

Legislative Council Panel on Commerce and Industry

**Creation of a
Favourable Ecological Environment
to Facilitate the Realisation of
Research and Development Results**

PURPOSE

This paper briefs Members on –

- (a) a proposed strategy to provide a more conducive ecological environment to facilitate the realisation of Research and Development (R&D) results in Hong Kong; and
- (b) proposed improvements to the scope and processing mechanism of the Innovation and Technology Fund.

**EXISTING SUPPORT FOR
INNOVATION AND TECHNOLOGY DEVELOPMENT**

2. Innovation and technology are drivers for economic development and competitiveness. They help improve the efficiency and performance of enterprises which in turn contribute to the sustainable growth of an economy. Indeed, innovation and technology has been identified as one of the six new economic areas which Hong Kong enjoys clear advantages and should be further promoted.

3. Government's efforts in the promotion of innovation and technology are multi-dimensional and yet focused. Broadly speaking, we can categorize them as infrastructural and software support.

Infrastructural Support

4. The flagship of Hong Kong's technology development is the Hong Kong Science Park. Located in Shatin, the existing Phase 1 and Phase 2 have a combined gross floor area (GFA) of 225 000 m², providing employment to over 7 300 persons.

5. In his 2010 Budget Speech, the Financial Secretary announced Government's decision to develop Science Park Phase 3 at an estimated cost of \$4.9 billion. The financial arrangements were approved by the Finance Committee in April 2010. Building works for the first batch of buildings are scheduled for completion in late 2013 with the whole phase being completed by 2016. Upon completion and full occupancy, this new Phase will provide a total GFA of about 105 000 m² in 10 buildings with additional spaces for R&D offices, laboratories and supporting facilities and around 4 000 R&D related jobs.

6. Apart from the Science Park, there are also three industrial estates in Tai Po, Tseung Kwan O and Yuen Long. Their overall occupancy rate is about 90%. To address potential future demand, the Hong Kong Science and Technology Parks Corporation is exploring means to revitalize and reposition the industrial estates.

Software Support

7. On the software front, in addition to funding support, Government is also actively engaging the academia, the industry and the community to further the development of innovation and technology. The various funding and promotional efforts are detailed below –

(a) Innovation and Technology Fund (ITF)

In late 1999, Government set up the \$5 billion ITF to fund applied R&D projects;

(b) R&D Centres

In April 2006, Government set up five R&D Centres to drive and co-ordinate applied R&D in selected focus areas to promote commercialisation of R&D results:

- (i) Automotive Parts and Accessory Systems R&D Centre (APAS);
- (ii) R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM);

- (iii) Hong Kong Research Institute for Textiles and Apparel (HKRITA);
- (iv) Nano and Advanced Materials Institute (NAMI); and
- (v) R&D Centre for Information and Communications Technologies (ICT) under the Hong Kong Applied Science and Technology Research Institute (ASTRI);

(c) R&D Cash Rebate Scheme

In April 2010, Government set up a \$200 million R&D Cash Rebate Scheme to reinforce the research culture among business enterprises and encourage them to establish stronger partnership with public research institutions. Under the Scheme, enterprises conducting applied R&D projects with the support of the ITF, or in partnership with local designated research institutions, will enjoy a cash rebate equivalent to 10% of their investments;

(d) Liaison with local stakeholders

To strengthen the linkage and create synergy between various stakeholders including Government, industry, academic and research (“官產學研”) sectors, we have been liaising with chambers of commerce, trade associations, universities and public bodies by organising theme-based or industry-based events on LED lighting, medical devices, etc. We have also been working closely with universities (in particular their technology transfer offices) as well as the R&D Centres to see what measures can be introduced to facilitate their work in applied research, in particular commercialisation;

(e) Collaboration with partners outside Hong Kong

Over the past years, we have developed close collaboration with our Mainland and overseas partners. For the Mainland, we have jointly established with the Ministry of Science and Technology a “Mainland-Hong Kong Science and Technology Co-operation Committee” to strengthen our technical collaboration with the Mainland at the national level. In view of our close proximity with the Pearl River Delta (PRD), we have also established technological co-operation frameworks with the Guangdong and

Shenzhen governments. In particular, the “Shenzhen-Hong Kong Innovation Circle” was established in 2007 with a view to attracting more overseas high-tech enterprises to conduct R&D activities and promote commercialisation in the region.

