

For discussion
on 18 November 2014

**Legislative Council
Panel on Commerce and Industry**

**Final Report on
Comprehensive Review on the Innovation and Technology Fund**

PURPOSE

This note presents the Final Report on the Comprehensive Review on the Innovation and Technology Fund (ITF).

BACKGROUND

2. The ITF was established in 1999 to provide funding support for projects that contribute to the promotion of innovation and technology (I&T) advancement of Hong Kong.

3. The Innovation and Technology Commission (ITC) has embarked on a comprehensive review of the ITF (referred hereafter as “Review”) which has been in operation for some 15 years. We briefed Members on the interim progress and recommendations arising from the Review at the Panel meetings held on 18 February 2014 (LC Paper No. CB(1)885/13-14(03)) and 18 March 2014 (LC Paper No. CB(1)1072/13-14(07)) respectively. With the support of the Panel, we have also implemented the recommendations in stages while continuing with the remaining part of the Review.

4. The Review is now complete and a final report is attached.

RECOMMENDATIONS

5. A summary of the latest recommendations in the Report is as follows –

Innovation and Technology Support Programme (ITSP)

- (a) relaxing the minimum number of industry sponsors for ITSP projects from two to one (for details please see paragraphs 3.24 to 3.25);
- (b) allowing ITSP platform projects conducted by universities to accept sponsorship from a company which is related to the university (for details please see paragraphs 3.26 to 3.28);

University-Industry Collaboration Programme (UICP)

- (c) relaxing the timeframe for UICP projects from two years to three years (for details please see paragraph 3.41);
- (d) allowing flexibility for the company and the university participating in a UICP project to negotiate and mutually agree on the IP arrangements (for details please see paragraph 3.42);
- (e) adopting the assessment framework of the ITSP for UICP projects (for details please see paragraph 3.43);

Patent Application Grant (PAG)

- (f) increasing the funding ceiling of the PAG from \$150,000 to \$250,000 (for details please see paragraph 3.69);
- (g) enhancing monitoring of the outcome of patent registration funded by the PAG (for details please see paragraph 3.69);

- (h) consequential to the increased PAG funding ceiling, raising the budget for patent application in all ITF-funded R&D projects accordingly from \$150,000 to \$250,000 (for details please see paragraph 3.69);

Public Sector Trial Scheme (PSTS)

- (i) raising the funding ceiling of PSTS projects from 50% to 100% of the original project cost for projects undertaken by R&D Centres (for details please see paragraphs 5.21 to 5.22); and

R&D Cash Rebate Scheme (CRS)

- (j) merging the CRS into the ITF as a long term arrangement for the Scheme (for details please see paragraph 9.10).

6. Most recommendations in the Report can be implemented administratively. However, the merging of the CRS into the ITF will require approval of the Legislative Council Finance Committee (FC). We will submit our case to the FC in due course.

WAY FORWARD

7. The ITF, ITC's flagship support programme, is a major tool to promote I&T. Given the fast changing conditions for I&T development, we will review the effectiveness of ITF support from time to time and implement new measures to create a more favourable ecology for conducting R&D and technology transfer activities.

Innovation and Technology Commission
November 2014

UICP

HKSP

APAS

NAMI

ITSP

ASTRI

Innovation and Technology Fund

GSP

SERAP

LSCM

HKRITA

HKPC

PSTS

Comprehensive Review on the Innovation and Technology Fund Final Report

Innovation and Technology Commission
November 2014

**Comprehensive Review on the
Innovation and Technology Fund (ITF)**

Final Report

**Innovation and Technology Commission
November 2014**

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CHAPTER 1 - PURPOSE

1.1 In mid-2013, we informed Members of the Legislative Council (LegCo) Panel on Commerce and Industry that the Innovation and Technology Commission (ITC) had commenced a comprehensive review of the ITF (the Review) to identify areas of improvements, after some 15 years of operation since 1999.

1.2 We have subsequently briefed Panel Members on the interim progress and recommendations arising from the Review at the Panel meetings held on 18 February 2014 (LC Paper No. CB(1)885/13-14(03)) and 18 March 2014 (LC Paper No. CB(1)1072/13-14(07)) respectively. With the support of the Panel, we have implemented in stages recommendations put forward in previous briefings, while continuing with the Review on the remaining areas of the ITF.

1.3 We have now completed the Review and the full set of findings is presented in this Report. We have also set out the progress of implementation of improvement measures proposed earlier, together with further recommendations.

CHAPTER 2 - BACKGROUND

Establishment of the ITF and Authority

2.1 The ITF was established by Resolution passed by the Legislative Council (LegCo) on 30 June 1999 as a statutory fund under section 29 of the Public Finance Ordinance (Cap. 2) to finance projects that contribute to innovation and technology upgrading in manufacturing and services industries in Hong Kong, and with a view to enhancing Hong Kong's economic development (generally referred to as applied research and development (R&D)).

2.2 The Finance Committee (FC) of the LegCo approved, on 9 July 1999, vide FCR(1999-2000)36, an appropriation of \$5 billion to the ITF. Members also approved the delegation of authority to the Financial Secretary to approve individual projects not exceeding the prevailing funding ceiling of a Category D project in the Public Works Programme. Projects exceeding such funding ceiling will require FC's separate approval. The power of administration of the ITF was subsequently delegated to the Commissioner for Innovation and Technology (CIT) upon the establishment of the Innovation and Technology Commission in 2000 (the current funding ceiling for a Category D project in the Public Works Programme is \$30 million).

Key Funding Programmes

2.3 At present, there are three funding programmes under the ITF that support R&D activities (for details please see Chapter 3) –

- (a) the **Innovation and Technology Support Programme (ITSP)** which supports mid-stream/downstream applied R&D projects mainly undertaken by the five R&D Centres set up by the Government, local universities and other designated local public research institutions;

- (b) the **University-Industry Collaboration Programme (UICP)** which supports collaborative projects undertaken by private companies in collaboration with local universities in the form of matching grant; and
- (c) the **Small Entrepreneur Research Assistance Programme (SERAP)** which provides dollar-for-dollar matching fund for small technology based enterprises to undertake in-house R&D projects that have innovative technological content and have a reasonable chance of successful development of a new product, process or service.

2.4 Apart from the above three programmes, there is also the **General Support Programme (GSP)** which supports non-R&D projects for the upgrading and development of the local industries as well as the promotion of an innovation and technology (I&T) culture in Hong Kong (please see Chapter 3 for details). Under the GSP, there are two sub-programmes, namely –

- (i) the **Patent Application Grant (PAG)** that provides funding support for patent applications; and
- (ii) the **Internship Programme** that supports organisations undertaking ITF projects to recruit graduates from local universities as interns.

2.5 In addition, the **Public Sector Trial Scheme (PSTS)** provides additional funding of up to 50% of the original R&D cost to completed R&D projects funded by the ITF under the ITSP, UICP and SERAP for the production of tools/prototypes/samples and the conducting of trials in the public sector (for details please see Chapter 5).

Evolution of the ITF Over the Years

2.6 As mentioned in paragraph 2.1, the ITF aims to support innovation and technology (I&T) development of industries. We have been guided by the general principles in setting up the ITF by supporting the I&T sector to compete in quality, focus on its niches, and move up the value chain by producing high value-added products/services with innovative technology content. We have been promoting collaboration among the Government, industry, academic and research sectors to support R&D and technology transfer and creating an ecology conducive to the development of I&T.

2.7 Over the years, the ITF has evolved continuously to suit prevailing circumstances. In the early years of its set up to 2006, the focus of ITF was more on supporting projects conducted by universities, the Hong Kong Applied Science and Research Institute (ASTRI) and Hong Kong Productivity Council (HKPC). After a large scale consultation exercise, the Government set up five R&D Centres in 2006 to drive and co-ordinate applied R&D in selected areas which had potentials for further development in Hong Kong. After the financial tsunami in 2008, the Government further upheld the importance of I&T by designating it as one of the six new industries that enjoyed clear advantages. Since then, much effort has been made to drive realisation and commercialisation of R&D outcomes. For instance, we introduced a new assessment framework in 2011 which aims to identify projects with better prospects of realisation/commercialisation apart from scientific/technology contents, and launched the PSTS to promote the application of R&D outcomes in the public sector.

2.8 In mid-June 2013, we commenced a comprehensive review of the ITF to explore further areas of improvements. The findings and recommendations of this Review are set out in this Report.

Overall Figures and Statistics

2.9 As at end-September 2014, the ITF has supported 4 187 projects with a total funding of some \$8.9 billion (funded out of the original \$5 billion commitment approved by FC in 1999 and investment income from the

Exchange Fund from the uncommitted balance of the ITF over the years). Among these projects, 2 404 (or 57% of the total number of approved ITF projects) are R&D projects supported under ITSP, UICP and SERAP, involving approved funding of \$8.1 billion (or over 90% of ITF total). This also includes a funding commitment of \$1,019 million approved by the Finance Committee of the LegCo to support the operation of the R&D Centres (for details please see Chapter 4). Among the three funding programmes, the ITSP is the largest which supports R&D and accounts for around 40% of the number of projects approved and around 80% of the approved funding. A breakdown of these projects is at Table 1.

Table 1: ITF Projects by Funding Programme

Programme	No. of Projects Approved	Approved Funding (\$ million)
ITSP	1 753	7,292.0 ^(Note 1)
UICP	258	294.8
SERAP	393	470.4
GSP (including Internship Programme, etc.)	1 783 ^(Note 2)	673.0
Others (including funding to support Partner State Key Laboratories (PSKL) and Hong Kong Branches of Chinese National Engineering Centres, etc.)	-	124.1
Total	4 187	8,854.3

(Note 1: Includes a funding commitment of \$1,019 million for the operation of the R&D Centres.

Note 2: Excludes applications under Patent Application Grant. For details please see paragraph 3.60.)

2.10 Statistics on the number of projects approved and the funding amount are set out in Table 2.

Table 2: ITF Projects by Financial Year

Financial Year	No. of Projects Approved	Approved Funding (\$ million)
1999-2004	562	1,564.9
2004-2009	790	2,067.8
2009-10	597	825.8
2010-11	437	805.7
2011-12	376	505.2
2012-13	493	718.8
2013-14	576	749.4
2014-15 (first six months up to September 2014)	356	473.6
Total	4 187	7,711.2^(Note)

(Note: Excludes a funding commitment of \$1,019 million for the operation of the R&D Centres and \$124.1 million for other programmes such as funding support for PSKL and CNERC.)

Depending on the prevailing economic situation, demand of the industry and capability of the research institutions, there are fluctuations in the number of ITF projects approved each year.

2.11 As regards the major technology areas of projects funded by the ITF, they are set out in Table 3.

Table 3: ITF Projects by Technology Area

Technology Area	No. of Projects Approved	Approved Funding (\$ million)
Information and Communications Technologies (ICT)	703	2,254.1
Electrical and Electronics	565	2,207.0
Manufacturing Technology	431	986.0
Biotechnology	259	545.8
Materials Science	145	355.4
Nanotechnology	152	373.0
Environmental Technology	101	182.0
Chinese Medicine	60	106.5
Others	1 771	701.4
Total	4 187	7,711.2^(Note)

(Note: Excludes a funding commitment of \$1,019 million for the operation of the R&D Centres, and \$124.1 million for other programmes such as funding support for PSKL and CNERC.)

2.12 As shown in Table 3, the top three technology areas include ICT, electrical and electronics, and manufacturing technology. Together, these three areas accounted for around 40% of the number of projects, or around 70% of total funding approved.

CHAPTER 3 – ANALYSIS BY FUNDING PROGRAMME

3.1 As mentioned above, the four key funding programmes of the ITF are the Innovation and Technology Support Programme (ITSP), the University-Industry Collaboration Programme (UICP), the Small Entrepreneur Research Assistance Programme (SERAP) and the General Support Programme (GSP). Under the ITSP, there is also the Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS) which aims to enhance the level of collaboration on R&D between organisations in Hong Kong and the Guangdong Province. In the ensuing paragraphs, we will assess the operation and performance of these programmes in detail.

A. INNOVATION AND TECHNOLOGY SUPPORT PROGRAMME (ITSP)

Details of the ITSP

3.2 The ITSP is the largest funding programme under the ITF. It supports R&D conducted by –

- (a) five R&D Centres set up by the Government, namely the Hong Kong Automotive Parts and Accessory Systems R&D Centre (APAS), the R&D Centre for Information and Communications Technologies under the Hong Kong Applied Science and Technology Research Institute (ASTRI), the Hong Kong Research Institute of Textiles and Apparel (HKRITA), the Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM), and the Nano and Advanced Materials Institute (NAMI);
- (b) local universities; and
- (c) other designated local public research institutions (referred as “other research institutions” below), including the Hong Kong Productivity Council (HKPC), the Vocational Training Council (VTC), the Clothing Industry Training Authority (CITA) and the

Hong Kong Institute of Biotechnology (HKIB).

3.3 Under the ITSP, there are broadly two categories of projects –

- (a) platform projects which are intended for the benefit of the industry as a whole. These projects require industry contribution of at least 10% of the project cost from two or more companies. The industry sponsors will not be entitled to own the project intellectual property (IP); and
- (b) collaborative projects which are intended to provide support to the industry or a company in conducting R&D, realising/commercialising the IP and taking the R&D outcome to the market. These projects require higher levels of industry contribution of at least 30% of the project cost for projects conducted by R&D Centres or at least 50% for projects conducted by other research institutions. The industry partner will be entitled to exclusive right to utilise the project IP for a defined period or own the project IP.

