

# **CHAPTER 9**

## **Innovation and Technology Commission**

<h3><b>Innovation and Technology Fund: Overall management</b></h3>
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**Audit Commission  
Hong Kong  
30 October 2013**

*This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.*

Report No. 61 of the Director of Audit contains 10 Chapters which are available on our website at <http://www.aud.gov.hk>

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# INNOVATION AND TECHNOLOGY FUND: OVERALL MANAGEMENT

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# INNOVATION AND TECHNOLOGY FUND: OVERALL MANAGEMENT

## Executive Summary

1. Innovation and technology are drivers of economic development and competitiveness. The Government attaches great importance to the significant contribution of innovation and technology to the development of Hong Kong's economy and industries. It launched the Innovation and Technology Fund (ITF) in November 1999 to provide funding support for research and development (R&D) projects that contribute to innovation and technology upgrading in manufacturing and service industries. Up to 30 June 2013, approved ITF project funds amounted to \$7.5 billion. The ITF has four programmes, namely the Innovation and Technology Support Programme (ITSP), the Small Entrepreneur Research Assistance Programme (SERAP), the University-Industry Collaborative Programme and the General Support Programme. ITSP and SERAP projects had accounted for 90% of the ITF funds. In April 2006, the Government established five R&D centres to coordinate R&D efforts in selected technology focus areas. The Innovation and Technology Commission (ITC) is responsible for administering the ITF.

2. The Audit Commission (Audit) has recently conducted a review of the ITF. The audit findings are contained in two separate Audit Reports: (a) ITF: Overall management (the subject matter of this Chapter); and (b) ITF: Management of projects (Chapter 10 of the Director of Audit's Report No. 61).

### **Review of ITF and performance monitoring**

3. *Review of ITF.* In July 1999, when seeking the Finance Committee (FC) of the Legislative Council (LegCo)'s approval for the establishment of the ITF, the Administration pledged that it would: (a) review the ITF periodically, say, once every three years; and (b) conduct impact studies for selected projects to examine the projects' accomplishment in the longer term. Audit however noted that since 2004, apart from the conduct of a mid-term review in 2009 and a comprehensive review in 2011 of the five R&D centres, the ITC had not conducted an overall

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comprehensive review or impact studies of the ITF as the Administration had pledged. By November 2013, the ITF would have operated for 14 years. Audit considers that the ITC needs to conduct the comprehensive review of the ITF without delay, and should work out a timetable with a target completion date for the review, so that the ITF can be timely fine-tuned to meet the changing needs of the community (paras. 2.4 to 2.10).

4. ***Post-completion evaluation of ITSP projects.*** The ITC conducts a post-completion evaluation for each project six months after project completion. Audit examined 25 ITSP R&D centre projects and noted that: (a) 13 projects had not been evaluated after project completion on their performance; and (b) for all the remaining 12 projects which had been evaluated, the evaluation results indicated that there was no “technology breakthrough” or “successful commercialisation” and the results of only two projects had been adopted by industry, but eight of these projects were still rated as “successful” by the ITC. Audit also considers that the conduct of a post-completion evaluation after a period of six months may be too soon and there may be a need for conducting follow-up evaluation. The ITC needs to review the appropriateness of the timeframe and improve its methodology adopted for post-completion evaluation of ITSP projects (paras. 2.11 to 2.13).

5. ***Performance measurement at programme level.*** The ITC measures the performance of the ITF by reporting: (a) in the Government’s annual Estimates performance indicators (e.g. the number of applications received and processed) for each programme (see para. 1); and (b) in the annual progress report submitted to the LegCo Panel on Commerce and Industry performance indicators (e.g. the number of new projects) for each R&D centres. Audit performed a research of the performance indicators used by overseas R&D institutes and found that the performance indicators used by the ITC could be enhanced to provide more comprehensive information on the performance of the ITF at programme level (paras. 2.16 and 2.17).

### **Performance of R&D centres**

6. The R&D centres had not been able to achieve the financial performance targets set in 2005. In June 2005, when seeking approval for the allocation of \$273.9 million (excluding the allocation to the R&D Centre for information and communications technologies which was separately subvented) from the ITF for

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setting up the five R&D centres, the Government informed the FC that: (a) each R&D centre would have an initial term of operation of five years, after which it was expected to do so on a self-financing basis, counting on its ability to obtain adequate industry contribution and generate income to meet its operating cost; (b) the centres were expected to be able to have up to 40% contributions from the industry towards R&D project costs as they ramped up to the fifth year of operation; and (c) the projected operating expenditure for each R&D centre would represent on average 16% of their total R&D project costs (para. 3.4).