In terms of overseas promotion, Hong Kong has signed Memoranda of Understanding (MOUs) on technology collaboration with a number of overseas economies and universities. Government has also organised visits to USA and Northern Europe to promote Hong Kong’s position as a regional technology hub and attract their technology companies to establish R&D bases in Hong Kong; and

(f) Fostering of an innovation and technology culture in Hong Kong

To ensure the sustainable development of innovation and technology in Hong Kong, we need to cultivate a strong innovation and technology culture in the society. For the general public, we hope to reinforce their understanding of and support for innovation and technology. For youngsters, we aim to inspire their interest in and commitment to innovation and technology, so as to nurture a new generation of innovators for the future economic and social development of Hong Kong.

Among the various activities organised by Government, the “InnoTech Month” launched in November 2010 is the most important and largest in scale. It features a nine-day InnoCarnival at the Hong Kong Science Park from 6 to 14 November 2010. Apart from showcasing the latest innovation and technology achievements of our universities and research institutes, the “InnoTech Month” also comprises technology workshops and competitions, interactive games and stimulating seminars which will provide members of the public, in particular youngsters, an opportunity to experience for themselves the fun and excitement of innovation and technology.

LATEST DEVELOPMENTS

8. The present Government’s policy framework in promoting innovation and technology is largely based on the recommendations in the report submitted by a Commission led by the late Professor Tien Chang-lin

in 1999 (Prof Tien's report). At that time, the Hong Kong economy experienced a significant transformation characterised by increasing links with the Mainland and the neighboring region, and a structural shift within the industrial sector from low-end production to manufacturing-related services. The relocation of low value-added and labour-intensive production to the PRD and elsewhere has enabled Hong Kong's companies to expand their operations substantially, resulting nonetheless in a much reduced manufacturing sector in Hong Kong.

9. In accordance with the recommendations in Prof Tien's report, Government restructured the then Industry Department into the present Innovation and Technology Commission (ITC) in 2000, set up ITF in 1999 and ASTRI in 2000, as well as strengthened technology collaboration with the Mainland. Over the years, these changes and efforts have brought positive impact on Hong Kong's innovation and technology development. For instance, Hong Kong's total R&D expenditure rose from \$5.9 billion in 1999 to \$12.3 billion in 2008 (108% increase), and its proportion in Hong Kong's total Gross Domestic Product (GDP) also rose from 0.46% in 1999 to 0.73% in 2008 (59% increase). The number of full time employees working in the R&D sector also doubled, rising from around 10 000 to 22 000 during the same period.

10. Despite the above, there is still room for improvement in the following areas –

- (a) **R&D intensity and private sector participation**: We are mindful that with a relatively small manufacturing base, R&D expenditure in Hong Kong as a percentage of our GDP is not particularly high. In terms of the ratio between public and private investments in R&D, Hong Kong is about 50-50 while most developed economies are in the region of around 30-70. The world trend is that technology development of economies is mainly driven by the private sector;
- (b) **Commercialisation of R&D results**: Since 1999, ITF has funded over 2 200 projects with a total funding of \$5.5 billion. While the quality of most of these projects is commendable from the research perspective, we would like to see more applications of R&D results for use in our society. We appreciate that in the world of R&D, securing a high rate of success for R&D projects is difficult. Nevertheless, we wish to facilitate the adoption of

more R&D results generated from our ITF projects by the private sector (i.e. the industry) as well as the Government. The second part of this paper will focus on proposed improvements to the scope and processing mechanism of ITF;