3.4 There is also a special funding arrangement for exploratory and forward looking R&D projects which aim to provide the foundation for future applied R&D projects. The current maximum funding amount for these projects is \$2.8 million for those conducted by R&D Centres (Seed projects) and \$1.4 million for universities and other research institutions (Tier 3 projects). Industry contribution is not mandatory.

3.5 For non-R&D Centre projects, at present, the ITSP invites two rounds of applications each year from universities and other research institutions, usually in January and July. Applications are considered by an Assessment Panel comprising members from the Government, academia, professional and industry, and its recommendations will be submitted to the Commissioner for Innovation and Technology (CIT) for approval. For collaborative projects (where the industry co-applicant should contribute at least 50% of the total project cost), due to the proprietary nature of the projects, an internal

assessment panel comprising ITC staff will be convened to assess the applications before submission to the CIT for approval.

3.6 For projects undertaken by the R&D Centres, applications are invited by the R&D Centres three to four times per year depending on the project schedule of individual Centres. R&D Centre projects are vetted by the respective Technology Committee/Technology Review Committee of the R&D Centre before submission to the ITC for assessment and approval by the CIT.

3.7 ITSP applications are considered based on an assessment framework, which comprises seven components –

- (a) innovation and technology component (20%);
- (b) technical capability (20%);
- (c) financial considerations (16%);
- (d) existence of a holistic plan of realisation/commercialisation (16%);
- (e) relevance with Government policies or in overall interest of the community (12%);
- (f) IP rights and benefit sharing (8%); and
- (g) management capability (8%).

The above framework was introduced in 2011. It provides a more structured framework which aims to identify projects that are not just meritorious in technology or innovative content, but have a better prospect for realisation/commercialisation and ultimately benefitting the industry and/or community at large.

Figures and Statistics

3.8 As at end-September 2014, the ITSP has supported 1 753 projects, involving a funding amount of \$7.3 billion. This amount includes a funding commitment of \$1,019 million approved by the Finance Committee of the Legislative Council (LegCo) to support the operation of the R&D Centres (for details please see Chapter 4).

3.9 In terms of the number of projects, about 40% are conducted by the R&D Centres, 45% by universities, and the remaining 15% by other research institutions such as the HKPC.

3.10 As regards the categories of projects, about 40% are platform projects, 7% are collaborative projects and the remaining 53% are Seed/Tier 3 projects.

3.11 Statistics of ITSP projects are set out in Table 4.

Table 4: Statistics of ITSP Projects

Financial Year	No. of Projects Approved	Approved Funding (\$ million)
1999-2004	224	1,130.3
2004-2009	485	1,838.4
2009-10	213	700.9
2010-11	150	694.5
2011-12	142	392.1 ^(Note 1)
2012-13	182	569.3
2013-14	212	580.7
2014-15 (first six months up to September 2014)	145	366.8
Total	1 753	6,273.0^(Note 2)

(Note 1: The approved funding in 2011-12 has dropped as a result of the delay effect of the economic slowdown arising from the financial tsunami in 2008-09 and the time for applicants to familiarise themselves with the new ITSP assessment framework introduced in the year.

Note 2: Excludes a funding commitment of \$1,019 million for the operation of the R&D Centres.)

3.12 We have the following key observations –

- (a) with the establishment of the five R&D Centres in 2006, they have played an increasingly important role in conducting R&D projects under the ITSP. For example, from 1999 to 2004 when ASTRI was the only R&D Centre established by the Government, it has only undertaken 22 ITSP projects (or around 10% of the total number of projects under the ITSP during that period); whereas in the recent five years from 2009 to 2014, the five R&D Centres have undertaken 442 R&D projects, representing almost 50% of total number of projects under the ITSP for the period; and
- (b) with the various enhancement measures and liberalisation of the ITF funding mechanism in recent years, the nature of the R&D projects has diversified. Instead of primarily focusing on platform projects during the initial years from 1999 to 2004, the ITSP has been supporting more collaborative projects recently, which involve much higher level of industry contribution and hence demonstrating higher level of recognition of the value of the ITF by the industry. For example, there was no collaborative projects during the initial five years from 1999 to 2004 and 21 during the subsequent five-year period from 2004 to 2009 (or around 4% of the total number of ITSP projects). During the recent five years from 2009 to 2014, the number of collaborative projects has grown to some 90.

3.13 Among the various disciplines, information and communications technologies (ICT), electrical and electronics and manufacturing technology are the three most important ones, which together accounted for 65% of the number of approved projects and 75% of the approved funding. This reflects the traditional industry strengths of Hong Kong in these sectors, and ICT being the heart of a modern information society that penetrates many different walks of life.

3.14 Biotechnology, Chinese medicine and environmental technology are another three important areas which we have seen an increasing trend in recent years. In sum, they accounted for 16% of the number of projects approved and about 14% of the approved funding. Nanotechnology and materials science are also important emerging technology areas which have jointly accounted for 14% of the number of approved projects and 11% of the approved funding.

Selected Examples

3.15 Some selected examples of ITSP projects are listed below (these are projects mostly conducted by universities and other research institutions as projects conducted by the R&D Centres will be separately featured in Chapter 5) –

- (a) the Chinese University of Hong Kong (CUHK) successfully developed a revolutionary non-invasive prenatal diagnostic approach for Down syndrome by direct analysing fetal DNA collected from the mother's blood sample. Conventional methods for detection of fetal chromosomal genetic abnormalities are invasive and carry a finite risk to the mother and unborn baby. Not only is the new diagnostic method a phenomenal commercial success worldwide, benefitting hundreds of thousands of pregnant women, it also represents one of the mostly rapidly developing areas of molecular testing. As arising from this technology, a sensitive analysis of fetal DNA for Down syndrome has been introduced as a clinical service in Hong Kong and the United States since the end of 2011;
- (b) the University of Hong Kong (HKU) has developed a real-time and programmable ultrasound imaging platform which aims to develop a real-time, programmable ultrasound imaging platform that can realise various advanced ultrasound imaging methods with high frame rate and high image quality. A non-exclusive licensing agreement has been reached to transfer some relevant IP to a Canadian company. A knowledge transfer agreement was also reached with a research institute based in New York;

- (c) the Hong Kong University of Science and Technology (HKUST) has developed a low-cost and lead-free flip-chip technology and its associated wafer level packaging technologies. Patents of this technology have been licensed to a Hong Kong company based in the HKSTP with LED manufacturing base in Nansha;
- (d) Hong Kong Baptist University (HKBU) in collaboration with CUHK, HKUST and the Hong Kong Polytechnic University (PolyU) has developed a platform for quality control (QC) standard of processed Chinese material medica. These QC standards are useful reference and basis for testing and certification of the corresponding decoction pieces and help address the current critical issue of the industry of lacking high quality reference standards for QC, testing and/or certification of decoction pieces;
- (e) CUHK has collaborated with seven organisations, including Chinese Academy of Sciences, universities and companies of Guangdong and Hong Kong, to develop a remote sensing satellite ground receiving station supporting the Earth's resources and environmental monitoring. The satellite receiving station will become part of the national satellite services network serving the South China. With the existing infrastructure, the satellite receiving station is able to receive multiple-spectral satellite data and greatly improve the monitoring capability; and
- (f) HKPC has developed a non-radioactive and user-friendly optical imaging system for assisting doctors on diagnostic and providing history records for further clinical reference in melanoma monitoring. Trials of the prototypes have been successfully carried out in several private clinics in Hong Kong. A license agreement with a healthcare company has been reached to produce the optical image system.

3.16 In addition, ITSP projects have also helped built up the research capabilities of local research personnel and enable them to establish centres of

excellence in their respective technology areas. Some selected examples include –

- (a) since the 1990s, a research team in the Department of Electronic and Computer Engineering of the HKUST has conducted a number of projects on display technologies funded under the ITF. The team has successfully licensed a bridged-grain thin-film transistor technology (BG-TFT) to a company in Foshan which has invested HK\$100 million to establish a prototyping line based on BG-TFT for active-matrix organic light-emitting diode displays. At the same time, the company also attracted funding of RMB50 million from a local government in the Mainland. The State Ministry of Science and Technology (MOST) approved in 2013 the establishment of the Partner State Key Laboratory (PSKL) on Advanced Display and Optoelectronic Technologies at HKUST;
- (b) a research team in the Department of Chemistry of HKU has successfully developed some proprietary organic LED (OLED) displays materials for a sponsoring company which is a major OLED materials manufacturer in the Mainland. OLED manufacturers could save substantial licensing fees for obtaining OLED materials from overseas. Having considered the outstanding performance of the team, MOST approved the establishment of the PSKL of Synthetic Chemistry in HKU in 2010; and
- (c) a research team in the Division of Life Science in HKUST, led by a world renowned neuroscientist, has conducted cutting edge research in understanding of brain development and in drug discovery for neurodegenerative diseases. The team has been awarded 10 ITF projects since 2001 to build up a range of drug discovery platforms, knowledge and expertise for identifying novel medicines to treat neurodegenerative disorders. In 2009, MOST approved the establishment of the PSKL of Molecular Neuroscience at HKUST.

Guangdong-Hong Kong Technology Cooperation Funding Scheme

3.17 In order to facilitate R&D collaboration between Hong Kong and the Mainland, we established in 2004 the Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS) under the ITSP which aims to enhance the level of collaboration on R&D between organisations in Hong Kong and Guangdong. Projects funded by the TCFS have to demonstrate an element of collaboration between Hong Kong and Guangdong or Shenzhen research institutes or the industry. Depending on the nature of the project, the projects may be funded solely by the ITSP in Hong Kong or Guangdong/Shenzhen, or jointly by the authorities of two sides, i.e. Guangdong/Hong Kong or Shenzhen/Hong Kong.

3.18 As at end-September 2014, the TCFS has approved over 220 projects, involving a funding amount of over \$770 million. Projects funded by the TCFS are relevant to many technology areas. Some examples are listed below –

- (a) PolyU has developed an interactive robotic system for more effective upper-limb rehabilitation training that is controlled in part by the user's intention, through the detection of muscle activity in the affected limb. Patents for this technology have been granted in the Mainland and the United States. Trials of this system have also been successfully carried out in several elderly care centres, with products based on the licensed technologies now manufactured and sold/ordered by a number of hospitals/rehabilitation centres, including those from Hong Kong, the Mainland, Europe and Singapore; and
- (b) LSCM and HKU have collaborated with 15 organisations, including Sun Yat-Sen University, South China University of Technology to develop radio frequency identification (RFID) enablement middleware for enterprise applications. This technology is currently being applied at the Hong Kong International Airport in order to increase the efficiency of baggage handling at one of the largest RFID baggage handling systems in the world. At present, the

implementation of the system has been demonstrably successful in increasing the baggage handling capacity of the Hong Kong International Airport from 8 000 articles an hour to over 16 000 articles.

Enhancements to the ITSP in Recent Years

3.19 The Government has reviewed the operation of the ITF from time to time and introduced a number of improvements over the past years, usually to the ITSP initially and extending them to other funding programmes (such as UICP and SERAP) based on experience gained. Since 2010, the Government has put forward various measures to provide a more conducive ecological environment to facilitate the realisation and commercialisation of R&D results. We have extended the funding scope of the ITF to cover production of tools, prototypes or samples and conducting of trial schemes in the public sector; adopted a “clustered-project approach” to enhance synergy and impact; and refined the assessment framework to give greater emphasis on realisation and commercialisation in addition to scientific and technical considerations.

3.20 During the Review last year, we have received feedback that the scope of the ITF was still too restrictive and had not reached downstream far enough to facilitate realisation and commercialisation of R&D results. Some views expressed include –

- (a) mismatch with industry needs – there were suggestions that support from the ITSP was inadequate for the industrialists to leverage on their unique strength of integration of existing technologies to devise innovative applications; and
- (b) insufficient focus on downstream R&D – most projects funded by the ITSP did not go beyond the stages of concept proofing and laboratory validation.

3.21 In order to render stronger support to downstream R&D and commercialisation activities, the Government has, after consulting the LegCo

Panel on Commerce and Industry in March 2014, expanded the existing funding scope of ITF to cover more downstream activities, including –

- (a) development engineering/system integration – engineering activities that help turn prototypes into more production-ready forms and the processes of bringing together several sub-technologies into a single system that can operate in a holistic manner;
- (b) large scale process optimisation – industrial processes of improving efficiency and capacity of translating R&D results into marketable products, as well as scaling up the production capacity of a laboratory prototype;
- (c) compliance testing and clinical trials – researches and experiments to fulfil certain special regulatory or technical requirements;
- (d) licensing of third-party IP – acquisition or licensing of a reasonable portion of third-party IP to support downstream R&D/commercialisation; and
- (e) industrial design – optimisation of functions, value and appearance of products and systems for the mutual benefit of both users and manufacturers.

3.22 With the support of the LegCo Panel on Commerce and Industry, the above extension has been formally implemented in the latest round of invitation for ITSP projects in July 2014 and will be applicable to all R&D projects under the ITF, including UICP and SERAP. A diagrammatic representation of the funding mechanism before and after the extension is at [Annex A](#).

