Technology Commission (ITC), which stands within the Commerce and Economic Development Bureau, the ITB will have a higher status, reporting directly into the Chief Executive, who himself noted that: *"We need dedicated leadership and stronger policy coordination for more effective organisation of work among the government, industry, academia and the research sector".* He said that: "*policies will be coordinated by the new bureau to improve scientific research, industrial development and to provide more employment opportunities".*

The original idea for the ITB was suggested in 2011, by Samson Tam, a Hong Kong legislator from the IT sector, who suggested that Hong Kong needed a bureau that would have:

> *"The responsibility to build up links to initiatives in Mainland China and the rest of the world under the 'Open Innovation' theme...Hong Kong has potential to evolve into a trader of knowledge, linking R&D in universities and serving as a technology transfer and commercialisation centre that serves Mainland China and the world".*[45]

The proposal seems to have met with general approval, with some of our respondents considering it to be a positive step in the move towards building a stronger ecosystem to support the commercialisation of research in Hong Kong.

> *"The ITC – they emphasise the innovation part, rather than the application part. The new ITB should help with that."*

Reports in the media have also been generally positive. The President of the Chinese Manufacturers' Association of Hong Kong noted that:[46]

> *"This new bureau has everything to do with Hong Kong's economic future, especially in regard to employment opportunities for the younger generation. Hong Kong students are creative enough to have won many international technology competitions. They just need more support from the government to use this knowledge to benefit real industries".*

Similarly, the Chief Information and Operations Officer of China CITIC Bank International, who is also the current President of the Hong Kong Computer Society, feels that the ITB can play a major role in driving the incubation of new businesses within Hong Kong:[47]

> *"The Hong Kong Government has always taken pride in its infrastructure: wi-fi hotspots coverage, number of carriers, large bandwidth, etc. But it shouldn't just focus on these things. Rather, the ITB should focus on applications development – applications that concern the livelihood, such as building Hong Kong as a smart city…the future ITB can formulate strategies and decide on resource allocation.*

[45] *Ibid.*
[46] *China Daily*, *Op. Cit.*
[47] 'IT leaders rethink tech strategies as ITB gets green light', *Computerworld*, 30 October 2014, http://cw.com.hk/news/innovation-and-tech-bureau-gets-legco-green-light,

*For example, the ITB can drive smart applications development by lining up strategic partners, providing subsidy, and directly injecting resources to companies. It may even form a company itself and make direct investments in applications development. Other than app development, the ITB can also consider driving incubation programmes, either through its existing incubations platforms Cyberport and Science Park or build a new one. Either way, it can consider introducing world-class incubation masters to lead the creation of a Hong Kong version of Silicon Valley."*

However, as noted earlier, there has been some political resistance to the proposed ITB, with opposition politicians refusing to approve its funding. The most recent information is that the funding request to set up the ITB was "killed off" by a "pan-democratic filibuster". The pan-democrats reportedly "slammed officials for failing to provide a clear blueprint before asking for a startup fund of HK$35 million. They also believed the bureau would be used to create new political posts for Leung's allies." The Chief Minister has indicated his intention to continue to seek approval for the bureau from the Legislative Council (Legco) to fund the ITB. Media reports refer to a rumoured plan to set up an advisory body so officials need not ask for Legco funding again.[48]

### 4.4.5 Hong Kong Science Park (HKSP)

We were told that the HKSP offers various advantages over, for example, similar set-ups in other parts of East Asia. Firstly, Hong Kong is the natural stopover place for businesses that wish to engage with China. Secondly, Western businesses appear to have a greater comfort level working in Hong Kong and, in particular, tend to have fewer concerns (whether they are legitimate or not) in Hong Kong about matters relating to the security of IP and integrity of testing, particularly when compared to China.

Some of our respondents thought that, certainly in the past, the Science Park (and Cyberport) had seemed to be more focused on renting out its facilities, rather than acting as an incubator facilitator of technology transfer. There was concern that there had, as yet, been little in the way of positive outcomes from these zones.

*"The quality of the facilities at the Science Park – it's a pretty impressive bit of infrastructure, the occupancy rate is fairly high and it continues to expand. There is probably more that could be done to realise the potential to draw in higher flyers. However, to date, the emphasis has been on managing the property – marketing the park and ensuring that the occupancy is high."*

*"We are catching up a little with Cyberport and the Science Park doing a few incubations. They each have 100 new companies, so in total that's 200 new companies – [that's really not a] big deal!"*

[48] 'Leung Chun-ying hits out at pan-dems after filibuster kills off IT bureau…for now', *South China Morning Post*, 15 February 2015, http://www.scmp.com/news/hong-kong/article/1713600/leung-chun-ying-hits-out-pan-dems-after-filibuster-kills-it-bureau

However, there was a perception that the performance might have recently improved.