- (c) **Career preference of young talents**: We have a good supply of quality science and engineering graduates as over 35% of our local graduates have degrees in science, mathematics, engineering or technology disciplines. However, not many of these young talents choose to pursue a career in the R&D sector probably due to the lack of good job opportunities. We consider that there is a need to foster a stronger culture that places more importance and pride in innovation and technology. We need to undertake measures that will help create more/better career opportunities for scientific personnel;
- (d) **Synergy among stakeholders**: The linkage amongst various stakeholders, including Government, industry, academic and research (“官產學研”) sectors can be further strengthened. We need to explore ways and means to facilitate collaboration among project proposals to create synergy and expedite the process for application and commercialisation. In particular, there is a need to bridge the gap between the academic sector, which tends to be more interested in developing high-end technologies, and the industries which demand practical technology solutions to enhance their product development and competitiveness; and
- (e) **Financial support from the private sector**: One major factor behind the success of Silicon Valley as a leading R&D hub is the availability and contributions of private capital, in particular from venture capitalists, to support projects with good realisation/commercialisation potential. However, such a culture has yet to gain roots in Hong Kong. While Hong Kong is a global financial centre with venture capitalists operating here, they tend to be more interested in projects from the Mainland or other economies in the region.

STRATEGY AHEAD

11. It has been ten years since Government established the existing policy framework for promoting innovation and technology development. In view of the rapidly changing global economic environment, the emergence of the Mainland as a major R&D investor and consumer, as well as the very robust technology advances, we believe it is now opportune to refine our policy framework to ensure that it continues to support our policy direction, as well as provides the necessary impetus to meet the challenges ahead – as we develop the innovation and technology sector into one of the six new economic areas of Hong Kong.

12. The refined strategy will include the following –

- (a) promoting collaboration among stakeholders for achieving greater synergy;
- (b) creating an ecological environment that is conducive to the development of innovation and technology;
- (c) refining the funding mechanism to encourage and select projects with greater prospect of realisation/commercialisation;
- (d) facilitating the trial of R&D products (especially in the public sector), so that researchers and product developers can gain actual experience to fine-tune their products, build up “reference” for subsequent marketing, and bring about wider economic and social benefits to the community;
- (e) motivating the private sector to invest more in R&D activities in Hong Kong;
- (f) fostering a stronger innovation and technology culture in Hong Kong; and
- (g) enhancing co-operation with government, industry, and academic and research institutes in the Mainland.

13. With this enhanced strategy, we hope to establish a framework that facilitates the creation of an ecological environment which is conducive to the realisation of R&D results in Hong Kong. For details, please refer to

----- **Annex A**. For such an environment to sustain and prosper, certain

improvements need to be made to the current ITF mechanism. Outside the Government, we count on the input and commitment of all stakeholders including the universities, R&D institutes, industry and the community.

REVIEW OF THE ITF MECHANISM

14. The \$5-billion ITF was established in 1999 to provide funding support for projects that contribute to innovation and technology upgrading in manufacturing and service industries. There are four major programmes under ITF –

- (a) Innovation and Technology Support Programme (ITSP) – for mid-stream/downstream R&D projects mainly undertaken by local public research institutes (including R&D Centres, universities and HKPC). There are broadly two categories of projects:
 - (i) platform projects which require industry contribution of at least 10% of the project cost. The industry sponsors (minimum of two) will not own the project intellectual property (IP); and
 - (ii) collaborative projects which require industry contribution of at least 30% (for R&D Centre projects only) or 50% (for non-R&D Centre projects) of the project cost. The industry sponsor(s) will be entitled to utilize the project IP exclusively for a defined period or own the project IP;
- (b) University-Industry Collaboration Programme (UICP) – a local university collaborates with a company in conducting R&D. The company contributes no less than 50% of the project expenditure and owns the project IP;
- (c) Small Entrepreneur Research Assistance Programme (SERAP) – It operates as a matching grant for SMEs under the size of 100, i.e. company contributing 50% of project cost. The IP will be owned the company. Unlike collaborative projects in (a) and (b) above, under SERAP, the company will be required to pay back the funding grant from ITF as and when they make profits from the project; and

- (d) General Support Programme (GSP) – for non-R&D projects and activities, e.g. surveys, seminars and competitions. Similar to ITSP projects, a minimum of 10% industry contribution from at least two industry sponsors is required.

15. As at end-September 2010, ITF has funded more than 2 200 projects at a total ITF funding of \$5.5 billion. Taking into account the accumulated income over the years (including investment income from the Exchange Fund), the uncommitted funding balance (i.e. available to support new ITF projects) is about \$2.4 billion.