7. In June 2009, the Government sought the FC's approval for a further allocation of \$369 million from the ITF to support the continued operation of the five R&D centres up to 2013-14. The centres' industry contribution target was drastically reduced from 40% to 15% pending future review. In May 2012, the Government again sought the FC's approval for another allocation of \$275.3 million from the ITF to support the continued operation of the R&D centres. The industry contribution targets were further adjusted to: (a) for three centres, 20% for their second five-year period; and (b) for two centres which had not achieved the 15% target, 18% for the two years of 2011-12 and 2012-13 (paras. 3.6 and 3.7).

8. Audit conducted an assessment of the performance of individual R&D centres and noted that: (a) the centres' performance results had deviated significantly from the estimated position as set out in 2005 when the FC's approval was sought for their setting up; (b) it was opportune to review the level of industry contribution for the centres in the forthcoming comprehensive review of the ITF; and (c) the chance for the centres to achieve the self-financing target in the near future was remote. The ITC needs to critically review the operations of the centres and set more realistic performance targets for their operations (para. 3.19).

### Commercialisation of ITF project results

9. *Commercialisation of ITSP project results.* The ITSP provides funding for midstream and downstream applied R&D projects. In the years from 2009-10 to 2012-13, total licence fee income collected per year by the five R&D centres altogether ranged from \$0.2 million to \$12 million, representing less than 1% to some 9% of the total R&D project costs for the year. Audit examined 15 ITSP R&D centre projects and noted that: (a) there were differences among R&D centres' practices in setting licence fees; (b) there were variations in income sharing arrangements between R&D centres and public research institutes, and Audit could

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not ascertain the bases for determining the sharing arrangements; and (c) there was scope for improving the collection of licence fees. For ITSP non-R&D centre projects managed by the ITC, although ITF expenditure spent from 1999-2000 to 2012-13 amounted to \$2.8 billion, the ITC did not have a system to capture commercialisation information on such projects (paras. 4.5, 4.6, 4.10, 4.14 and 4.15).

10. ***Commercialisation of SERAP project results.*** SERAP provides funding on a dollar-for-dollar matching basis to small technology-based and entrepreneur-driven companies to undertake R&D projects that have innovation and technology content and business potential. The maximum SERAP funding for each project is \$6 million. Funding is recouped from the recipient company if the SERAP project is commercially successful, i.e. the company is able to generate revenue from the project or attract follow-on investment by a third party. Audit however found that, up to 31 May 2013, only \$22.8 million had been recouped, representing 7% of the \$334 million disbursed. Audit analysed 239 completed projects and noted that: (a) no recoupment was received for 145 projects (60%); and (b) 61 projects (26%) had low recoupment rates of 10% or less. The ITC needs to be more vigilant in tracking the revenue and investments received by recipient companies and take more initiatives in detecting suspected abuses and safeguarding the public money (paras. 4.19, 4.20, 4.22, 4.23 and 4.30).

### **Audit recommendations**

11. **Audit recommendations are made in PART 5 of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has recommended that the Commissioner for Innovation and Technology should:**

#### ***Review of ITF and performance monitoring***

- (a) **conduct a comprehensive review of the ITF without delay and work out a timetable with a target completion date for the review (para. 5.6(a));**
- (b) **review and improve the existing mechanism for conducting post-completion evaluation of ITSP projects, and take steps to establish a more structured and coordinated approach in assessing the effectiveness of the projects in achieving their R&D objectives (para. 5.6(b));**



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- (c) review and improve the existing performance measurement of the ITF, including the setting of more performance targets, on how the ITF has contributed to the industry (para. 5.6(c));

### *Performance of R&D centres*

- (d) conduct a cost-effectiveness review of the five R&D centres, taking into account the performance results Audit identified (para. 5.8(a));
- (e) conduct a review on the target level of industry contribution for the R&D centres, and review the feasibility of achieving the self-financing target for individual centres in the longer term (para. 5.8(b));
- (f) set realistic performance targets, including quantitative and qualitative ones, on the operation of the R&D centres (para. 5.8(c));

### *Commercialisation of ITF project results*

- (g) 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 ITSP R&D centre projects and ITSP non-R&D centre projects (para. 5.10(a));
- (h) set up a proper system to monitor and follow up on the commercialisation of ITSP non-R&D centre projects (para. 5.10(c));
- (i) consider reporting regularly the progress of commercialisation of ITF project results to senior management of the ITC and the Steering Committee on Innovation and Technology (para. 5.10(d)); and
- (j) step up the ITC's follow-up action on recoupment of the Government's contribution to SERAP projects (para. 5.10(e)).

