For discussion on
19 January 2016

Legislative Council Panel on Commerce and Industry

Continuing the Funding Support for Technology Transfer Offices of Local Universities, Partner State Key Laboratories and Hong Kong Branches of Chinese National Engineering Research Centres through the Innovation and Technology Fund after 2015-16

PURPOSE

This paper seeks Members' support for Government's proposal to continue the funding for Technology Transfer Offices (TTOs) of local universities, Partner State Key Laboratories (PSKLs) and the Hong Kong Branches of Chinese National Engineering Research Centres (CNERCs) through the Innovation and Technology Fund (ITF).

BACKGROUND

2. At the Panel meeting on 16 April 2013, Members supported the proposal of providing funding, through the ITF, on an annual reimbursement basis to the following institutions for three years from 2013-14 –

(a) to provide funding to designated universities[1] to enhance the capabilities of their TTOs. An annual funding of up to $4 million would be provided to each university starting from 2013-14;

[1] Six local universities, namely *City University of Hong Kong, Hong Kong Baptist University, The Chinese University of Hong Kong, The Hong Kong Polytechnic University, The Hong Kong University of Science and Technology, and The University of Hong Kong*, are designated as local public research institutions under the R&D Cash Rebate Scheme (CRS). CRS, also funded under the Innovation and Technology Fund, aims to reinforce the research culture among private companies and to encourage them to establish strong partnership with designated local public institutions, including universities.

(b) to provide additional funding to PSKLs to further recognise their achievements, strengthen their research and development (R&D) capabilities and promote joint effort with their Mainland counterparts. From 2013-14 to 2015-16, the annual funding support for each PSKL would be raised from $2 million to $5 million; and

(c) to provide funding to the Hong Kong Branches of CNERCs to enhance their R&D capabilities and collaboration with the Mainland. An annual funding of up to $5 million would be provided to each Hong Kong Branch of CNERC starting from 2013-14.

The above funding support will expire after 31 March 2016.

PROPOSAL

3. Having considered the progress made by TTOs, PSKLs and the Hong Kong Branch of CNERC, we propose to continue our funding support, through the ITF, from 2016-17 for three years (i.e. up to 2018-19) on an annual reimbursement basis as follows –

(a) to support each TTO of the six local universities (see Footnote 1) with an annual funding of up to $4 million;

(b) to support each PSKL with an annual funding of up to $5 million, and allow a maximum of 30% of the funding to be used for consumables; and

(c) to support each Hong Kong Branch of CNERC with an annual funding of up to $5 million, and allow a maximum of 30% of the funding to be used for consumables.

Details are set out in the ensuing paragraphs.

(A) Funding Support for TTOs

Existing Funding Arrangements

4. Technology transfer refers to the process of transferring technology from academia to society. This process will enable technological developments to become accessible to a wider range of users who can then further develop the technology and knowhow into new products, processes, applications, services, etc.

5. Technology transfer is manpower-intensive and requires skills that are different from knowledge transfer for other non-I&T related faculties. At the Panel meeting on 16 April 2013, Members supported ITC to provide an additional funding support for the six universities designated as local public research institutions to enhance their technology transfer capabilities. Specifically, the ITC funding aims to enhance TTOs' work including technology transfer and realisation of R&D results, building up the necessary professional support services such as contract negotiation, protection of intellectual property (IP), financial management and promotional and relevant marketing activities, etc., and facilitating liaison and collaboration with the research community and industry locally, in the Mainland and overseas.

6. Starting from 2013-14, ITC provides an annual funding of up to $4 million to each TTO of the six local universities for three years. Such funding is provided through the ITF on an annual reimbursement basis. The ITC funding support to TTOs will end in 2015-16.

Latest Developments and Achievements

7. In the past two years, our funding has not only accelerated patenting and licensing activities of the TTOs, but also supported them to engage professional services and/or hire domain experts. The additional staff have helped synergise individual universities' technology transfer efforts among stakeholders, plan and implement technopreneurial measures, etc. Furthermore, through increased participation in seminars, conferences and exhibitions, the TTOs have further expanded their networks in the industry. Staff of the TTOs have gained more experiences

in negotiation and collaboration with potential investors and industry partners. Key performance indicators of the TTOs are listed at **Annex A**.