16. During meetings of the Commerce and Industry Panel and Finance Committee in the past year or so, Members have expressed concern over the pace of commercialising the R&D deliverables under ITF projects, particularly in the context of discussing the Annual Progress Report of the R&D Centres on 15 June 2010 (ref. LC Paper No. CB(1)2191/09-10(06)). Some Members urged the Administration to streamline the relevant procedures and explore possible areas of improvement. In particular, the following suggestions were raised –

- (a) Wider use of research deliverables in the public sector should be encouraged, such as the use of light-emitting diode (LED) lighting in public housing estates of the Housing Authority; use of RFID technology in the medical sector, the logistics trade (e.g. Hong Kong International Airport), and retail chain stores for stock-taking and inventory management;
- (b) Facilitating the promotion of the research deliverables by providing a reasonable number of prototypes for trial use by Government departments (e.g. Highways Department and Education Bureau) and public bodies organisations (e.g. Hospital Authority and Airport Authority);
- (c) apart from conducting trial schemes in government departments and quangos, R&D Centres should also enlist the interest of trade associations in promoting trial of the research deliverables in the private sector; and
- (d) extending the scope of ITF to provide sustainability and bringing a wider positive impact to the community.

17. Over the years, the ITF framework has been revised to meet various needs at different junctures. As a result, modifications were made and new elements were added to individual funding programmes on a piece-meal basis, thereby rendering the current ITF framework quite complicated. The processing time required is quite long (which could take more than six months from submission of application to funding approval). Whilst all appreciate the need to ensure accountability and proper use of public funds, there is also a fundamental need to motivate more stakeholders to come up with high quality projects and to speed up the processing time. At the end of the day, it is a matter of achieving the best possible balance.

18. As part of our overall plan to create a more conducive ecological environment to facilitate the realisation of R&D results in Hong Kong, we have embarked upon a comprehensive review of the ITF mechanism having regard to the experience and feedback received as well as the changing circumstances. As such, ITC has in the past few months gauged views of various stakeholders with a view to coming up with possible improvement measures.

PROPOSED IMPROVEMENTS FOR ITF

19. A highlight of the major proposed measures to be undertaken in the Review is set out below:

- (a) *To extend the scope of ITF funding to cover production of tools/ prototypes/samples and conducting of trial schemes in the public sector*

We hope this will help realisation of our R&D results by providing a “reference” (by public sector users) for the product as it struggles its way to the open market. As a general rule, we propose to cap such funding at 30% of the original R&D project cost unless there are really exceptional circumstances. The conduct of trial schemes will initially be confined to R&D Centre projects involving Government departments, public bodies or trade associations (except in very exceptional circumstances where there is great public interest) and will cover various costs necessary to have the R&D products to be tested out in reality. After we gather sufficient experience, we will extend this to other designated local research institutions as appropriate.

(b) To provide “follow-on” funding

We will fix a schedule for inviting ITSP proposals twice in a year so that the applicants can submit a bid for a follow-on of the project provided that the milestones set for the project have been fully met. This will facilitate the retention of research staff/expertise.

We will also liaise with the Research Grants Council (RGC) Secretariat so that good RGC-funded projects, which start with upstream/foundation research but have migrated to “applied research”, can be considered for funding support under ITF. This will allow better interface of the two key sources of funding in the world of research.

[Items (a) and (b) together refer to extending the ITF “vertically”.]

(c) To extend the scope of ITF to provide synergy and enhance impact

At present, ITF projects are approved on an “individual” basis. In future, we will play a more active role to identify projects with possible interface with other parties and bring all together. For example, in the case of LED lighting, at present, ASTRI, a number of universities, HKPC and private companies are all conducting research on this. We will try to bring them together. Also, applications covering different aspects of a common area (e.g. how to combat water pollution) but addressing different issues (the odour, lack of oxygen and bacteria level) might present potential for holistic solution. While individual applications will still need to be assessed on their individual merit, input at a macro level (in conjunction with relevant Government bureaux/departments) can bring about wider impact by adopting a “cluster project approach”.

[Item (c) refers to extending the ITF “horizontally”.]