## Response from the Administration

12. The Commissioner for Innovation and Technology welcomes the value for money audit of the ITF and agrees with the audit recommendations.



## **PART 1: INTRODUCTION**

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

### ***Background***

1.2 Innovation and technology are drivers of economic development and competitiveness. They help improve the efficiency and performance of enterprises, which in turn contribute to the sustainable growth of the economy. The Government attaches great importance to the development of innovation and technology in Hong Kong. The Chief Executive of the Hong Kong Special Administrative Region has stressed in his 2013 Policy Address that the Government will focus on the development of the highly competitive sectors of the innovation and technology industries in the light of Hong Kong's strengths.

1.3 Over the years, the Government has been promoting research and development (R&D) and technology upgrading by:

- (a) the funding of innovation and technology upgrading in industry under the Innovation and Technology Fund (ITF);
- (b) the funding of research in higher education institutions via the University Grants Committee and the Research Grants Council's block grants or earmarked/indicated grants;
- (c) the provision of technological infrastructure (such as the Hong Kong Science Park and the three Industrial Estates); and
- (d) the conduct of other support work (e.g. nurturing human resource development and strengthening Mainland and international collaboration in science and technology).

1.4 In January 2004, the Government established a high-level Steering Committee on Innovation and Technology chaired by the Financial Secretary with

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members from the relevant Government bureaux, academia, industry and R&D organisations. The Steering Committee is responsible for coordinating the formulation and implementation of innovation and technology policies, and ensuring greater synergy among different elements of the innovation and technology programmes. Its terms of reference include:

- (a) advising on the formulation of policies to support the development of innovation and technology and the commercialisation of R&D deliverables;
- (b) determining focuses and priorities;
- (c) ensuring effective alignment, coordination and synergy among the stakeholders;
- (d) reviewing, where necessary, the institutional arrangements for effective policy and programme implementation;
- (e) advising on the allocation of resources among major elements of the innovation and technology programme to optimise their utilisation; and
- (f) exploring means to attract investments from overseas in the technology sector.

### ***Hong Kong's ranking in competitiveness and innovation***

1.5 International organisations regularly assess and publish rankings on the competitiveness and innovation of economies in the world:

- (a) in the 2013-14 Global Competitiveness Index published by the World Economic Forum, Hong Kong was ranked seventh among 148 economies worldwide; and
- (b) in the 2013 Global Innovation Index published by INSEAD and its associates, Hong Kong was ranked seventh among 142 economies worldwide.

1.6 While Hong Kong achieved high rankings in the two indices, its rankings in the innovation and technology sub-components of the indices were modest. For example, Hong Kong was ranked 23<sup>rd</sup> in the innovation sub-component of the Global Competitiveness Index, behind Taiwan, Singapore and South Korea.

1.7 The ITF is an important Government scheme that provides financial support for R&D projects to enhance Hong Kong's innovation and technology development. By November 2013, it would have operated for 14 years.

## Innovation and Technology Fund

### *Aim and funding*

1.8 The ITF aims to provide funding support for projects undertaken by research institutes, local companies, universities, industry support organisations, etc. that contribute to innovation and technology upgrading in manufacturing and service industries, so as to increase productivity and enhance competitiveness. It was established as a statutory fund under section 29 of the Public Finance Ordinance (Cap. 2) by a resolution of the Legislative Council (LegCo) on 30 June 1999 (Note 1). In July 1999, the Finance Committee (FC) of LegCo approved the Government's proposal to inject \$5 billion into the ITF. In November 1999, the ITF was launched. Any unexpended balance of the ITF is invested with the Exchange Fund, with investment income credited to the ITF. As at 30 June 2013, the fund balance of the ITF was \$2.2 billion. Up to 31 March 2013, the following revenue had been received and expenditure incurred by the ITF:

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**Note 1:** *In September 1998, the First Report of the Commission on Innovation and Technology recommended the establishment of the ITF to underline the Government's commitment to its policy and strategy for promoting innovation and technology, and to provide a secure source of funding for their implementation. The Commission recommended that the ITF should be used to finance projects that contributed to innovation and technology upgrading in both the manufacturing and service industries. The Chief Executive accepted the Commission's recommendations and pledged in his 1998 Policy Address an injection of \$5 billion into the ITF.*