8. Some examples of the outcome of the TTOs' work are highlighted below –

(a) Technology transfer and realisation of R&D outcomes

Example one:

A team in the Faculty of Medicine at the University of Hong Kong (HKU) has successfully developed oral Arsenic Trioxide for treating acute promyelocytic leukaemia (APL). Benefits of this new drug include high efficacy in APL treatment, good safety profile, cost effectiveness, no need for hospitalisation during treatment, etc. It will likely replace the current intravenous arsenic trioxide. The new drug is expected to be available in the Hong Kong market in 2016. After market launch, the new drug will be the first prescribed and patented drug which is researched, developed and manufactured entirely in Hong Kong for patients suffering from APL.

Example two:

High-strength steel has been widely used for making rocket engine casing, aircraft landing gear, bullet-proof steel, etc. In recent years, ultra-high strength steel is becoming more popular in traditional industries such as construction, machinery manufacturing, automotive industry, etc. A professor at the City University of Hong Kong has discovered an innovative way to manufacture ultra-high strength steel. His invention has advantages over materials made of conventional methods in terms of toughness, weldability, corrosion resistance, etc. This technology has been licensed to a high-tech steel machinery manufacturer in the Mainland whose steel products are widely used by large and medium-sized steel plants globally.

(b) Building up the necessary professional support services

Example three:

TTO of the Chinese University of Hong Kong (CUHK), namely the Office of Research and Knowledge Transfer Services (ORKTS), launched a new initiative in 2014-15 to strengthen its market knowledge and supplement its in-house business development capabilities. ORKTS engaged professional agents to evaluate selected R&D projects of CUHK to enable the university to formulate a more market-oriented technology development and marketing plan. Furthermore, ORKTS has appointed an agent specialising in IP licensing to market CUHK technologies to companies overseas.

Example four:

Our funding has also enabled the Knowledge Transfer Office (KTO) of Hong Kong Baptist University (HKBU) to maintain a capable team of technology transfer practitioners. With KTO's expertise and advice, five technology start-ups had licensed patents developed at HKBU and were spun off from the university in 2014. All these spin-offs were founded by professors and students of HKBU and they were also provided with ITF funding support under the Technology Start-up Support Scheme for Universities. One of these technology start-ups has attracted an investment funding from a venture capital which valued the technology start-up at about $50 million.

(c) Facilitating liaison and collaborations with the research community and industry

Example five:

With the support of its TTO (i.e. Innovation and Technology Development Office), the Hong Kong Polytechnic University banded together major partners in the aviation industry and co-founded the Aviation Services Research Centre (ASRC) in 2013. ASRC has conducted ITF-funded R&D projects in

advanced aviation maintenance, repair and overhaul (MRO) technologies, and provided operating solutions to the labour-intensive MRO industry. Two innovations arising from the R&D projects enable the automation of aviation maintenance procedures like replacement of aircraft outer skin panels and restoration of aviation parts to their optimum shapes. This substantially reduces the turnover time for aircraft maintenance which helps consolidate Hong Kong's position as an aircraft maintenance hub.

Example six:

The Hong Kong University of Science and Technology (HKUST) has been in a strategic industrial partnership with a Chinese multinational electronics company producing products including television sets and mobile phones etc. This company has agreed to establish a 'Communication and Information Technology Research Grant' at the university for three academic years starting from 2015. The grant will support HKUST students in the Master of Science programme to pursue innovation research and creativity in the areas of communication and internet technologies with industrial impacts. With the support of its TTO, HKUST has also reached a framework agreement with the company to collaborate in next generation communication technologies.

Continuing Funding Support and Further Review

9. The first tranche of the ITC funding for TTOs of the six local universities has produced certain results. Technology transfer is an ongoing process requiring long-term effort. We therefore propose to continue the existing funding support for TTOs of the six local universities for another three years from 2016-17 onwards. In other words, ITC will provide an annual funding of up to $4 million to each TTO over three years up to 2018-19.