(d) To refine the current ITF project vetting criteria to give greater emphasis to relevant factors apart from scientific/technical considerations

At present, the vetting criteria focus mainly on the scientific/technical aspects. To enable more in-depth/comprehensive assessment of applications thereby enhancing the chance of realisation, we propose to include in the vetting process factors other than scientific/technical considerations. Factors/components to be taken into account in the proposed assessment framework are proposed as follows -

- (i) Scientific component;
- (ii) Technical capability;
- (iii) Financial considerations;
- (iv) Existence of a holistic plan to realisation/commercialisation;
- (v) Relevance with Government policies or in overall interest of the community;
- (vi) Proposal on IP rights and benefit sharing; and
- (vii) Management capability.

A more detailed elucidation is at **Annex B**.

(e) To review the existing industry contribution models

At present, industry contribution for platform projects is set at a minimum of 10% from at least two industry sponsors. Past experience suggests that in some cases, securing 10% industry contribution could prove to be difficult particularly in cases where the research has a high social value but low commercial use, e.g. devising a mobile surveillance system to detect falling objects from high buildings which will more likely be only of interest to the Police. We would consider in justified cases, waiving such request if there is strong policy support from Government bureaux/ departments.

On the other hand, we consider it desirable to encourage a higher level of financial contribution – not only because this will ‘save’ public funds to be used for other good projects, but also because it is an indication of keen interest which usually means a higher chance of success. We also feel that apart from sponsorship from the industry, we should allow other sources of financial contribution to be considered e.g. charitable trusts, universities or even the professor himself.

(f) To make greater use of the General Support Programme (GSP)

To make greater use of the GSP to promote an innovation and technology culture in Hong Kong, we would review the Programme to see how best it can be improved as well as publicise it to attract more applications from universities, trade associations, NGOs and District Councils. The current requirement of 10% industry sponsorship similar to ITSP may not be appropriate given the very different nature of activity.

(g) To shorten the ITF process

We will make every effort to speed up the process, in particular collaborative projects where the industry contribution is over 50%. We have introduced on a pilot basis a Focused Project Facilitation Programme (FPFP) to give priority consideration to projects with good potential as proposed by the R&D Centres.

(h) To align the ITF to meet long term development goals

It is necessary to align the ITF to meet changing circumstances as well as long term development goals. For instance, we have recently announced a new initiative to provide financial assistance to Partner State Key Laboratories (SKLs) in Hong Kong to enhance their research capability. Details will be worked out in early 2011. We will also make use of the ITF to augment the development plan of testing and certification – one of the six new industries announced in the CE’s Policy Address.

- (i) *To facilitate negotiations on IP rights and sharing to promote more R&D work*

We will set up a dedicated task force to study this area. Our aim is to establish a fair, transparent model for distributing the commercial benefits amongst all parties concerned - researchers/professors, universities, R&D Centres, industry sponsors and others.