> *"For 10 or 11, 12 years, I don't think it's [the HKSP] been very active in soliciting academia into the park to spin off. That was one of the criticisms. In Hong Kong, funding research in the academic world has done very well, but in terms of translation of research, it's been fairly disappointing. But since last year, there has been a change of personnel within the park and it's also had a change in focus and direction. So we say now, it's not just the responsibility of the academic to get something to a finished product. (It's our role) to help them link up with industry to commercialise and find the pipeline in Asia area. So we've been more proactive in approaching the universities."*[49]

## 4.5 Government Policy

### 4.5.1 The Role of Government

Some commentators query whether the government and/or universities should be involved in making decisions about which investments to fund. As mentioned earlier, the Hong Kong Government has taken a deliberately *laissez-faire* approach to policy generally.

> *"Governments that throw taxpayers' dollars at high-tech dreams through university research investment have only seen a graveyard of costly and failed projects. The Hong Kong Government should learn this lesson as the city strives to be a world-class technology research centre. When bureaucrats and academics act as technology investors in the name of creating local, world-class research institutes, it potentially leads to a gross misuse of public resources."*[50]

However, certainly among the people interviewed for this research, there was widespread agreement that government could and should have a role in identifying and supporting those areas that were a natural fit for Hong Kong.

> *"Hong Kong should be taking a lot closer look at the prevailing technology and asking what will be the impact globally and then also relevant to Hong Kong. We can brag about the transparency of the system, fair and open market with good governance: But what is the role and influence of financial technology? Then you need to have some kind of government wisdom to look into that. How will it impact on practice in years to come? And questions about also privacy, state security and big data. So rather than having a uni or science park saying mini robots is the next big thing – but what has that got to do with Hong Kong. And that's where legislative members are able to do that. At the end of it, if it doesn't impact on the society in the way it should, then you shouldn't be working in that area."*

> *"Governments should decide and encourage – but it also depends on the local infrastructure and expertise – some areas that we think would be good for local development – have to look into the local situation."*

[49] This comment was from a Science Park employee.
[50] Peter Guy, 2015

Some people had specific suggestions where they thought government activity to encourage commercialisation should be focused. Certain sectors were considered a more natural fit for Hong Kong.

> *"If it's life sciences, then the outcome is to improve quality of life and it is less controversial – everyone can agree it should happen."*

> *"Because Hong Kong is a very strong user of IT and Hong Kong overall is a very developed infrastructure-wise, it should focus on the technology that the city uses: technology that will support data centres, cloud computing, security and if it can afford to do more on the hardware side, for example wireless communication."*

> *"Rather than just being a place to deploy technology in order to create GDP, they could start to actually use the insights from the service provider. So they would know what will be the next generation technology. It's not quite as tangible, but it's very insightful and it could be harnessed better. It's good for Hong Kong if there are actually policies towards building them, rather than just deploying."*

Moreover, it was thought that there was a role for government to do whatever was necessary to make the proposition attractive to the private sector.

> *"If the life cycle would be shared by the business sector, that's where energy for the innovation and transformation comes from. Government is going to find it difficult to transform society, difficult to change anything major. The transformation has to come from the private sector."*

> *"Uni administrators are not businessmen, nor are government. They need policy to let platform for more profit to come in. The strategy should be more pro-business in terms of making it easier for companies to come to Hong Kong and work with the unis, to simplify the process."*

Our respondents thought that the government's role extended beyond financing considerations – it was also about coordination.

> *"The coordination and the thinking behind it. It's one area where you're seeing Singapore, for example, making a push on this: the government being the commissioner of innovative activities, that government-led demand."*

While Hong Kong has long been known as a financial centre, and less so as a technology hub, it was not beyond the bounds of possibility that the government could create such an industry in Hong Kong.

> *"The discoverer of foetal DNA in maternal blood came back to Hong Kong and did the work here – we have to make use and capitalise on this type of discovery, build the molecular and diagnostic industry around it. If Hong Kong has to buy in talent, not rely on locals, then it should."*

The question was raised as to whether it was possible to buy in brainpower, or whether it required a more integrated system.

*"They're not so much buying in patent or kit – they're buying in the brainpower – it's people that allow you to do the integrative research and innovation, don't know if there's been research on this, but that's the stuff that's harder to outsource. If all you're doing is working on something very niche – you could go and replicate it in Western China, because you want to build up the capacity. But if what you need is experts in seven different areas all able to collaborate, because you're not building a widget, you're building a final product or solution, that's much harder to move…"*

### 4.5.2 General Barriers

Some people identified specific barriers – or blockage points – within the system and suggested that these might be the points at which government funding was best directed.

*"The valley of death from innovation to commercialisation – it will take some additional effort from government to set a policy so some of the risk can be mitigated from early stage startup to a stage where private sector wants to get involved."*

There were calls for more government money to be invested at various stages through the process of commercialisation.

*"The translation of research part needs more government support. It's not just filing patents and acquiring patents on an annual basis: the amount of funding required for uni research to get into market place, takes 10 to 100 times the initial research."*

### 4.5.3 Stability of Policy

We only spoke with one business in Hong Kong, but the feedback we received seemed to have broader applicability. We were told that there was a need to have a stable policy environment – this point did not just apply to Hong Kong, but wherever they were trying to market their products.