10. During the coming three years, the universities will also be required to submit annual reports on the impact and outcome of the funding

for respective TTOs. We will conduct another review of the funding arrangement in 2018.

(B) Funding Support for PSKLs

Existing Funding Arrangements

11. The State Key Laboratory (SKL) scheme is one of the major national science and technology development schemes managed by the State Ministry of Science and Technology (MOST). So far, a total of 16 laboratories of universities in Hong Kong have been recognised as PSKLs based on MOST's SKL scheme, all of which have gone through a vigorous admission process to demonstrate their research excellence in particular technology areas. The PSKLs, as R&D partners of corresponding SKLs in the Mainland, serve as a base for high level R&D, assembling and nurturing outstanding researchers, as well as scholarly exchanges. There are currently 16 PSKLs in Hong Kong as detailed in **Annex B**.

12. As an additional source of funding to enable PSKLs to map out a longer term development plan to strengthen their research capability and to build up the necessary infrastructural support (manpower and equipment) for exploring new technology areas, ITC committed to provide an annual funding of $2 million to each PSKL in Hong Kong for five years starting from 2011-12. The funding support has been increased to $5 million since 2013-14. The ITC funding support to PSKLs will end in 2015-16.

Latest Developments and Achievements

13. The PSKLs have reported continued R&D achievements, application of R&D results, international awards received, and extended collaboration with the Mainland since 2011-12. Examples include –

(a) R&D achievements and application of R&D results

The PSKL of Synthetic Chemistry (HKU) has published over 210 papers in world-leading journals, including Journal of the American Chemical Society, Angewandte Chemie International Edition, Chemical Science, Advanced Materials and other

peer-reviewed international journals. It has also executed exclusive licence agreements on three OLED material patents to a leading manufacturer of OLED displays to develop the next-generation OLED technologies with superior performance based on platinum complexes.

(b) International awards

The Head of the PSKL of Synthetic Chemistry (HKU) and the Deputy Head of the PSKL of Oncology in South China (CUHK) were elected to National Academy of Sciences, United States as Foreign Associates in 2013 and the Head of the PSKL of Molecular Neuroscience (HKUST) was elected to the same Academy in 2015.

(c) Extended collaboration with the Mainland

The PSKL of Ultraprecision Machining Technology (PolyU) has collaborated with the Guangdong University of Technology and has been awarded a five-year grant of RMB 30 million from the Innovative R&D Team Programme of Guangdong Province to develop nano-machining technology and equipment.

Enhancement Measures and Further Review

14. We are encouraged by the outstanding achievements of the PSKLs during our five-year funding cycle of 2011-12 to 2015-16. We propose to continue to provide funding to the PSKLs for three years from 2016-17 until 2018-19. For the three-year period, a PSKL can receive a maximum of $5 million each year.

15. To further enhance our funding support for PSKLs, we propose the extension of funding scope from manpower and equipment to consumables, and allowing a maximum of 30% of the funding to be used for consumables. This would better suit the needs of PSKLs which have already passed the initial establishment stage and no longer need to purchase equipment every year.

16. With the endorsement of the Mainland-Hong Kong Science and Technology Co-operation Committee, ITC will co-ordinate the first round of reassessment on PSKLs starting in the latter half of 2016. The first round will focus on the 12 PSKLs set up in 2010 or before. The funding to a laboratory will cease if it is no longer recognised as a PSKL. We will conduct another review of the funding arrangement in 2018.

(C) Funding Support for the Hong Kong Branches of CNERCs

Existing Funding Arrangements

17. While PSKLs focus on carrying out innovative research taking into account the national innovation and technology priorities, Hong Kong Branches of CNERCs serve as major impetus in providing engineering research and consultancy support to the industries. Research institutions approved by MOST as CNERCs have strong R&D capabilities and enjoy leading positions in their chosen areas of expertise both in the Mainland and internationally. In June 2012, approval was granted by MOST for the Hong Kong Applied Science and Technology Research Institute (ASTRI) to establish the first Hong Kong Branch of the National Application-Specific Integrated Circuit (ASIC) System Engineering Research Centre in collaboration with the Southeast University on a pilot basis.