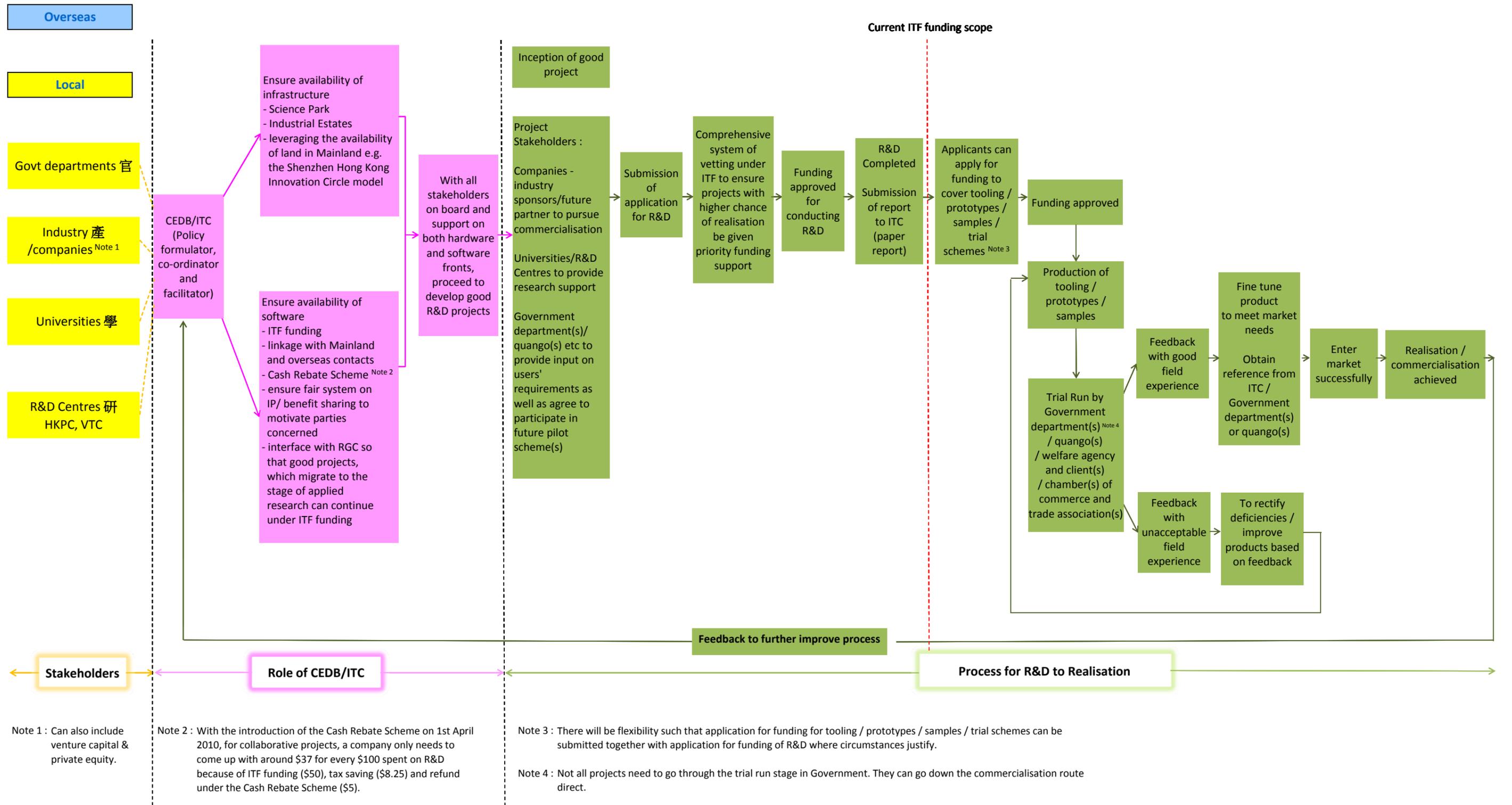
WAY FORWARD

20. We will brief all stakeholders including universities, R&D Centres, industry etc. as fit. We aim to roll out the new initiatives in stages starting from early 2011. Networking events will also be organised to foster closer ties among Government, industry, academic and research sectors which will pave the way to more good projects bringing benefit to the community.

ADVICE SOUGHT

21. Members are invited to give their views on –
- (a) the proposed strategy to create a favourable ecological environment to facilitate the realisation of R&D results in Hong Kong (paragraphs 12 and 13); and
 - (b) the proposed improvement measures under the ITF Review (paragraph 19).

Creating an Ecological Environment Conducive to the Realisation of R&D Results



**Typical Factors/Components to be Taken Into Account
in the Proposed Assessment Framework for ITF Projects**

Proposed Component	Elaboration
<i>(1) Scientific component</i>	
(a) Whether the project pertains to applied research;	Upstream research will not be accorded priority since this is more within the ambit of RGC funding. However, if funding by RGC has taken a project from the stage of foundation research to the stage of applied research, we can consider funding under ITF. This will provide continued support to the R&D activity as well as better interface between the two key funding sources.
(b) Nature of the project – (i) whether it has novelty (global/regional/Hong Kong); (ii) whether it will enhance quality (e.g. capacity, reliability and speed); and (iii) whether it will render cost more competitive;	We will not always require rocket science research, but will consider in the overall sense if the R&D can bring about benefit to Hong Kong.