Looking Into the Future

3.23 Apart from extending the funding scope, we propose to introduce further improvements to the ITSP as follows –

(a) Relaxing the Current Requirement of the Minimum Number of Industry Sponsors for Platform Projects Under the ITSP From Two to One

3.24 *At set out above, all ITSP platform projects currently require industry sponsorship of at least 10% of the project cost from no less than two private companies which serves to demonstrate the industry relevance of the R&D work (hence a better chance of application in the industry). There have been comments from our stakeholders that the present requirement is too restrictive and may hinder the speedy commencement of good R&D projects, i.e. though a good project proposal has been worked out, it cannot commence due to the inability of finding two industry sponsors.*

3.25 *After reviewing the situation, given that the project IP for ITSP platform projects is to be opened to all industry players and to better facilitate the commencement of more good projects, we consider that the requirement for industry sponsorship can be relaxed from at least two companies to one company.*

(b) Allowing ITSP Platform Projects Conducted by Universities to Accept Sponsorship From a Company Which is Related to the University

3.26 *Currently, a project sponsor for an ITSP platform project should not be related to the lead applicant in terms of ownership or management. The rationale behind this is to prevent potential conflict of interest.*

3.27 *Nevertheless, with our increasing emphasis on realisation/commercialisation, we realise that that such requirement is too restrictive –*

- (i) *it prevents university staff, such as a professor and his/her research team members, to establish a company to take charge in the productisation and commercialisation of the R&D outcome and enjoy a fair share of the commercialisation benefits, hence reducing the chance of commercialisation;*
- (ii) *it also prevents universities from setting up companies to attract external funding sources (e.g. capital from venture capitalists or donations) to sponsor and kick-start a worthwhile project; and*
- (iii) *the above is contrary to our key objective of encouraging university professors to bravely take their R&D outcomes from the campus to the real world.*

3.28 *Having considered the above, we propose to relax the requirement for ITSP projects undertaken by local universities (not applicable to projects conducted by R&D Centres and other research institutions) by accepting sponsorship from a company which may be related to the university or their staff (e.g. a subsidiary of the university set up to commercialise the R&D outcome, a company owned/managed by the project coordinator or a member of the project team) as long as such arrangement has the support of the university concerned and does not violate the relevant rules and regulations of the university.*

3.29 *Despite the above two new measures, a project with a larger number of sponsors or higher level of industry sponsorship will be considered more favourably in the process of vetting. In addition, as with all ITSP platform projects, the IP rights arising from the project will be owned by the university, and should generally be made available to all members of the industry on a non-exclusive basis (e.g. through licensing) in line with the normal IP arrangements for platform projects.*

3.30 *We will keep in view the experience after implementing the above and introduce improvements as necessary.*

B. UNIVERSITY-INDUSTRY COLLABORATION PROGRAMME (UICP)

Details of the UICP

3.31 The UICP is a funding programme under the ITF which provides matching grant for collaborative projects undertaken by local companies in collaboration with universities. The matching is on a 50:50 basis and only cash sponsorship is accepted. Given UICP projects are proprietary in nature, the IP rights arising from the projects belong to the applicant companies. There are three schemes under the UICP –

- (a) **Teaching Company Scheme** which supports local companies to take on postgraduate students from local universities to assist in propriety R&D work;
- (b) **Matching Grant for Joint Research** which aims to foster private companies to collaborate with universities in propriety R&D projects; and
- (c) **Industrial Research Chair Scheme** which aims to assist universities and industry to develop research efforts that respond to industrial needs by inviting professors to lead designated R&D projects.

3.32 The UICP is open for application all year round and the results are normally announced around a month upon receiving the full information relating to the application. Given the proprietary nature of UICP projects, applications are assessed by an internal panel consisting of ITC staff against a set of established criteria before submission to the Commissioner for Innovation and Technology for approval.

Figures and Statistics

3.33 As at end-September 2014, the UICP has approved 258 projects, involving a funding amount of \$294.8 million. This accounted for 12% and 4% respectively of the total number of R&D projects and total funding approved for R&D under the ITF. Statistics of these projects are set out in Table 5 and Table 6.

Table 5: Statistics of UICP Projects

Financial Year	No. of Projects Approved	Approved Funding (\$ million)
1999-2004	127	167.1
2004-2009	52	28.7
2009-10	7	7.5
2010-11	11	10.2
2011-12	11	15.0
2012-13	23	30.9
2013-14	18	22.2
2014-15 (first six months up to September 2014)	9	13.2
Total	258	294.8

Table 6: Projects under the UICP

Scheme	No. of Projects Approved	Approved Funding (\$ million)
Teaching Company Scheme	95	17.8
Matching Grant for Joint Research	160	273.4
Industrial Research Chair Scheme	3	3.6
Total	258	294.8

3.34 As we have previously mentioned, universities are the most important players in conducting applied R&D during the early years of ITF, hence the

UICP was naturally one of the most important financial tool in support such R&D activities from 1999-2004. With the establishment of the R&D Centres in 2006, the proportion of ITF R&D projects undertaken by universities has decreased in recent years.

3.35 Figures show that most projects under the UICP are supported by the Matching Grant for Joint Research (the number of projects and funding amount account for around 60% and 90% of all UICP projects), followed by the Teaching Company Scheme. The Industrial Research Chair Scheme was the least subscribed amongst the three schemes as it requires substantial commitment on the part of a distinguished researcher of a university to lead the relevant R&D project for a fixed duration, in general up to 2 years, and to devote no less than 90% of the time of his working time in the project. Notwithstanding the above, we propose to retain the Industrial Chair Research Scheme to cater for the rare circumstances whereby some professors are desiring to commit almost all their time to a R&D project.

3.36 The more popular technology areas supported by UICP projects are largely similar to that of the ITSP. ICT, manufacturing technology and electrical and electronics are the three most common areas supported under the UICP. Together, these three areas accounted for 60% of the total number of projects under the UICP and around 50% of approved funding.

3.37 Biotechnology, Chinese medicine and environmental technology are also important areas which, together, accounted for around 30% of the total number of projects under the UICP and 45% of approved funding. There are also some projects related to nanotechnology and materials science.

Selected Examples

3.38 Some selected R&D projects supported under the UICP are listed below –

- (a) CUHK has collaborated with a renowned local Chinese medicines manufacturer to develop a Chinese medicines-based healthcare product for women of all ages. This project has applied modern scientific methodology to investigate the traditional Bak Foong Pills, to analyse their active ingredients and quantify their bio-efficacy using the latest technology. By optimising the beneficial ingredients, a quality-controlled, scientific proven, new healthcare product has been developed;
- (b) CUHK has collaborated with a local biotechnology company to develop novel methodologies on optimisation of industrial enzymes. The project technologies have been applied to improve biochemical properties of a number of enzymes of eminent commercial values and laid a solid scientific and technological foundation for the applicant company to develop a new line of products and enhance its technical competitiveness; and
- (c) HKUST is collaborating with a battery company to develop a Battery Management System for the monitoring and adjusting battery status. It would be integrated with a bicycle assisted by an electric motor, an electric bike and E-scooter. Laboratory test and road test would be conducted to demonstrate the developed system.

Looking Into the Future

3.39 Universities are cradles of talents and fountains of innovative ideas. In addition to the steady supply of science, engineering and technology graduates, we have a pool of professorial talents who have contributed to the excellence of our universities which are consistently ranked amongst the best in Asia.

3.40 We hope to continue make use of the UICP to foster collaboration between universities and the industry. Looking ahead, we propose to introduce the following improvement measures –

(a) Relaxing the Timeframe for UICP Projects From a Maximum of Two to Three Years

3.41 *There have been feedback that for a postgraduate student working on an UICP project as part of his/her doctoral degree, a project period of three years would be more in line with the usual timeframe for completing his/her doctorate. In addition, allowing a student to work for the company for a longer duration would help groom the student to pursue a career in I&T (e.g. joining the company after the project), thereby increasing the pool of talents in Hong Kong.*

(b) Allowing Flexibility for the Company and the University Participating in an UICP Project to Negotiate and Mutually Agree on the IP Arrangements, Including Ownership, Licensing and Benefit Sharing

3.42 *At present, the funding guidelines of UICP stipulate that the project IP will rest with the company. While we appreciate that having contributed more than 50% of the project cost, it is reasonable for the company to own the IP, we also recognise that there may be cases whereby the IP may better rest with the universities/professors concerned (e.g. the professors would be in a better position to undertake further development/commercialisation of the R&D outcome). In any case, we believe it should be up to the university and the company to agree on the best IP arrangements.*

(c) Adopting the Assessment Framework of the ITSP for UICP Projects

3.43 *For historical reasons, the UICP assessment framework is slightly different from that of the ITSP (for details please see paragraph 3.7 above). In order to better align the assessment frameworks of both programmes and for consistency, we propose to formally adopting the assessment framework of the ITSP to UICP projects.*

C. SMALL ENTREPRENEUR RESEARCH ASSISTANCE PROGRAMME (SERAP)

Details of SERAP

3.44 SERAP is the only programme under the ITF that supports in-house R&D carried out solely by private companies (without any university/R&D Centre partners). Key features of SERAP include –

- (a) the provision of Government funding on a dollar-for-dollar matching basis to small technology-based companies to undertake R&D projects within two years;
- (b) the funded projects should have innovative technological content, and have a reasonable chance of successful development of a new product, process or service that can be brought to the market;
- (c) Government's contribution to each project is capped at \$6 million;
- (d) recipient companies will hold all IP rights arising from the project; and
- (e) Government's contribution will be recouped in stages if the project is able to generate revenue or the recipient company is able to attract third-party investment.

3.45 The original purpose of setting up SERAP was to provide funding support to technology entrepreneurs and encouraging them to carry out R&D projects and start small businesses to commercialise their R&D results during the pre-venture capital stage. If a technology company has to become a sustainable business in the industry, it would need to grow past its pre-venture capital stage by increasing its staff size as well as delivering more products/services. Additional funds will then be needed. The ones of high potentials may even attract venture capital (VC) investments to bridge this financial gap.

3.46 A company will be eligible to apply if –

- (a) it is incorporated in Hong Kong under the Companies Ordinance;
- (b) it has less than 100 employees in Hong Kong;
- (c) it is not a large company; and
- (d) it is not a subsidiary of or significantly owned/controlled by a large company.

3.47 Project applications will be considered by the SERAP Project Assessment Panel comprising independent experts in the innovation and technology sector. Major vetting criteria include –

- (a) the innovation and technology component of the project;
- (b) the commercial viability of the project;
- (c) the team capability and commitment; and
- (d) the relevance with Government policies or in overall interest of the community.

Enhancement to SERAP in Recent Years

3.48 SERAP has been reviewed from time to time, taking into account the experience gained from implementation and feedback received. Major enhancements over the years are summarised below –

- (a) In 2008
 - size of eligible company was expanded from “no more than 20 employees” to “no more than 100 employees”;
 - the two-phased application system was streamlined to a single-phase system in April 2008. Before that, an applicant was required to confine the project’s initial trial phase to no more than

six months and then subsequently apply for funding for the second phase;

- a new measure was introduced in which 10% of Government's contribution would not be disbursed until the companies submitted the Final Report and the audited accounts of the projects to the ITC;
- the reference interest rate in calculating the penalty for late recoupment payment to the Government was changed from "an interest rate at the prime rate on all sums due and unpaid" to "an interest rate at 5%, 10% or 15% on all sums due and unpaid";

(b) In 2009

- the funding ceiling of SERAP for each project was raised from \$2 million to \$4 million;

(c) In 2012

- the funding ceiling of SERAP for each project was further raised from \$4 million to \$6 million;
- the scope of eligible companies was expanded to include enterprises that have received VC investment; and
- the scope of project activities eligible for funding support was expanded to include industrial design, testing and certification of prototype, clinical trial, etc.

Figures and Statistics

3.49 As at end-September 2014, SERAP has approved a total of 393 projects, involving a funding amount of \$470.4 million, representing around 5% of the total funding provided by the ITF. Statistics of these projects are set out in Table 7 and Table 8.

Table 7: Statistics of SERAP Projects

Financial Year	No. of Projects Approved	Funds Approved (\$ million)
1999-2004	176	175.1
2004-2009	110	117.3
2009-10	34	48.3
2010-11	21	31.9
2011-12	14	19.5
2012-13	12	23.9
2013-14	17	35.6
2014-15 (first six months)	9	18.8
Total	393	470.4

Table 8: SERAP Projects by Technology Area

Technology Area	No. of Projects Approved	Funds Approved (\$ million)
ICT	208	228.3
Electrical and Electronics	87	106.0
Manufacturing Technology	20	20.6
Biotechnology	39	68.2
Materials Science	13	17.7
Nanotechnology	4	9.4
Environmental Technology	13	13.9
Chinese Medicine	1	0.4
Others	8	5.9
Total	393	470.4

3.50 The trends of SERAP applications received are somehow affected by multiple factors including the global and regional economic situations, market demand as well as the sectoral strength of the local I&T business community. Throughout the years, the majority of the funded projects are consistently relevant to ICT (53%), electrical and electronics (22%) and biotechnology (10%).

Selected Examples

3.51 Some selected examples of projects supported by SERAP are listed below.

- (a) an entrepreneurial integrated circuit (IC) engineer has developed a high-speed 8-bit microprocessor that helped the company grow from a single person company to a strong company with several hundred employees and a market leader in providing one-stop IC design solutions. The company now owns nine US patents and offers a wide range of consumer chips, generating annual revenue of \$800 million;
- (b) a start-up company has developed an integrated wetness care system. It comprises wetness detecting devices attached to disposable diapers of the bed-ridden patients wirelessly connected to a central display unit to facilitate monitoring by nurses. This system alleviates nursing problems encountered when taking care of bedridden patients. The company has filed patent applications for in the US, Australia and the Mainland, and received the Gold Award in the International Exhibition of Inventions of Geneva in 2012;
- (c) a Hong Kong-based drug development company has developed a novel therapeutics treatment of human malignancies, in particular hepatocellular carcinoma, using recombinant human arginase. Thereafter, the company has received venture capital investments. Also, it delivered the first novel drug developed in Hong Kong which has obtained approval from the US Food and Drug Administration (FDA) to commence human clinical studies in the US by the issuance of Investigational New Drug (IND); and
- (d) a biotechnology company set out to commercialise research undertaken on the molecular diagnostics of infectious diseases. Ever since the company has made significant technology advancement in molecular diagnostics, producing innovative lines

of clinical and non-clinical diagnostic products, and delivering practical solutions to ensure the health and safety of society. In 2000, the company opened its first fully-dedicated commercial molecular testing and R&D laboratory, offering testing services to the world's research and industrial markets.