18. Starting from 2013-14, an annual funding of up to $5 million for three years is provided to each Hong Kong Branch of CNERC for enhancing its R&D capabilities and collaboration with the Mainland. The initial ITC funding support to PSKLs will end in 2015-16.

Latest Developments and Achievements

19. Since its establishment in June 2012, the first Hong Kong Branch hosted by ASTRI has collaborated with the National ASIC System Engineering Research Centre on seven projects. R&D outcomes from these joint projects can be applied in low power wireless communication, optical fiber communication, intelligent power modules, and medical treatment and rehabilitation.

20. In October 2015, five more Hong Kong Branches of CNERCs covering engineering technology areas regarding steel construction, rail transit electrification and automation, precious metals material, tissue restoration and reconstruction, and control and treatment of heavy metal pollution were recognised by MOST. These five new Hong Kong Branches were officially recognised by MOST after vigorous assessment by a panel of overseas experts and local industrialists. Details of the six Hong Kong Branches are at **Annex C**.

Enhancement Measures and Further Review

21. As in the case of providing funding support to PSKLs, we also propose to provide continued funding support to Hong Kong Branches to strengthen their applied research capability and necessary infrastructural base (manpower and equipment) for supporting industries. In other words, starting from 2016-17, each Hong Kong Branch can also receive a maximum of $5 million per year for a three-year period. We also propose to allow a maximum of 30% of the funding to be used for consumables so that their funding conditions will be on par with the PSKLs. We intend to conduct a review of these arrangements in 2018.

ADVICE SOUGHT

22. Members are invited to support the proposal to continue the funding for TTOs, PSKLs and the Hong Kong Branches of CNERCs as stipulated above.

Innovation and Technology Commission
January 2016

Annex A

Key Performance Indicators of Technology Transfer Offices (TTOs) of the Six Universities Designated as Local Public Research Institutions by the Innovation and Technology Commission (ITC)

Performance Indicators	2012-13	2013-14 (ITC funding started)	2014-15
No. of patents filed	524	685	687
No. of patents granted	258	314	303
No. of patents licensed	238	289	333
No. of technology transfer-related public lectures, symposium, exhibitions, etc. delivered to the industry	Information not available	243	473
No. of promotional, marketing, business development activities, etc. organised and attended by TTOs	Information not available	32	42
No. of training courses, workshops, etc. provided to staff of TTOs	Information not available	19	11

Annex B

Partner State Key Laboratories in Hong Kong			
Hosting Organisation	**Partner State Key Laboratory**	**Head**	**Year of Approval**
香港大學 The University of Hong Kong	新發傳染性疾病國家重點實驗室夥伴實驗室 Partner SKL of Emerging Infectious Diseases	管軼教授 Prof GUAN Yi 袁國勇教授 Prof YUEN Kwok-yung	2005
香港大學 The University of Hong Kong	腦與認知科學國家重點實驗室夥伴實驗室 Partner SKL of Brain and Cognitive Sciences	沈伯松教授 Prof SHAM Pak-chung	2005
香港中文大學 The Chinese University of Hong Kong	華南腫瘤學國家重點實驗室夥伴實驗室 Partner SKL of Oncology in South China	孔祥復教授 Prof KUNG Hsiangfu	2006
香港城市大學 City University of Hong Kong	毫米波國家重點實驗室夥伴實驗室 Partner SKL of Millimeter Waves	陳志豪教授 Prof CHAN Chi-hou	2008
香港中文大學 The Chinese University of Hong Kong	農業生物技術國家重點實驗室夥伴實驗室 Partner SKL of Agrobiotechnology	張建華教授 Prof ZHANG Jian-hua	2008
香港理工大學 The Hong Kong Polytechnic University	超精密加工技術國家重點實驗室夥伴實驗室 Partner SKL of Ultraprecision Machining Technology	李榮彬教授 Prof LEE Wing-bun	2009
香港科技大學 The Hong Kong University of Science and Technology	分子神經科學國家重點實驗室夥伴實驗室 Partner SKL of Molecular Neuroscience	葉玉如教授 Prof Nancy IP Yuk-yu	2009
香港城市大學 City University of Hong Kong	海洋污染國家重點實驗室夥伴實驗室 Partner SKL of Marine Pollution	林群聲教授 Prof Paul LAM Kwan-sing	2009