*"Policies change: by the time protocol and legal and distributor agreements are signed and by the time he gets clients, it's suddenly the government changes its mind and they want to support something different."*

### 4.5.4 Remove Regulatory Barriers

One of the ways in which the Hong Kong Government could facilitate commercialisation would be to reduce the regulatory controls according to various respondents, including people working in the biomedical field, IT and a business trying to sell products in Hong Kong.

It was suggested the Hong Kong Government could also take steps to remove the red tape in applying for grants.

*"This IT fund, the application process can be simplified. I understand that in Hong Kong, it's important that they have a vigorous process to ensure no conflict of interest. But it is to the point where it makes it inefficient. It puts a burden on industry partners: not only do they have to provide the funding for matching, but also proof and documents that create an extra burden on them. Streamlining them a bit would be more encouraging to investors."*

For people working in the biomedical field, one of the major barriers to the commercialisation of research is the regulatory requirement, particularly those demanded by the Chinese Food and Drug Agency (CFDA). Anything that the Hong Kong Government could do to ease those requirements would improve the environment for commercialising research.

### 4.5.5 Encouraging Entrepreneurship

It was thought that government should have a role in encouraging people – and particularly young people – to become entrepreneurs, though quite how such schemes might work was not clear.

*"They have been encouraging entrepreneurship for young people. The startups, of course, had a very high failure rate. The question is, how do you keep recycling them when they fail: do you support them three or four times. Or if they fail once, do they just go back to sitting in their bedrooms? It's the broader question of how do you build up that culture (of entrepreneurship) and the ecosystem?"*

Returning to the supply side, according to some, there was also a perceived need to embed an entrepreneurial culture through academia.

*"In actual fact, that's what we're trying to with the professors: educating them about entrepreneurship, going into the school, getting them to be aware of such sectors and informing them about the long turnaround time. Once people understand it, then hopefully it spreads to their students too and they get it a lot earlier."*

## 4.6 Measurement

Looking at ways to measure the impact of commercialisation efforts, again, it was suggested that Hong Kong would do well to follow the British example, using a combination of quantitative data, expert opinion and 'story telling' (i.e. qualitative data) to build a picture of whether commercialisation efforts have been successful.

*"For Hong Kong, I would say at this point in time if you are to involve academics, we probably still need to follow the UK model: for a successful technology and commercialisation case, it's the story telling – what is the impact (of the initiative) in terms of its economic development, the jobs and setting a new standard for an industrial sector. You have to tell stories about it, otherwise it's very hard to justify."*

Currently, the main sources of information are the evaluations undertaken by the institutions that receive funding for the commercialisation of their research.

> *"There are records kept on the efforts of the knowledge transfer officers – they're associated with each of the universities – they're in charge of knowledge exchange at six of the eight unis. [The record] tends to just detail the licenses, spinouts, patents. The RGC get annual reports from each of the unis telling them how much activity is going on each year."*[51]

The difficulties in measuring knowledge exchange and in benchmarking a knowledge-based economy (KBE) have been acknowledged by the Hong Kong Census and Statistics Department (HKCSD) which states:[52]

> *Knowledge, unlike conventional capital goods, has no fixed production capacity and hence presents great challenges in terms of measurement. At the heart of a KBE, knowledge itself is particularly difficult to quantify and to price. There is no direct way to measure the performance of a KBE. Instead, a descriptive framework using a suite of indicators may be used to measure Hong Kong as a KBE.*

The HKCSD groups these indicators into the following categories:

- ICT – indicators to reflect the efficiency and effectiveness of knowledge and information distribution/application in the economy;
- Human resources development – indicators to reflect the quantity and quality of individuals equipped for access to, and use of, knowledge and information for further production/ creation/distribution of knowledge and information in the economy;
- Innovation *system* – indicators to reflect the quantity, quality and rate of knowledge and information production/creation/application in the economy;[53] and
- Business *environment* – indicators to reflect how conducive the business environment is to the production/creation/distribution/application of knowledge and information in the economy.

## 4.7 Sectoral approach

As already reported, it was considered important to focus on those sectors of relevance to Hong Kong. Some of them included communications, finance and Chinese medicine.

> *"We do have a lot of the traditional Chinese medicine manufacturers. Their level of technology may be very different, but it's local industry that we have to look at supporting and developing."*

One of our respondents stressed the need to recognise that different sectors would most likely require different approaches.

> *"There are always going to be areas that are easier – it's somewhat different for life sciences, we don't have large pharma in Hong Kong and it's also subject to very strict regulatory approval in many places. So you really have to look at what's needed and look at that individual industry segment."*

[51] Reports provided by HK HEIs are available at http://www.ugc.edu.hk/eng/ugc/activity/kt/kt.htm
[52] HKSCD, *Op. Cit.*
[53] All relevant information from the CSD's reporting has been provided earlier in Section 3.2

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