Looking Into the Future

3.52 While SERAP has been an important funding source to support in-house R&D activities in the private sector, the current arrangements have certain limitations, particularly when compared to the ITSP and UICP –

- (a) size of company – SERAP is restricted to small and medium enterprises (SMEs) which have less than 100 employees and are not subsidiary companies significantly owned or controlled by publicly listed companies. Larger companies in general cannot benefit from the funding support to conduct in-house R&D;
- (b) funding ceiling – while funding support by ITF on R&D projects conducted in collaboration with designated institutions may reach \$30 million per project, the funding ceiling of SERAP is only \$6 million per project; and
- (c) repayment requirement – while there is no repayment requirement for projects funded by the ITSP and UICP, SERAP recipients are required to repay the funding from ITF when the project generates revenue or receives third-party investment. There have been comments that this repayment requirement would in a way become a disincentive for SERAP recipients to pursue success.

3.53 To address the limitations of SERAP, we will replace it with a new and improved Enterprise Support Scheme (ESS) with the following arrangements –

- (a) size of company – companies registered in Hong Kong regardless of size will be eligible to apply. In implementing the Scheme, we will

ensure that there are clear assessment criteria and sufficient checks and balance to ensure an open and objective selection process, including the necessary tests on technical merit, benefit to the community, proportionality and reasonableness; and the vetting panels for ESS would comprise experienced prominent persons in various domains of the I&T sector such as academia, industry, venture capital, etc. to ensure a fair and balanced assessment of the applications;

- (b) amount – funding up to \$10 million for each approved project will be provided on a generally matching basis. Contribution from the applicant company should, unless in very exceptional circumstances, not be less than 50% of the total project cost. Both cash and in-kind contribution will be accepted;
- (c) assessment of applications – the applicant company would be assessed under a marking scheme to be devised, making reference to the current marking criteria of the ITSP and SERAP. Since creating employment opportunities and nurturing local talent are our top priority, we would put special emphasis on the applicant’s employment plan for talents;
- (d) fund recoupment requirement – in contrast with SERAP, we propose that there will be no requirement for recoupment of the approved funds. This will provide greater encouragement to companies to invest in R&D; and
- (e) IP arrangement and benefit sharing angle – the applicant company will own the IP of the project (unless otherwise agreed among parties concerned). As for the ”benefit-sharing” requirement, we will also allow much greater flexibility.

3.54 The salient features of ESS as compared with SERAP are shown in Table 9.

Table 9: SERAP vs. ESS

	SERAP	ESS
Size of Company	Less than 100 employees	No restriction
Funding Ceiling	\$6 million	\$10 million
Recoupment Requirement	Yes	No

3.55 In March 2014, we obtained the support of the LegCo Panel on Commerce and Industry in principle for the ESS. We are currently finalising the implementation details and aim to submit them to the Panel again in late 2014.

D. GENERAL SUPPORT PROGRAMME (GSP)

Details of the GSP

3.56 The GSP is the only funding scheme under the ITF catering for non-R&D projects that contribute to the upgrading and development of our industries, as well as fostering an innovation and technology culture in Hong Kong. Examples of GSP projects include conferences, exhibitions, seminars, workshops, studies and surveys, competitions, scholarships and youth activities.

3.57 Under the present funding guidelines, eligible applicants include organisations in Hong Kong such as non-profit making organisations, public bodies, charitable organisations, local universities or private companies. Sponsorship of no less than 10% of the total project cost, either in form of cash, in-kind or a combination of both, is also required. Applications for the GSP are open all year round. An Assessment Panel comprising members of the academia, industry, professional and experts in different sectors meets regularly (around every 3 months) to consider the applications before submitting its recommendations to the Commissioner for Innovation and Technology for approval.

3.58 Normally, events/activities funded under the GSP should be primarily conducted in Hong Kong. Where justified, the GSP may also support events/activities outside Hong Kong. The relevant expenditure should however not exceed 50% of the total project cost.

3.59 Under the GSP, there are also two sub-programmes, namely –

- (a) the **Patent Application Grant (PAG)** which provides funding support for patent applications from an individual or a company who/which has never owned a patent before, including cost for patent search-cum-technical assessment and other costs involved in the patent application process, such as attorney fees, consultant fees, etc. At present, the funding ceiling for grant to each person or company is \$150,000 or 90% of the cost of patent application. HKPC is the implementation agent for the PAG; and

- (b) the **Internship Programme** which supports organisations undertaking R&D projects under the ITF (i.e. those funded by the ITSP, UICP and SERAP) to recruit graduates from local universities as interns. At present, each ITF project can engage up to 2 interns at one time, the maximum internship is 24 months, and the monthly allowance for an intern is \$12,000 for a graduate with Bachelor’s degree and \$14,000 for a graduate with a Master’s or higher degree.

Figures and Statistics

3.60 As at end-September 2014, the GSP (excluding Internship Programme and PAG) has approved 123 projects, involving a funding amount of over \$170 million. Figures of all the projects/applications approved under the GSP (including the two sub-programmes) are set out in Table 10.

Table 10: Statistics of all GSP Projects/Applications

Scheme	No. of Projects/Applications Approved	Funds Approved (\$ million)
GSP (excluding Internship Programme and PAG)	123	173.3
Internship Programme	1 660	312.1
PAG	1 449 ^(Note)	187.6
Total	3 232	673.0

(Note: PAG applications normally not counted as ITF projects.)

Enhancements to the GSP in Recent Years

GSP (excluding Internship Programme and PAG)

3.61 To maximise the benefits that GSP projects could bring to the industry and community, we have been reviewing the GSP from time to time in light of the experience gained, and as a result we have introduced improvement measures to enhance the Programme’s effectiveness and flexibility.

3.62 The last major review of the GSP was carried out in 2011, after which various improvement measures on the scope and processing mechanism of the GSP were introduced. For example we have relaxed the sponsorship requirement in respect of number of sponsor from two to one; expanded the scope of eligible sponsors to include NGOs and charitable organisations and individuals; adopted an assessment framework; extended the funding scope and streamlining the project reporting mechanism, etc. We have further reviewed the GSP in 2013 and introduced one further improvement to the sponsorship requirement by accepting sponsorship from the applicant itself, or related parties, as eligible sponsorship.

3.63 With these improvements, the number of GSP applications has increased in recent years (i.e. 13 in 2010-11, 23 in 2011-12 and 33 in 2013-14), and the amount of GSP funding approved is also on the rise (i.e. \$5.5 million in 2010-11, \$20.1 million in 2011-12 and \$27.3 million in 2013-14).

3.64 Some selected examples of GSP projects are as follows –

- (a) the Hong Kong Federation of Youth Groups received funding to organise the “Innovation and Technology Scholarship Award Scheme” since 2011. The Scheme, with funding support from the Hongkong and Shanghai Banking Corporation Limited, aims to provide young science talents an opportunity to strengthen their exposure outside Hong Kong and gain industry experience, with a view to encourage the youths to pursue innovation and technology as their lifelong career. Each year about 25 university students are awarded the Scholarship to join a programme comprising elements of overseas/Mainland attachment, mentorship; community service; and local internship. Throughout the years the Scheme has established itself as one of the most recognised schemes of its kind in Hong Kong, and has received strong support and positive feedback;
- (b) the Hong Kong Computer Society has hosted the Asia Pacific Information & Communications Technology Awards 2013 (APICTA 2013), an international awards program to promote ICT awareness in the community, and provide networking and product benchmarking

opportunities to innovators and entrepreneurs in the region. Through hosting the event in Hong Kong, the project aims to reaffirm Hong Kong's excellence as a digital city, to further stimulate the innovation and creativity of the local ICT sector and to cultivate young talents. The event was participated by 12 Asian member economies in 17 award categories in ICT;

- (c) the Gordon Research Conferences (Hong Kong) Limited received GSP funding in 2013 and 2014 to establish in Hong Kong the “Asia home” of Gordon Research Conferences (GRC), a prestigious international scientific conference for exchanges of new concepts in science and promotes frontier research in various scientific streams. The project helps promote Hong Kong's image as a world-class, knowledge-based economy, and foster an I&T culture among university students and the industry. Each year the conference attracts about 1,000 local and overseas participants from the academic, industry and professional sectors; and
- (d) the Hong Kong Institute of Biotechnology conducted a project on Good Manufacturing Practice (GMP) training and post-training information acquisition for the Chinese medicines manufacturing industry. This project aims to promote the implementation of GMP among local manufacturers of propriety Chinese medicines (pCm) through a programme including basic GMP training, GMP facilities tour, and on-site company interviews. The project would also provide reference on the current situation of the Chinese medicines manufacturing industry as well as views and needs of local pCm manufacturers on GMP implementation.

Internship Programme

3.65 The Internship Programme has been running smoothly and is welcomed by applicants as shown by the steady trend in the number of applications received in recent years. The Programme provides more exposure and incentives to young generation to explore their interest and career in R&D. In the past three years, over 60% of interns under this Programme either found a

job, or indicated interest in a future employment, in the R&D field. In 2012, the monthly allowance for an intern has been increased from \$10,000 to \$12,000 for a graduate with Bachelor's degree, and from \$12,000 to \$14,000 for a graduate with a Master's or higher degree.

PAG

3.66 The PAG was launched by the then Industry Department in 1998 and has been merged into the ITF in 2002. It has been well received by the community as reflected by the steady number of applications (about 200 per year) received in recent three years (among those about 65% were approved), especially subsequent to the increase of the funding ceiling per application from \$100,000 to \$150,000 effective from 1 February 2010. In mid-2014, we conducted a survey to collect the feedbacks from fund recipients. The key findings are set out below –

- (a) about 75% of the respondents used the PAG to apply for patent registrations for their invention in more than one country/territory, showing that the PAG has effectively encouraged applicants to capitalise on their intellectual work through patent registration in various markets. The three most popular places for patent registration are the US, the Mainland and the EU;
- (b) of the respondents who have used up the PAG, about 80% indicated that they have successfully obtained patent registration, about 15% indicated that their applications were still in progress and the remaining reported that their applications were not successful;
- (c) about 70% of respondents who have successfully obtained patents mentioned that they would maintain the patents in force, reflecting that the PAG has effectively encouraged inventors to use patents to protect their inventions; and

- (d) about 80% of respondents agree or strongly agree that they were satisfied with the PAG while about 10% of respondents held a neutral view. The remaining about 10% respondents disagree or strongly disagree with the PAG. The majority of the comments received was that the funding ceiling is not sufficient for patent registration in popular markets and should be increased.

3.67 Apart from gauging views from PAG fund recipients, the ITC has also, in parallel, collected data on the current market of patent applications and felt that the current level of subsidy may not be sufficient and should be increased.

Looking Into the Future

3.68 We have been reviewing the GSP (together with the Internship Programme and PAG) from time to time.

3.69 *In the light of the review of the PAG conducted this year, we propose to introduce the following improvement measures to enhance its effectiveness and monitoring –*

- (a) *increasing the funding ceiling of the PAG from \$150,000 to \$250,000 per application. This will in general be sufficient to cover the average actual costs of the majority of PAG fund recipients to successfully obtain a patent in either one or more of the top three most popular jurisdictions, namely, the US, the Mainland and the EU;*
- (b) *requiring the implementation agent, HKPC to monitor the outcome of patent registration of fund recipients for a limited period (say 2 years) after the expiry of the PAG fund to better assess the final outcome of the application; and*
- (c) *on a separate but related issue, the corresponding funding ceiling of patent application budget in all ITF-supported R&D projects will also be increased accordingly from \$150,000 to \$250,000.*

3.70 *With these improvements, more local companies and individual inventors will be able to capitalise on their intellectual work through patent registration and be encouraged to make better use of patents to protect their inventions.*

CHAPTER 4 – ANALYSIS BY RESEARCH AND DEVELOPMENT (R&D) CENTRE

Background of R&D Centres

4.1 The Government set up five R&D Centres in 2006 to drive and coordinate applied R&D in their respective technology areas and promote commercialisation –

- (a) Hong Kong Automotive Parts and Accessory Systems R&D Centre (APAS);
- (b) R&D Centre for Information and Communications Technologies under the Hong Kong Applied Science and Technology Research Institute (ASTRI);
- (c) Hong Kong Research Institute of Textiles and Apparel (HKRITA);
- (d) Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM); and
- (e) Nano and Advanced Materials Institute (NAMI);

4.2 On 24 June 2005, the Finance Committee (FC) of the Legislative Council (LegCo) approved vide FCR(2005-06)21 a total commitment of \$273.9 million under the ITF for the establishment of APAS, HKRITA, LSCM and NAMI and their first five years of operation (except the operating expenditure of ASTRI which is funded separately from Government's annual recurrent subvention).

4.3 In June 2009, having regard to the performance of the R&D Centres after an interim review, FC approved vide FCR(2009-10)27 an increase in the funding commitment by \$369 million to extend the operation of the four R&D Centres up to 31 March 2014.