Partner State Key Laboratories in Hong Kong			
Hosting Organisation	**Partner State Key Laboratory**	**Head**	**Year of Approval**
香港中文大學 The Chinese University of Hong Kong	植物化學與西部植物資源持續利用國家重點實驗室夥伴實驗室 Partner SKL of Phytochemistry and Plant Resources in West China	梁秉中教授 Prof LEUNG Ping-chung	2009
香港大學 The University of Hong Kong	肝病研究國家重點實驗室夥伴實驗室 Partner SKL of Liver Research	吳呂愛蓮教授 Prof Irene O.L. NG	2010
香港大學 The University of Hong Kong	合成化學國家重點實驗室夥伴實驗室 Partner SKL of Synthetic Chemistry	支志明教授 Prof CHE Chi-ming	2010
香港理工大學 The Hong Kong Polytechnic University	手性科學國家重點實驗室夥伴實驗室 Partner SKL of Chirosciences	黃國賢教授 Prof WONG Kwok-yin	2010
香港浸會大學 Hong Kong Baptist University	環境與生物分析國家重點實驗室夥伴實驗室 Partner SKL of Environmental and Biological Analysis	蔡宗葦教授 Prof CAI Zongwei	2013
香港大學 The University of Hong Kong	生物醫藥技術國家重點實驗室夥伴實驗室 Partner SKL of Pharmaceutical Biotechnology	徐愛民教授 Prof XU Aimin	2013
香港中文大學 The Chinese University of Hong Kong	消化疾病研究國家重點實驗室夥伴實驗室 Partner SKL of Digestive Disease	沈祖堯教授 Prof Joseph SUNG	2013
香港科技大學 The Hong Kong University of Science and Technology	先進顯示與光電子技術國家重點實驗室夥伴實驗室 Partner SKL of Advanced Displays and Optoelectronic Technologies	郭海成教授 Prof KWOK Hoi-sing	2013

Annex C

Hong Kong Branches of Chinese National Engineering Research Centres			
Hosting Organisation	**Hong Kong Branch of CNERC**	**Head**	**Year of Approval**
香港應用科技研究院 Hong Kong Applied Science and Technology Research Institute	國家專用集成電路系統工程技術研究中心香港分中心 Hong Kong Branch of the National ASIC System Engineering Research Center	湯復基博士 Dr Franklin Tong	2012
香港理工大學 The Hong Kong Polytechnic University	國家鋼結構工程技術研究中心香港分中心 Hong Kong Branch of National Engineering Research Center for Steel Construction	鍾國輝教授 Prof K F CHUNG	2015
香港理工大學 The Hong Kong Polytechnic University	國家軌道交通電氣化與自動化工程技術研究中心香港分中心 Hong Kong Branch of National Rail Transit Electrification and Automation Engineering Technology Research Center	倪一清教授 Prof Yi Qing NI	2015
香港城市大學 City University of Hong Kong	國家貴金屬材料工程技術研究中心香港分中心 Hong Kong Branch of National Precious Metals Material Engineering Research Center	呂堅教授 Prof LU Jian	2015
香港科技大學 The Hong Kong University of Science and Technology	國家人體組織功能重建工程技術研究中心香港分中心 Hong Kong Branch of National Engineering Research Center for Tissue Restoration & Reconstruction	唐本忠教授 Prof Ben Zhong TANG	2015
香港科技大學 The Hong Kong University of Science and Technology	國家重金屬污染防治工程技術研究中心香港分中心 Hong Kong Branch of Chinese National Engineering Research Center for Control & Treatment of Heavy Metal Pollution	陳光浩教授 Prof CHEN Guang Hao	2015