(2) <i>Technical capability</i>	
<p>(a) Quality of technical submission; and</p> <p>(b) Competence of technical team;</p>	<p>This refers to ability to instil confidence that the applicant and his team will be able to deliver fully on the technical side (e.g. background and experience of the research team and feasibility of the R&D work plan.)</p>
(3) <i>Financial considerations</i>	
<p>(a) Proposed financial contribution to the project cost; and</p>	<p>The minimum remains to be 10% for platform projects and 50% for collaborative projects. But in general, the higher degree of contribution, the stronger industry interest in the project and hence the greater chance of success to commercialisation.</p> <p>Apart from contribution from the industry, we will extend this to other sources such as universities, personal contribution by applicants (i.e. professors), venture capital, charitable organisations, etc.</p>
<p>(b) Quality of financial submission</p>	<p>This refers to whether the budget and project expenditure items are reasonable (e.g. size of the manpower budget and income projection.)</p> <p>Regarding equipment procured under the project, we will take into account expected usage rate, mode of acquisition (purchase vs. rental), future use/divestment (e.g. for teaching/research purposes at universities and shared-use at Science Park.)</p>

(4) Existence of a holistic plan to realisation/commercialisation

To enhance the chance of realisation, the applicant should provide information such as:

- at what stage the R&D project is (from concept inception to realisation);
- future positioning of the technology/product in the market and potential market winner;
- what will be the exact deliverables/milestones (both qualitative and quantitative) and at what time frame;
- whether ITF funding will be required for a further phase of research work;
- whether there are associated/complementary technology development projects which will add to chance of realisation i.e. the proposed cluster project approach; and
- whether there are competitors and analysis of their strengths/weaknesses.

For R&D projects aiming at pilot use in the public sector (e.g. Government departments and quangos), the applicant should where appropriate supply letter(s) of support; plan for trial schemes, etc.

For R&D projects aiming at commercialisation, the applicant should where appropriate supply letter(s) of support from:

- company(ies) interested to license the research outcome for further development; and

- manufacturer(s) interested to produce the product in large scale.

It will not always be necessary to prove that the product will reach the open market. Just pushing it step(s) down the process of realisation will be acceptable.

(5) Relevance with Government policies or in overall interest of the community

Apart from serving the industry, we will be interested in technologies that will dovetail Government policies bringing benefit to the community at large, e.g.:

- R&D that can support important Government initiatives e.g. environmental protection and healthcare;
- R&D that can bring great social benefit e.g. creating devices to help track Alzheimer patients to relieve stress of family members;
- R&D that can contribute to upgrading of industry e.g. cleaner method of production;
- R&D that can provide opportunities for training of local scientific personnel;
- R&D that can foster close collaboration among key stakeholders (官產學研); and
- R&D that can enhance the image of Hong Kong internationally.

For R&D projects that will involve activities/expenditure outside Hong Kong (e.g. the Mainland), the applicant should demonstrate the Hong Kong angle i.e. the benefits that will be enjoyed by the Hong Kong community.

(6) Proposal on IP rights and benefit sharing

Whilst seeking a reasonable financial return from commercialisation, we will allow the necessary flexibility to motivate various stakeholders. In fact, it should be stressed that the ITF is set up to fulfil the public mission of promoting innovation and technology, monetary return is only a secondary consideration.

The applicant will be required to provide information on:

- whether the R&D result will be 'patentable' and its plan;
- whether there is any plan for spin off in due course and if so, the details;
- the proposed formula of benefit sharing among all parties concerned (licence fee and royalty), and the likelihood of acceptance by all; and
- whether it will provide the unrestricted use of the technology by Government departments/quangos. This is to avoid ITF funding R&D projects which in the end though successful, are precluded from use by Government due to an unreasonably high price.

(7) <i>Management capability</i>	
	<p>This pertains to whether the applicant and his entire ‘backup’ can instil confidence in the ability to bring the whole project to realisation. This is wider than criteria (2) above pertaining to ‘Technical Capability’. Apart from the commitment of the applicant himself, we will be interested in whether he has a wider network of support e.g. Technology Transfer Office of universities and research partners with successful record or good international experience.</p> <p>We will also where appropriate review the track records to see if the applicant has delivered in previous applications.</p>
(8) <i>Other considerations</i>	