4.4 In 2011, we conducted a comprehensive review on the R&D Centres' operation and overall performance for the first five-year period. With the support of the LegCo Panel on Commerce and Industry (C&I Panel) and having regard to the outcome of the review, FC approved vide FCR(2012-13)21 in May 2012 an additional commitment of \$275.3 million to extend the operation of the R&D Centres as follows –

- (a) for NAMI and APAS which had met the interim industry contribution target of 15% in their first five-year period, their operation period was extended until 31 March 2017 and their industry contribution target was revised to 20%; and
- (b) for HKRITA and LSCM which had not achieved an industry contribution of 15% in the first five years, their operation period was only extended to 31 March 2015. We undertook to closely monitor/review their performance during a two-year observation period ending March 2013 (i.e. two years after the last review) with a revised industry contribution target of 18%.

4.5 We subsequently briefed the C&I Panel at its meeting on 18 June and 19 November 2013 that both HKRITA and LSCM had exceeded the industry contribution target of 18% during the two-year observation period from 2011-2013 and their performance had shown sustained improvement and was generally satisfactory. With the support of the C&I Panel, the FC approved on 24 January 2014 vide FCR(2013-14)55 an additional \$100.8 million to extend the operation of HKRITA and LSCM up to 31 March 2017 to align with the operation period of APAS and NAMI. Their industry contribution target was also raised to 20%.

4.6 In other word, the FC has so far approved a total of \$1,019 million out of the ITF to support the Centres' operation for 11 years from April 2006 to March 2017. Summary of the funding commitment approved by FC, operating expenditure and staff strength of the R&D Centres as at 31 March 2014 are set out in Table 11.

**Table 11: Funding Commitment, Operating Expenditure
and Staff Strength of the R&D Centres**
(\$ million)

R&D Centre	Approved Funding Commitment	Cumulative Operating Expenditure	Staff Strength
		(up to 31 March 2014)	
APAS	228.2	117.0	22
ASTRI	n/a ^(Note)	908.7	499
HKRITA	197.7	103.2	26
LSCM	207.9	124.7	49
NAMI	385.2	214.1	64
Total	1,019.0	1,467.7	660

(Note: ASTRI is funded separately from Government's annual recurrent subvention.)

4.7 The R&D expenditure of the R&D Centres are funded separately out of the ITF on a project basis.

Overall Figures and Statistics

4.8 As at end-September 2014, the five R&D Centres have conducted over 700 projects (accounted for about 30% of total number of R&D projects supported by the ITF) involving a funding amount of about \$3,300 million (accounting for about 40% of the approved funding for all R&D projects supported by ITF).

4.9 A summary of the number of projects and funds approved by R&D Centre is set out in Table 12.

Table 12: New Projects Undertaken by R&D Centres

R&D Centre	No. of New Projects Approved	Approved Funding (\$ million)
APAS	77 (18)	208.1 (57.9)
ASTRI	322 (21)	2,222.2 (128.0)
HKRITA	116 (19)	286.5 (32.4)
LSCM	64 (8)	317.3 (6.2)
NAMI	128 (44)	292.9 (99.8)
Total	707 (110)	3,327.0 (324.3)

(Note: Figures in bracket denote figures for collaborative projects.)

4.10 Among the above projects, 110 are collaborative projects (or about 85% of all collaborative projects supported by the ITSP), involving a funding amount of over \$320 million (or about 95% of total approving funding for all collaborative projects supported by the ITSP).

4.11 The R&D expenditure of the R&D Centres is shown in Table 13.

Table 13: R&D Expenditure
(\$ million)

R&D Centre	Actual Cumulative R&D Expenditure (as at 31 March 2014)
APAS	137.5
ASTRI	1,907.5
HKRITA	226.1
LSCM	268.2
NAMI	235.0
Total	2,774.3

4.12 R&D Centres are platforms for co-ordinating applied R&D in their respective areas, and as such the level of industry contribution remains the most

important indicator to show the degree of support of the industry in their work. The performance of the R&D Centres in terms of industry contribution is set out in Table 14.

Table 14: Level of Industry Contribution of the R&D Centres ^(Note 1)

R&D Centre	2006-11 (First Five-Year Period)	2011-12	2012-13	2013-14	2011-14 (3-year average)
APAS	16.5%	13.9%	30.5%	41.8%	38.2%
ASTRI ^(Note 2)	14.9%	20.2%	25.3%	19.3%	n/a
HKRITA	12.4%	23.0%	26.8%	35.0%	30.7%
LSCM	12.3%	15.4%	18.7%	28.2%	21.1%
NAMI	31.2%	35.9%	39.0%	15.9%	34.7%

(Note 1: The level of industry contribution is calculated as follows –

$$\frac{\text{Industry Contribution Pledged}}{\text{Approved Project Expenditure}} \times 100\%$$

Note 2: Due to historical reason, ASTRI previously adopted a slightly different method of calculating industry contribution. We have since 2013-14 aligned its industry calculation method with that of other R&D Centres and this is set out in the figure under the ‘2013-14’ column in Table 14 above.)

4.13 As it can be seen in the above table, all the R&D Centres have been able to achieve an overall industry contribution target of 20% in the first three years of the second five-year period.

Overall Performance of the R&D Centres

4.14 Since the establishment of the R&D Centres, the ITC has been submitting annual reports of the operation and performance of the R&D Centres to the LegCo C&I Panel. The R&D Centres also took the opportunities to report their major progress in terms of technological advancement, stakeholder collaboration, realisation/commercialisation and future R&D roadmap. The latest report was submitted to the C&I Panel at its meeting on 17 June 2014.

4.15 As we have reported to this Panel at the Annual Report of the R&D Centres in June 2014, we are delighted that after some eight years of operation, the R&D Centres have gradually become more mature. For instance –

- (a) they have taken up a significant role in acting as the focal point for technology collaboration among the Government, industry, academia and research sectors;
- (b) in terms of commercialisation, some of the R&D Centres have started receiving more income other than industry sponsorship for ITF projects, including contract service income and licensing fees/royalties;
- (c) they have made great effort in conducting trials in the public sector. Over the past few years, they have conducted over 70 trial projects in the public sector;
- (d) they have obtained increasing support of the industry as demonstrated by the increase in the level of industry contribution over the years; and
- (e) they have gradually made a name as the trusted R&D partner in their respective sectors. For example, LSCM has been appointed as an institutional member of the Hong Kong Logistics Development Council in recognition of its knowledge and expertise in the logistics industry, and HKRITA has collaborated with various stakeholders on a number of successful projects, supporting various Government departments and non-government organisations, such as the Fire Services Department, Hong Kong Sports Institute, etc.

4.16 A summary of the performance of each R&D Centres are set out in the ensuing paragraphs. For examples of realisation and commercialisation of the R&D Centres, please refer to Chapter 5.

APAS

4.17 The mission of APAS is to becoming a world-class automotive parts and accessory system R&D Centre and assist Hong Kong's foundation industries to enter into or expand in the automotive market. It has been coordinating R&D projects in four focus areas –

- (a) hybrid and electric vehicles;
- (b) safety and environment;
- (c) electronics, controls and software; and
- (d) new materials and processes.

4.18 As at end-September 2014, APAS has conducted 77 projects, involving a funding amount of \$208.1 million. Among them, 39 are platform projects, 18 are collaborative projects and 20 are Seed or Public Sector Trial Scheme (PSTS) projects.

4.19 During the comprehensive review of the R&D Centres in 2011, in order to improve cost-effectiveness, we proposed that the APAS should be merged into the Hong Kong Productivity Council (HKPC) for the following reasons –

- (a) a merger can facilitate collaboration between APAS and HKPC in R&D projects while making greater use of HKPC's resources and experience in promoting commercialisation (e.g. publicity and industry networking); and
- (b) APAS can pool its resources to focus on R&D projects and technology matters, thus avoiding resources duplication with the HKPC and enhancing its R&D capacity.

4.20 With the agreement of the Board of Directors of APAS and the HKPC Council, APAS was formally merged into the HKPC in November 2012 to become a division of the HKPC.

4.21 After the merger, APAS has proactively capitalised on the wider network with the industry. This is indicated by the significant improvement of APAS's performance. Its level of industry contribution has increased from 16.5% during the first five-year period from 2006 to 2011 to 30.5% and 41.8% respectively in 2012-13 and 2013-14. While the size of APAS is relatively small, it has conducted a high proportion of collaborative projects (about 23% of its project are collaborative projects). This, in a way, demonstrated the confidence of APAS's industry sponsors in its technical competence and the good market potential of its R&D results. For example, APAS has just obtained CHAdeMO certification (from Japan) for its 50kW charging station for electric vehicles, which demonstrated that the technology has met the relevant industry standard.

4.22 APAS will further strengthen industry connection through seminars and trade shows. It is reviewing its R&D technology roadmap and increasing efforts to explore new project ideas with universities and R&D institutions. APAS will also make better use of the promotional platform of HKPC to increase commercialisation opportunities with industry partners

ASTRI

4.23 ASTRI is the first R&D Centre set up by the Government in 2000. The mission of ASTRI is to enhance Hong Kong's competitiveness in technology-based industries through applied research. For historical reasons, ASTRI is funded separately from Government's annual recurrent subvention. Its R&D efforts traverse four main technological areas, namely –

- (a) communications technologies;
- (b) IC design;
- (c) sensing and integration; and
- (d) software and systems.

4.24 As at end-September 2014, ASTRI has conducted 322 projects, involving a funding amount of \$2.2 billion. Among them, 154 are platform projects, 21 are collaborative projects and 147 are Seed or PSTS projects.

4.25 ASTRI has been actively engaging its industry partners with the focus on matching their needs with its technological capabilities and resources. ASTRI has also leveraged the commercialisation platform developed and dedicated additional efforts to achieve more major contracts with a view to further enhancing ASTRI's brand name and improving its contribution to the society.

4.26 In view that ASTRI had been in operation for over a decade, we have, in 2012-13, conducted a comprehensive review on the performance and mode of operation of ASTRI, to identify any improvements required and recommend the way forward. For this purpose, a Review Committee comprising major stakeholders such as representatives from the industry and academia was set up to participate in the review exercise. The recommendations arising from Review are being implemented in stages. For instance, ASTRI's calculation method of the level of industry contribution has been aligned with that of other R&D Centres from 2013-14.

4.27 In recent years, ASTRI has established collaboration platforms with international companies. For example, ASTRI and HP Hong Kong have jointly established an ASTRI-HP Information Research Centre in November 2013 to develop software modules for big data analytics platform systems, and established a long-term strategic partnership with TCL Communication Technology Holdings Limited (TCL) to conduct joint R&D on 4G product applications and 5G wireless technologies.

4.28 To further facilitate ASTRI to build up its research capabilities in new and emerging technologies that meet the demands of the industry, the ITC introduced in 2014 a clustered-seed approach for projects conducted by ASTRI on a trial basis for two years. In 2014-15, ASTRI commenced 10 Seed projects in four clusters, namely Wireless Technologies, Internet-of-Things (IoT) Endpoints, Security, and Image and Data Processing.

HKRITA

4.29 The mission of HKRITA is to be a leading centre of excellence in research, development and technology transfer in textiles technologies. The major technology focus areas of HKRITA include –

- (a) new materials and textiles and apparel products;
- (b) advanced textiles and clothing production technologies;
- (c) innovative design and evaluation technologies; and
- (d) enhanced industrial systems and infrastructure.

4.30 As at end-September 2014, HKRITA has conducted 116 projects, involving a funding amount of \$286.5 million. Among them, 77 are platform projects, 19 are collaborative projects and 20 are Seed or PSTS projects.

4.31 The performance of HKRITA was not very satisfactory during the initial years of operation, the level of industry contribution was 12.4% during the period from 2006 to 2011, which was not able to achieve the interim target of 15% during this period. In view of this, in May 2012, when approving the extension of the R&D Centres, the FC only approved to extend the operation period of HKRITA (together with LSCM) for 2 years until March 2015 (the operation period of APAS and NAMI was extended for 5 years until March 2017) and the ITC undertook to observe its performance during a two year observation period from 2011-13.

4.32 As it turned out, the performance of HKRITA has significantly improved subsequently with its focus placed on conducting demand-led R&D which meets the needs of its clients. HKRITA has also established a business development team to promote its R&D outcomes to the relevant stakeholders. The improvement is demonstrated by the significant increase of the level of industry contribution from 12.4% during the period from 2006 to 2011 to 26.8% and 35.0% respectively in 2012-13 and 2013-14. The number of new projects commenced has increased from 51 for the period from 2006 to 2011 to 19 and 25 respectively in 2012-13 and 2013-14. The number of patents granted to HKRITA has also increased from none during the first five-year period from 2006 to 2011 to 21 during the period from 2011 to 2013. There are also

projects developed for the good of the community such as the development of special protective pants for the elderly and better work uniform for firemen.

4.33 In view of its satisfactory performance of HKRITA during the two-year observation period from 2011 to 2013, the FC has approved, in January 2014, to extend the operation period of HKRITA (together with LSCM) to March 2017.

4.34 In the future, HKRITA will engage in a wider range of research areas and research partners, including overseas institutions. For example, it has signed a Memorandum of Understanding with the Shinshu University of Japan in 2013 to collaborate on research in high performance fibre and new printing technologies.

4.35 With more R&D projects coming into fruition, HKRITA is also putting more efforts to maximise its contribution to realising the R&D outcomes in the local community through PSTS projects.

LSCM

4.36 The mission of LSCM is to foster the development of core competencies in applied R&D in logistics and supply chain related technologies, such as radio-frequency identification (RFID), and to facilitate adoption of these technologies by industries in Hong Kong and the Mainland to enhance their competitiveness. The major technology focus areas of LSCM include –

- (a) infrastructure information technology system;
- (b) IoT and RFID technology;
- (c) location based service technology;
- (d) logistics and supply chain analytics/applications; and
- (e) supply chain security.

4.37 As at end-September 2014, LSCM has conducted 64 projects, involving a funding amount of \$317.3 million. Among them, 37 are platform projects, 8 are collaborative projects and 19 are Seed or PSTS projects.

4.38 Similar to HKRITA, the performance of LSCM was not very satisfactory during the initial years. Its level of industry contribution for the period from 2006 to 2011 was only 12.3%, falling short of the target of 15%. As with HKRITA, in May 2012, FC only extended its operation period for 2 years until March 2015 and the ITC undertook to observe its performance during the two-year observation period from 2011-13.

4.39 Subsequently, the performance of LSCM has showed marked improvement. The level of industry contribution has increased to 18.7% and 28.2% respectively in 2012-13 and 2013-14. The number of new project commenced has also increased from 29 during the period from 2006 to 2011 to 13 in each of 2012-13 and 2013-14. In view of its satisfactory performances, the FC approved in January 2014 to extend the operation period of LSCM to March 2017.

4.40 LSCM has also proactively reached out and forged closer working relationship with various industry sectors in addition to the logistics and supply-chain sector, including the retail sector, construction sector, medical sector, etc. It has been playing an important role in building a platform among the Government, industry, academia and research sectors and as an active player in promoting the trial of R&D outcomes in the public sector, such as collaborating with the Construction Industry Council and the Customs and Excise Department.

4.41 In the future, LSCM will build upon its network of small and medium sized enterprises and strengthen its commercialisation programme to identify technology solutions to supply chain of various sectors and expand its potential clientele to the Mainland.

NAMI

4.42 The mission of NAMI is to serve as the platform for the technology development of Hong Kong in the areas of nanotechnology and advanced materials. In particular, NAMI will identify and perform innovative, market-driven R&D projects in partnership with the local industry and research

community in a concerted manner and drive the commercialisation of R&D project outputs.

4.43 NAMI's R&D activities are focused on five main sectors –

- (a) sustainable energy;
- (b) solid state lighting and display;
- (c) construction and building materials;
- (d) environmental technologies; and
- (e) bio and healthcare.

4.44 As at end-September 2014, NAMI has conducted 128 projects, involving a funding amount of \$292.9 million. Among them, 33 are platform projects, 44 are collaborative projects and 51 are Seed or PSTS projects.

4.45 While there were some short term fluctuations, NAMI has been able to achieve one of the best level of industry contribution over the years. Over 30% of the projects commenced by NAMI are collaborative projects and its latest level of industry contribution for the second three year period from 2011-14 is 34.7%, significantly exceeding the 20% target.

4.46 Over the years, NAMI has grown steadily and built up its in-house research capabilities, such as in the areas of display and solid state lighting, environmental technologies and building and construction materials to meet industry demand. NAMI has also been adopting a business development strategy of industry engagement, with a view to proactively soliciting industry support for more market-driven collaborative R&D projects, and bringing about more R&D results and licensing income from technologies such as high brightness LED, thermal insulation coating materials, light weight hydrophobic cementitious materials, etc.

4.47 In the future, NAMI will develop a more diversified technology portfolio which will be conducive to the healthier development of NAMI. Besides, NAMI will utilise its core technologies to fit into different companies' product roadmaps in order to establish long term technology partnership.

Looking Into the Future

4.48 Given that the funding for the operation of the R&D Centres has been approved up to March 2017, we will conduct another review of the R&D Centres in 2015 – by that time they have operated for nearly 10 years – and we will be able to assess more comprehensively their performance and put forward our recommendations with regard to their future operation.

CHAPTER 5 – REALISATION AND COMMERCIALISATION

5.1 One of the major objectives of the ITF is to facilitate dissemination and utilisation of R&D outcomes. In this context, “realisation” includes cases where the R&D outcomes are being used in the public sector as there may not be a “commercial” market, whereas “commercialisation” refers to moving the R&D outcomes down the value chain to be incorporated into products or services for sales in the market.

Overall Picture

5.2 The Government understands that it is a long and difficult process in bringing innovative technologies from the laboratory to the market. Technology developers face many challenges and obstacles, such as lack of capital and active industry participation, and new R&D products not readily adopted due to lack of good track record on usage, etc.

Key Measures to Facilitate Realisation and Commercialisation

5.3 In order to drive realisation, we have introduced the following measures.

Improving the ITF Vetting Mechanism

5.4 In early 2011, we rolled out a new strategy to create a more conducive environment to facilitate the realisation and commercialisation of R&D outcomes. In particular, we refined the vetting criteria for ITF applications so that in assessing a project proposal, besides putting emphasis on its scientific/technical component, consideration is also given to the holistic plan of realisation/commercialisation so as to encourage and identify projects with greater prospect of realisation/commercialisation.

Extending the ITF Funding Scope

5.5 In order to render stronger support to downstream R&D and commercialisation activities, the Government has, in mid-2014, expanded the funding scope of ITF to cover more downstream activities, such as development engineering/system integration, industrial design, compliance testing and clinical trials, etc. This will render stronger support to downstream R&D and commercialisation activities, allowing full exploitation of the technological edge of local industries. For details please see Chapter 3.

Public Sector Trial Scheme

5.6 To promote realisation or application of the R&D outcomes in the public sector, we introduced, in March 2011, the Public Sector Trial Scheme (PSTS) whereby additional funding is provided to completed R&D projects funded by the ITF for the production of tools/prototypes/samples and the conducting of trials in the public sector. The public sector includes Government departments, public bodies and trade associations, etc. The PSTS has significantly helped realisation of R&D outcomes through actual implementation to identify areas of enhancement and step-by-step improvements to meet the needs of clients. In certain cases, it also provides a good reference for the products as they compete for business in the open market in future.

5.7 As at end-September 2014, there are over 100 trials done in the public sector, with over 60 conducted under the PSTS, involving a funding amount of over \$90 million. These trial projects were applied in many different types of public sector organisations and benefited many sectors of the community. A breakdown of the PSTS projects by supporting organisation is set out in Table 15.

Table 15: Breakdown of PSTS Projects by Supporting Organisation

Type of Supporting Organisation	Number of PSTS Project ^(Note)
Government departments	24
Hospitals	16
Elderly centres	4
Non-governmental organisations and public bodies	23
Universities	4
Industry associations/chambers of commerce	8
Partners/trials in the Mainland	3

(Note: There may be more than one partner involved in a trial.)

5.8 To further promote the adoption of R&D outcomes in the public sector, we have, in April 2014, implemented two further improvement measures, including –

- (a) waiving the industry sponsorship requirement for projects under Innovation and Technology Support Programme initiated by Government bureaux/departments and statutory bodies where there are –
 - (i) clear support from Government bureaux/departments and/or statutory bodies;
 - (ii) clear community interests; and
 - (iii) difficulties in seeking industry sponsorship in the prevailing circumstances; and
- (b) raising the funding ceiling for PSTS projects from 30% to 50% in order to encourage the conduct of larger scale trial scheme to assess speedily and comprehensively the effectiveness of the new innovation and conduct repeated trial overcome possible obstacles.

Improving the Intellectual Property Arrangements

5.9 In order to encourage dissemination and commercialisation of R&D outcomes, the ITC established in January 2011 a Steering Committee on Review of Intellectual Property (IP) Issues in the Innovation and Technology Sector (IP Steering Committee), which comprises representatives from the Government, academia, industry and research sectors, to advise the ITC on the prevailing IP arrangements under the ITF and the R&D Centres and other IP issues related to the promotion of I&T in Hong Kong. The Committee held six meetings and concluded its work in June 2013 and agreed on the following broad principles –

- (a) Government’s key objective is to promote applied R&D and facilitate realisation/commercialisation of R&D results;
- (b) Government’s interest is primarily on bringing benefits to the community rather than seeking good financial return for the ITF;
- (c) however, the financial management angle remains an important consideration given that the ITF is funded by public monies. Also, commercialisation income and industry contribution are useful indicators of the degree of support from the industry; and
- (d) Government has no interest in owning any IP rights. We are happy to have them vested with the local research institutions or their company partners as fit. We hope to, in the long run, help the local research institutions to build up a good client base and encourage industry participation.

5.10 With the endorsement of the IP Steering Committee, the ITC promulgated a new “Guide on IP Arrangements for R&D Projects Funded under the ITSP” (IP Guide) which embodies the above principles. The IP Guide sets out the general policy and arrangements pertaining to IP and related matters for ITSP projects. Compared to the previous IP guidelines, the new IP Guide gives greater flexibility to R&D Centres and research institutions to negotiate with their collaboration partners the suitable IP arrangement, including IP

ownership, licensing and benefit sharing. At the same time, the ITC also encourages the R&D Centres to develop their own commercialisation policies and procedures taking into account their unique circumstances and other relevant considerations, such as prevailing Government policies.

5.11 In order to encourage more international collaboration in R&D between local universities and research institutions with their overseas counterparts, the IP Steering Committee also supports the ITC to adopt a more flexible approach in negotiating the relevant IP arrangements in joint research projects with renowned overseas universities/institutions. These cases would be considered on a case-by-case basis based on individual merits where it is justified in terms of the overall benefits to the industry/community, such as enhancing the research capabilities of local research personnel and potential for technology transfer to the local industry or community.

Supporting Technology Transfer in Universities

5.12 Tertiary institutions in Hong Kong remain to be important targets in promoting commercialisation of R&D results. Six local universities¹ have set up their Technology Transfer Offices to engage in commercialisation and technology transfer. To enhance their capabilities, the ITC has been providing an extra resource amounting to an annual funding of up to \$4 million under the ITF, initially for three years from 2013-14 to 2015-16 to each of the six universities. Our aim is to enhance the universities' capabilities to transfer their R&D results into real world applications to the benefit of the community. The scope of the ITF funding includes professional support services such as legal advice and IP rights protection, promotion of R&D results to the industry, etc.

5.13 Furthermore, in September 2014, we set up a new Technology Start-up Support Scheme for Universities under the ITF to provide an annual funding of up to \$24 million to six local universities, initially for three years, to encourage their students and professors to start technology businesses and

¹ These universities are 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.

commercialise their R&D outcomes. We hope that the Scheme can bring R&D results from the campus to the real world by encouraging more technopreneurial activities and facilitating commercialisation of university intellectual property. The Scheme will provide incentive to encourage science, technology and engineering graduates to pursue their career in the innovation and technology sector, adding fresh impetus to the innovation ecosystem.

R&D Centres

5.14 The ITC has asked the R&D Centres to improve the capabilities of their staff to enhance their efforts in realisation/commercialisation of R&D outcomes and to actively take part in conducting PSTS projects. Together, over 80% of the total number of PSTS projects are conducted by the R&D Centres, accounting for about 90% of the total approved funding for PSTS projects.

Selected Examples

Realisation

5.15 The R&D Centres have played a significant role in realisation of R&D outcomes in the public sector. These projects have benefited various Government bureaux/departments and other stakeholders in different sectors. Some examples are highlighted below –

- (a) the Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM) has collaborated with the Customs and Excise Department to apply the “E-Lock-Based Enabling Technology” at border control points. This technology has helped reduce the number of repeated customs inspection for cargos at control points, enhance couriers’ efficiency and reliability, and facilitate logistics flow between Hong Kong and the Mainland;
- (b) the Hong Kong Research Institute of Textiles and Apparel (HKRITA), LSCM and the Hong Kong Applied Science and Technology Research Institute (ASTRI) have jointly developed a

system on “Wearable Electronics for Better Quality Community Care for the Elderly” which involves an outerwear made of a Nu-Torque fabric embedded with the RFID system. Trial of this system has been conducted in two elderly centres under the Tung Wah Group of Hospitals (TWGHs) to improve monitoring of the elderly, particularly those who might be more susceptible to losing their way due to Alzheimer’s disease;

- (c) the University of Hong Kong (HKU) has collaborated with the Hong Kong Federation of the Blind, Ebenezer School & Home for the Visually Impaired and the Housing Department to launch a trial on “A Smartphone Control Device and Signpost System for Visually Impaired Users” which has enabled the visually impaired persons to control and operate mobile applications on smartphones and receiving instant location information;
- (d) for the construction community, the ITF have funded a number of projects in developing the applications of information and communications technologies and Internet-of-Things (IoT) technology in relation to construction site management and safety. One of the on-going projects titled “Location-based Technologies for Asset Tracking and Risk Management” is led by LSCM to develop a pro-active construction management system (PCMS) for construction site safety management; and
- (e) the Housing Authority, the Civil Engineering and Development Department, and the Construction Industry Council have rendered strong support to LSCM in developing a PCMS based on location-based technologies, including the conducting of trials in two housing construction projects. The PCMS is an integration of technologies that identifies relative location of workers and records the movements and relative location of workers and moving equipment. It is expected that the PCMS will significantly enhance the capacity of on-site workers in detecting sources of dangers which would help reduce the number of accidents in a construction sites.

Commercialisation

5.16 Below are some examples of commercialisation by the R&D Centres (for projects undertaken by mainly universities, please see Chapter 3) –

- (a) ASTRI has developed enhancement technologies on 4G Long Term Evaluation (LTE) by adopting dual mode baseband transmission mode, i.e. time division duplex (TDD) and frequency domain duplex (FDD). In 2012-13, ASTRI has licensed this technology to two companies. One of the licensees launched the first commercial grade TD-LTE small cellular base station reference design in 2012, and the other company set up a new R&D centre in the Hong Kong Science Park;
- (b) HKRITA has been proactively commercialising the “Finer Nu-Torque Cotton Yarn Production” technology internationally. Nu-Torque technology is one of the most significant advancements in spinning of singles ring yarns. So far, this technology has gone through five generations of R&D and put into production. The current licensee could product yarns under Nu-Torque technology at a total capacity up to 700 000 spindles in their production line in the Mainland, Thailand, Malaysia and India; and
- (c) the Nano and Advanced Materials Institute (NAMI) has developed a low-cost single component Die Attach Adhesives (DAAs) with high thermal conductivities, low curing temperature and high shelf temperature using nanomaterials and micro/nano-capsule technique with application in High Brightness-Light-Emitting Diode (HB-LED) and other semiconductor packaging applications. This product has been licensed non-exclusively to a Hong Kong electronics company in 2012 and since then, the licensee has been selling the DAAs to various Mainland die-bonding factories. DAA won the 2014 Hong Kong Awards for Industries Technological Achievement Award.

5.17 Since their establishment in 2006, the R&D Centres have received more than \$135 million commercialisation income, including income arising from licensing, royalty, contract services, sales of patents, etc. We are mindful that the figure is not very significant and could fluctuate greatly due to a number of factors including the market situation and technological development. Nevertheless, we will continue to work with the Boards of Directors and management of the Centres to further improve their performance.

Cross-institution Collaboration

5.18 Recently, one of the major focuses of the ITC on realisation is to facilitate cross-institutional collaboration in projects which could benefit a wider section of the community. For instance, the elderly are vulnerable to different illnesses and the physical and health status of some have presented challenges to their families, friends and caregivers. Recognising the needs for technology in welfare services, the ITC has taken steps to engage and co-operate with various organisations to solicit input and explore ways to promote the use of innovation and technology in improving the quality of life of the elderly and dependent population, including the Labour and Welfare Bureau, Elderly Commission, Hong Kong Housing Society (HKHS), Hong Kong Jockey Club, TWGHs, etc.

5.19 The R&D Centres have also initiated various projects that aim to improving the living standard of the elderly and the quality of elderly services, such as safety, convenience and dignity and to increase the effectiveness of delivery of service. For example, various technologies have culminated in the establishment of “iHome” in 2012 – a project to integrate the technologies for the enhancement of the quality of life of the elderly funded by the ITF. With the help from the HKHS, a show flat has been set up to demonstrate the latest technologies for aging at home such as health monitoring and safety technologies including telehealth system, wireless pulse oximeter, mobile and wearable sensors, and environmental control technologies, etc.

Looking Into the Future

5.20 In the future, the ITC will, apart from providing funding support through the ITF, take a more proactive approach in linking up the various stakeholders to drive more collaboration to facilitate realisation of R&D outcomes and to bring greater impact to the community. The ITC and the R&D Centres will liaise with different sectors of the community to understand their needs, match them with the suitable technologies and support them by way of a clustered-project approach, in particular in some identified focus areas such as elderly and social care, construction industry, logistics industry, etc.

5.21 *In order to speed up the process of industry adoption of R&D outcomes, we believe that the scale of the trials conducted under the PSTS should be larger in order to demonstrate the benefits to a wider audience and in different settings. As such, we propose to further increase the funding ceiling of projects from 50% to 100% of the actual cost of the original R&D project(s) supported by the ITF on the following conditions –*

- (a) *the PSTS project should be undertaken/coordinated by the R&D Centres. The R&D Centre concerned may collaborate with universities and other research institutions in conducting the actual trial; and*
- (b) *the applicant (i.e. the R&D Centre) would need to demonstrate that the project would bring wide community interests (e.g. benefits not restricted to a particular sector or product and justify the need for a larger budget.*

5.22 *This new measure will be introduced on a trial basis and limited to R&D Centre initiated projects. This is in consideration of the wealth of experience and technology knowhow the R&D Centres have accumulated and the networks built up with various stakeholders, including Government bureaux/departments, statutory bodies and non-government organisations in PSTS projects over the years. We will review the experience and make adjustments as fit.*

CHAPTER 6 – FOSTERING COLLABORATION

6.1 Cooperation with key players in the innovation ecosystem enables ITF support to reach out to a wider population of innovators and technology users in the public and private sectors. It would encourage a thriving and stimulating environment for R&D activities.

6.2 Apart from collaboration at the local level, international and Mainland collaboration allows researchers to widen their exposure/network of research, create synergy and leverage upon their respective research capabilities.

At the Local Level

6.3 In Hong Kong, apart from the research partners such as universities and R&D Centres, the ITC has worked closely with the InvestHK, the Hong Kong Science and Technology Parks Corporation (HKSTPC), University Grants Committee/Research Grants Council (UGC/RGC) to reach out as far as possible to apply the R&D outcomes of ITF projects in real life environment.

InvestHK

6.4 The Government welcomes technology companies outside of Hong Kong to set up their R&D bases locally as they play an important role in cross fertilisation of ideas and spurring innovation. The InvestHK proactively reaches out to technology companies all over the world to invite them to set up or expand their business operations in Hong Kong, including setting up their R&D departments in Hong Kong. In this connection, the ITC has rendered continuous support to InvestHK which provides enterprises with one-stop services, among which is the provision of information on Government's support to technology companies such as the ITF and Science Park's infrastructural facilities.

Hong Kong Science Park

6.5 Hong Kong Science Park is an important part of our infrastructure supporting Government's effort to promote I&T development. Apart from the provision of a park-like environment with state-of-the-art facilities and comprehensive services and technical support, Science Park operates three incubation programmes to nurture technology start-up companies. The incubation programmes provide subsidised office premises, shared-use laboratories and equipment, and management, marketing, financial and technical assistance in the critical initial stage of these companies. As at end September 2014, 572 companies have participated in the programmes. Among the 332 graduates of the programmes, over 74% are still in the business.

6.6 Incubatees of the programme can also apply for the Small Entrepreneur Research Assistance Programme under the ITF (or the new Enterprise Support Scheme once established) to seek funding for conducting R&D. A successful example of the incubation programme graduate is a fabless IC design house which grew from a one person company in 2003 to now a team of over 300 employees with its headquarters located in the Science Park and offices set up in Mainland and Taiwan. The company has won a number of awards over the years and was ranked 23rd in Deloitte China Technology Fast 50 Report in 2010.

UGC and RGC

6.7 The UGC/RGC provides funding to support high quality academic research while the ITF aims to support applied R&D and promote technology transfer and commercialisation (note: the Health and Medical Research Fund with a capital commitment of \$1.4 billion is another research fund which aims to build research capacity and support health and medical research). There have been comments that the funding programmes of UGC/RGC and the ITF work in silos, seemingly the respective effort in funding R&D projects is not coordinated well with each other. As such, we have worked with the Education Bureau, the UGC/RGC Secretariat to explore ways of forging a closer link between the funding programmes of the ITF and the UGC/RGC, in particular the Theme-based Research Scheme (TRS), the Area of Excellence

(AoE) and the Collaborative Research Fund (CRF) managed by the RGC. After discussion, a new arrangement which provides an interface between the funding programmes of UGC/RGC and ITF has been formulated and implemented since last year.

6.8 With the interface, applicants of UGC/RGC schemes will be asked to provide an optional technology transfer plan with their funding application, which serves for the ITC's advance information. Once these applications have been approved for UGC/RGC funding, the ITC will be invited to keep in view of these projects and their progress. For projects with potentials to proceed to the applied R&D phase, the project teams will be encouraged to apply for the ITF such that their projects could receive funding support from the ITF on successful completion of the UGC/RGC-funded projects.

Public Sector Organisations

6.9 The public sector is seen as an important test bed for indigenous local innovation. In Chapter 5, we have outlined the key measures implemented by the ITC to facilitate the application of R&D outcomes in the public sector and examples of how these projects could benefit many different sectors of the community from elderly, construction, logistics sector, to trade and industry associations.

At the Mainland and International Levels

6.10 For Hong Kong with a population of some 7 million people, it is important to collaborate with the Mainland and international partners for bringing many potential benefits, including an increased scale and scope of R&D activities, cost and risk sharing, an improved ability to deal with complexity of R&D topics, etc.

6.11 The ITC has been actively promoting R&D collaboration with other economies and will continue to do so. At present, the ITF funding guidelines allow up to 50% of the R&D work of a funded project to be conducted outside Hong Kong.

6.12 Some examples of Mainland and international collaboration are highlighted below.

Mainland Collaboration

6.13 We have been working with the stakeholders to enhance collaboration with the Mainland on science and technology in order to capitalise the opportunities presented by the National 12th Five-Year Plan. We are most encouraged that the National 12th Five-Year Plan has set out clearly the Central Government's support on innovation and technology development in Hong Kong SAR.

6.14 Through the Mainland/Hong Kong Science and Technology Cooperation Committee with the State Ministry of Science and Technology (MOST), we formulate and implement initiatives to dovetail with the National 12th Five-Year Plan on Science and Technology Development to enhance Hong Kong's participation in the national roadmap of technology development. Initiatives include –

- (a) establishment of the Partner State Key Laboratories (PSKLs) in Hong Kong. These laboratories serve as a base for high level research and development, assembling and nurturing outstanding researchers, as well as scholarly exchanges for the country. Since 2011-12, the ITF has provided 5-year financial assistance to each PSKL. A new round of application exercise for PSKL was completed in July 2013, in which MOST approved four applications from local universities. The total number of PSKLs established in Hong Kong was increased from 12 to 16. To further recognise their achievements, strengthen their R&D capabilities and promote their joint efforts with their Mainland counterparts, funding support to the PSKLs in Hong Kong is enhanced. From 2013-14 until 2015-16, the annual funding ceiling has been increased from \$ 2 million yearly to \$5 million for each PSKL;
- (b) establishment of the Hong Kong Branch of Chinese National Engineering Research Centre(s) (CNERC(s)) in Hong Kong. The

Hong Kong Applied Science and Technology Research Institute (ASTRI) as a pilot case has been approved by MOST in June 2012 to establish the National ASIC System Engineering Research Centre Branch Office in Hong Kong in collaboration with Southeast University in Nanjing. Starting from 2013-14, funding up to a ceiling of \$5 million is provided to each Hong Kong Branch of CNERC(s) each year to enhance their R&D capabilities and collaboration with the Mainland. Such funding is provided on an annual basis for an initial period of three years. The first round application exercise for Hong Kong Branches of CNERCs has started in March 2014, and is open to all universities and R&D Centres in Hong Kong to apply. 28 applications have been received by the ITC which are under vetting;

- (c) establishment of the national high-tech industrial base in Hong Kong. MOST designated the Hong Kong Science Park as Hong Kong National High-tech (Partner) Industrialisation Base for Green Technology in mid-November 2011, Hong Kong National Modern Services Industrialisation (Partner) Base in November 2013, and Hong Kong National High-tech Industrialisation (Partner) Base for Integrated Circuits in August 2014;
- (d) promoting Hong Kong's participation in national science and technology programmes; and
- (e) successful nomination of 56 Hong Kong experts to enter into the National Science and Technology Programmes Expert Database.

International Collaboration

6.14 Our efforts in supporting international collaboration include –

(a) *Hong Kong Polytechnic University (PolyU) and Aviation Services Research Centre*

ITF has recently funded two clusters of projects on developing new or improved aviation services technologies, both of which are led by the PolyU in association with the Aviation Services Research Centre, which is an industry-led non-profit making organisation established by the PolyU in collaboration with Boeing Corporation. These projects have also secured sponsorship from leading local companies specialised in aviation maintenance services;

(b) *Soft-landing Programme for Technology and Innovation Collaboration*

with the funding support of the General Support Programme under the ITF, the HKSTPC has been carrying out a project titled “Soft-landing Programme for Technology and Innovation Collaboration”. The programme aims to attract Technology Transfer Offices of renowned overseas universities/research institutions to set up strategic outposts in Hong Kong, with a view to exploring collaboration with local partners on R&D and commercialisation activities for tapping into the Mainland opportunities; and

(c) *Bilateral Cooperation with Israel*

in February 2014, the Government signed an Memorandum of Understanding (MOU) with the MATIMOP, the executive agency of the Office of the Chief Scientist under the Ministry of Economy of Israel on promoting bilateral cooperation in industrial R&D. To take forward the MOU, the ITC led a delegation including representatives from a number of R&D Centres to visit Israel in May this year.

CHAPTER 7 - IMPLEMENTATION OF THE RECOMMENDATIONS IN THE DIRECTOR OF AUDIT'S REPORT NO. 61

7.1 In 2013, the Director of Audit conducted a value-for-money audit on the ITF and set out the findings and recommendations in Chapter 9 and Chapter 10 of his Report No. 61¹ (the Audit Report) which was tabled at the Legislative Council on 13 November 2013. The key recommendations of the Audit Report include –

(a) Review of the ITF and Performance Monitoring

- conduct a comprehensive review of the ITF without delay and work out a timetable with a target completion date for the review;
- review and improve the existing mechanism for conducting post-completion evaluation of Innovation and Technology Support Programme (ITSP) projects;

(b) Commercialisation of ITF Projects Results

- in collaboration with the R&D Centres, co-develop a set of principles and policies on the setting of licence fees, sharing and collection of licence fee income for both R&D centre projects and non-R&D centre projects;
- periodically review on a sample basis cases of licence fee setting and income sharing to ensure that they comply with the laid down principles and policies;
- set up a proper system to monitor and follow up on the commercialisation of non-R&D centre projects;

¹ Chapter 9 of the Report covers the Overall Management of the ITF and Chapter 10 covers Project Management.

(c) Processing and Monitoring of Projects Under the ITSP

- consider setting an overall passing mark on ITSP applications and identifying the key assessment components, failure to achieve the passing marks of which would render an ITSP application not be supported;
- take action to ensure that the Progress Reports, Final Reports, annual audited accounts and final audited accounts of ITSP projects are submitted in a timely manner in accordance with the Fund Agreement;

(d) Processing and Monitoring of Projects Under the SERAP

- step up the ITC's follow-up action on recoupment of the Government's contribution to Small Entrepreneur Research Assistance Programme (SERAP) projects; and
- take follow-up action on long outstanding projects which did not comply with the requirements of the Fund Agreement.

7.2 The ITC agreed with the recommendations in the Audit Report and has taken them into account in conducting the comprehensive review on ITF. Apart from completing the comprehensive review which is the subject of this Report, we have already implemented some improvement measures and actions are in progress for the remaining ones. For instance –

- (a) the ITC has promulgated in April 2014 a more comprehensive/systematic post-project evaluation framework to better assess and monitor the outcome and commercialisation of projects conducted by R&D Centres as well as the performance of the project teams. We will further refine the evaluation framework and extend it to non-R&D Centre projects in light of experience gained with the R&D Centres;

- (b) all R&D Centres have already reviewed and/or established their own sets of commercialisation and IP guidelines, which cover the principles and policies concerning setting of licence fees and benefit sharing, which have been/will be submitted to their relevant Boards/committees for approval in the coming months. All R&D Centres have agreed to include in their internal audit programme and/or to conduct sample checks on compliance with the ITC's and their internal guidelines;
- (c) the ITC has separately met with the relevant Vice Presidents responsible for R&D of the six local universities and solicited their support to impress upon the research teams in universities to monitor their projects and submit reports in more timely manner. Serious cases will also be brought up to the attention of the Vice Presidents as fit;
- (d) the ITC has set an overall passing mark of 50% under the assessment framework for ITSP applications and a separate passing mark of 50% for the key assessment component of "Management Capability" to facilitate the assessment of project applications;
- (e) the ITC has reviewed comprehensively the operation of SERAP including its effectiveness in promoting in-house research conducted by companies with a view to deciding its way forward. Arising from the review, we will roll out a new Enterprise Support Scheme to replace SERAP ; and
- (f) the ITC has set up a Task Force to Follow Up the Director of Audit's Report No. 61 regarding SERAP (the Task Force) to advise, among other things, on the handling of long outstanding projects which did not comply with the requirements of the Fund Agreement. The Task Force comprises representatives from the industry as well as relevant professionals such as accountants and lawyers. We will handle the cases according to the Task Force's recommendations.

7.3 We will continue to implement the remaining recommendations in the Audit Report and submit half-yearly progress report to the Audit Commission.

CHAPTER 8 – OVERALL ROLE IN THE CREATION OF AN INNOVATION AND TECHNOLOGY (I&T) ECOLOGICAL ENVIRONMENT

Macroeconomic Environment

8.1 With the financial support provided by the Government through the UGC/RGC and the ITF as well as the private sector investment,, we are gradually building up an ecosystem on I&T. From a macro perspective, Hong Kong's Gross Domestic Expenditure on R&D (GERD) has risen from \$7.1 billion in 2001 to \$14.8 billion in 2012, representing an average annual growth of around 7%. The number of R&D personnel has also more than doubled during the same period, from around 11 000 to 25 000.

8.2 While we appreciate that the increase in R&D personnel and GERD is not solely attributed to the ITF, the ITF is certainly a key player in fostering the I&T ecology.

8.3 Despite the sustained increase in the GERD and number of R&D personnel, we are aware that the GERD as a ratio to GDP (e.g. ranges from 0.72% to 0.77% during 2008-2012) has remained relatively low compared to other knowledge-based economies. Our economic structure has presented a number of constraints in promoting I&T development –

- (a) decreasing manufacturing activities – our economy is driven by the service sector which accounted for 93% of the GDP growth in 2012. The manufacturing sector, which drives innovation and R&D activities, has been shrinking and contributes to a meagre 1.5% GDP growth reported for the same period;
- (b) relatively short history of promoting I&T – as stressed by both the Government and stakeholders, promotion of I&T requires long-term investment and collaboration among the Government, industry, academia and research sectors;
- (c) non-existence of defence-related spending – defence spending is a major driver of R&D activities in other developed economies;

- (d) universities mainly focused on basic research and has less interested in applied research; and
- (e) over 80% of ITF-supported R&D projects, via the ITSP and UICP, are conducted by universities, R&D Centres and designated local public research institutions. The only available source of funding for in-house R&D activities for the private sector is SERAP, which is only available to SMEs and funding support from the ITF is limited to \$6 million per project.

8.4 In view of these constraints, we have explored ways to further improve our funding mechanism and create an eco-system on both the software and hardware fronts, conducive to the development of the I&T in Hong Kong.

Creation of Ecology Conducive to I&T Development

8.5 The Government is committed to promoting innovation and technology development in Hong Kong. We strive to create a vibrant ecosystem with excellent software and hardware support for the key players to collaborate on research, development and innovation activities. As seen in the last three years, we have been continuously introducing enhancements to the ITF for creating a favourable ecology for the realisation and commercialisation of R&D results. A diagrammatic illustration of the ITC's role in creating an I&T ecology is at [Annex B](#). Such efforts will continue in order to sustain the momentum and positive impacts that the ITF has created.

CHAPTER 9 – PROPOSED MERGING OF THE R&D CASH REBATE SCHEME (CRS) INTO THE ITF

9.1 Apart from the ITF, the Government launched the CRS in April 2010 with a funding commitment of \$200 million approved by the Finance Committee (FC) of the Legislative Council (LegCo) to provide cash rebate to private companies on their investment in R&D projects funded by ITF or conducted in partnership with designated local public research institutions. Initially, the level of cash rebate was 10%. This was subsequently increased to 30% in February 2012 to increase the attractiveness of the Scheme. While the funding source of the CRS is independent from the ITF, it plays an important role in promoting R&D and reinforcing the research culture among private companies, including encouraging them to establish stronger partnership with local research institutions.

9.2 In seeking the LegCo FC's approval for the Scheme, the Administration undertook to conduct a full review three years after the Scheme was introduced. A review was conducted in 2013 and the outcome was reported to the LegCo Panel on Commerce and Industry (C&I Panel) on 19 February 2013. Panel members were generally satisfied with the progress of the Scheme and our proposed technical refinements on the implementation of the Scheme. On 18 February 2014, we also updated the C&I Panel on the progress of the Scheme up to 31 December 2013. This Chapter provides an update of the progress of the Scheme for its first five years' implementation up to 30 September 2014 and recommends the way forward.

Figures and Statistics

9.3 Up to end-September 2014, the Scheme has approved 941 applications involving cash rebate of \$95.5 million, benefitting more than 630 companies. The numbers of cash rebate applications and Partnership projects pre-registered are set out in Table 16.

**Table 16 : Cash Rebate Applications and Amount of Cash Rebate (in \$ million)
Approved and Number of Partnership Projects Pre-registered
between 2010-11 and 2014-15**

	2010-11 (launched on 1 April 2010)	2011-12 (Note)	2012-13	2013-14	2014-15 (6 months up to 30 Sept 2014)	Total
ITF Projects (\$ million)	212 ¹ (5.9)	151 (10.5)	135 (17.7)	146 (16.0)	81 (13.2)	725 (63.3)
Partnership Projects (\$ million)	0 (-)	23 (0.9)	56 (6.4)	81 (14.0)	56 (10.9)	216 (32.2)
Total (\$ million)	212 (5.9)	174 (11.4)	191 (24.1)	227 (30.0)	137 (24.1)	941 (95.5)
Number of Partnership Projects pre-registered	35	43	116	107	63	364

(Note: Cash rebate level was increased from 10% to 30% with effect from 1 February 2012.)

9.4 We have continued to undertake publicity work to promote the Scheme, such as distributing publicity pamphlets, conducting briefing for SMEs and trade associations and including the information of the Scheme in publicity materials of other Government departments/public organisations distributed to the trade.

¹ 2010-11 figures cover ITF projects approved on or after 1 April 2009 (i.e. one year prior to the launch of the Scheme).

Observations and Evaluation

9.5 Companies have responded positively towards the Scheme, especially after the increase of the cash rebate level to 30% in February 2012, as reflected by –

- (a) the continued increase in the number of approved cash rebate applications, from 174 in 2011-12 to 191 in 2012-13, and to 227 in 2013-14 (the average annual growth rate was 14%). In the first six months of 2014-15 (up to end-September 2014), we have approved 137 applications, representing 60% of the total number in 2013-14;
- (b) the increasing amount of cash rebate approved, from \$11.4 million in 2011-12 to \$24.1 million in 2012-13, and to \$30.0 million in 2013-14 (the average annual growth rate was 68%). In the first six months of 2014-15, we have approved a total of \$24.1 million of cash rebate, representing 80% of the amount of 2013-14;
- (c) the general growing trend of the number of pre-registration of Partnership projects, from 43 in 2011-12 to 116 in 2012-13 and to 107 in 2013-14. During the first six months in 2014-15 (up to end September 2014), we have already accepted 63 pre-registrations, representing 59% of the total number in 2013-14; and
- (d) the highest two cash rebate disbursements so far made were \$3.6 million and \$2.7 million, and the industry contribution involved amounting to over \$21 million.

9.6 The increase in the cash rebate applications of Partnership projects demonstrated that the Scheme has promoted more collaboration between companies and designated local public research institutions. The amount of cash rebate approved for Partnership projects has significantly increased from \$0.9 million in 2011-12 to \$6.4 million in 2012-13, and to \$14.0 million in 2013-14. In the first six months of 2014-15, the approved amount was \$10.9 million, representing 78% of the total in 2013-14.

Financial Commitment

9.7 As at 30 September 2014, the financial commitment of cash rebate disbursement under the Scheme is as follows –

	(\$ million)
(a) Cash rebate approved	95.5
(b) Estimated amount of cash rebate commitment for ITF projects ^(Note)	48.7
(c) Estimated cash rebate commitment for pre-registered Partnership projects ^(Note)	17.4
Total	161.6

(Note: Items (b) and (c) above are rough estimates based on the industry contribution received and the past trend on the percentage of companies eventually coming forward to apply for cash rebate.)

9.8 Based on the existing trend, we expect that the \$200 million commitment of the Scheme will likely be exhausted in the second half of 2015.

Looking Into the Future

9.9 The increasing number of CRS applications and pre-registered Partnership projects have shown that the Scheme has effectively encouraged private companies to invest more in R&D and establish stronger collaboration with local public research institutions.

9.10 As it is a long term process to inculcate a R&D culture, and momentum has now been built up for companies to make use of the Scheme, we recommend the continued operation of the CRS so as to maintain the current financial incentives to the private sector in R&D investment. However, to provide a more stable and longer term source of funding as well as to simplify the administration, we propose to merge the CRS into the ITF as a long term arrangement for the Scheme.

CHAPTER 10 – CURRENT FINANCIAL POSITION OF THE ITF

10.1 The initial ITF funding at the time of its establishment in June 1999 was \$5 billion. Up to September 2014, the total revenue earned was about \$4.1 billion. They represented mainly the investment income from the Exchange Fund to which the unspent ITF funding has been parked as well as the project incomes ploughed back to the ITF over the years.

10.2 As at end-September 2014, the uncommitted balance of ITF was \$0.2 billion and the cash balance was about \$1.3 billion. According to our latest cash flow forecast, the uncommitted balance of the ITF would be fully committed in around June 2015 and the cash balance would be exhausted in early 2016.

10.3 We will consult the Legislative Council on the future financial arrangements of the ITF in due course.

CHAPTER 11 – SUMMARY OF LATEST RECOMMENDATIONS

11.1 This Chapter summarises the proposed improvement measures set out in this Report –

Innovation and Technology Support Programme (ITSP)

- (a) relaxing the minimum number of industry sponsors for ITSP projects from two to one (for details please see paragraphs 3.24 to 3.25);
- (b) allowing ITSP platform projects conducted by universities to accept sponsorship from a company which is related to the university (for details please see paragraphs 3.26 to 3.28);

University-Industry Collaboration Programme (UICP)

- (c) relaxing the timeframe for UICP projects from two years to three years (for details please see paragraph 3.41);
- (d) allowing flexibility for the company and the university participating in a UICP project to negotiate and mutually agree on the IP arrangements (for details please see paragraph 3.42);
- (e) adopting the assessment framework of the ITSP for UICP projects (for details please see paragraph 3.43);

Patent Application Grant (PAG)

- (f) increasing the funding ceiling of the PAG from \$150,000 to \$250,000 (for details please see paragraph 3.69);
- (g) enhancing monitoring of the outcome of patent registration funded by the PAG (for details please see paragraph 3.69);

- (h) consequential to the increased PAG funding ceiling, raising the budget for patent application in all ITF-funded R&D projects accordingly from \$150,000 to \$250,000 (for details please see paragraph 3.69);

Public Sector Trial Scheme (PSTS)

- (i) raising the funding ceiling of PSTS projects from 50% to 100% of the original project cost for projects undertaken by R&D Centres (for details please see paragraphs 5.21 to 5.22); and

R&D Cash Rebate Scheme (CRS)

- (j) merging the CRS into the ITF as a long term arrangement for the Scheme (for details please see paragraph 9.10).