**Table 1**  
**Revenue and expenditure of ITF**  
**(1999-2000 to 2012-13)**

Particulars	Amount (\$ million)
(a) Setting up of ITF in November 1999	5,000
(b) Revenue	
— Investment income received from the Exchange Fund	3,490
— Commercialisation income received from ITF projects	47
— Refund of grants from ITF projects	<u>393</u>
	3,930
(c) Expenditure (see breakdown in para. 1.14)	6,551
(d) Closing balance as at 31 March 2013 ((a) + (b) - (c))	2,379

*Source: Records of Treasury and Innovation and Technology Commission*

### ***Innovation and Technology Commission***

1.9 The Financial Secretary is designated as the administrator of the ITF. He has delegated his power of fund administration to the Commissioner for Innovation and Technology of the Commerce and Economic Development Bureau (CEDB). The Commissioner heads the Innovation and Technology Commission (ITC), which is a department under the Communications and Technology Branch of the Bureau. Apart from promoting R&D, providing infrastructural support to facilitate technological upgrading and development of the industries and support to the industries, the ITC is responsible for processing applications of R&D projects and other ancillary projects of the ITF, disbursing funds to successful applicants, and monitoring the progress and achievements of approved projects under the ITF. It also oversees the performance of the R&D centres (see para. 1.11). As at 30 June 2013, the ITC had a headcount of 233 comprising 190 civil service posts and 43 non-civil service contract posts. For 2012-13, \$181 million was paid from the general revenue of the Government to finance the ITC's day-to-day operation.

***ITF programmes***

1.10 The ITF has funded four programmes since 1999:

(a) ***Innovation and Technology Support Programme (ITSP):***

- (i) this programme provides funding for midstream/downstream applied R&D projects under a three-tier funding framework;
- (ii) the applicant should be:
  - one of the five R&D centres (see para. 1.11);
  - a designated local public research institute (e.g. local universities, the Hong Kong Productivity Council (HKPC) and the Vocational Training Council); or
  - a private sector company; and
- (iii) up to 30 June 2013, 1,430 projects had been approved involving \$6,334.2 million (84% of the total approved funds for all ITF projects since its establishment in 1999);

(b) ***Small Entrepreneur Research Assistance Programme (SERAP):***

- (i) this programme provides dollar-for-dollar matching grant for small technology-based enterprises to undertake projects that have innovation and technology content and business potential. The grant will be recouped if the project is able to attract follow-on investment or generate revenue;
- (ii) the applicant should be a company incorporated in Hong Kong under the Companies Ordinance (Cap. 32) with less than 100 employees in Hong Kong. It should not be a large company or a subsidiary of or significantly owned/controlled by a large company; and

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- (iii) up to 30 June 2013, 373 projects had been approved involving \$427.8 million (6% of the total approved funds);
- (c) ***University-Industry Collaboration Programme (UICP):***
- (i) this programme provides funding to R&D projects undertaken by local universities in collaboration with private sector companies;
  - (ii) the applicant should be a private sector company incorporated in Hong Kong under the Companies Ordinance. It has to contribute no less than 50% of the project cost; and
  - (iii) up to 30 June 2013, 240 projects had been approved involving \$273 million (4% of the total approved funds); and
- (d) ***General Support Programme (GSP):***
- (i) this programme provides funding for non-R&D projects that contribute to fostering an innovation and technology culture in Hong Kong (e.g. conferences, exhibitions and seminars);
  - (ii) an applicant should be an organisation, such as non-profit making trade or industry association, local university, public body or local unincorporated or incorporated company; and
  - (iii) up to 30 June 2013, 1,329 projects had been approved involving \$475.4 million (6% of the total approved funds).

Up to 30 June 2013, the total approved amount for these four programmes was \$7,510 million. Up to 31 March 2013, the actual expenditure was \$6,551 million (see paras. 1.8 and 1.14). The difference was mainly due to the fact that funds were disbursed to projects by instalments based on their progress.



### *R&D centres*

1.11 In 2004 (five years after the establishment of the ITF), the Government reviewed the development of innovation and technology and considered that since R&D projects were mainly initiated by individual researchers, they were not conducive to building the necessary technology focus. It therefore proposed to identify technology areas where Hong Kong had comparative advantages and the potential for meeting industry and market needs, and to establish R&D centres to drive and coordinate R&D efforts and promote commercialisation of R&D results in the selected technology areas. Following the public consultation exercise in 2004, in early 2005, the Government introduced a new strategic framework which aimed at a more focused approach to promoting innovation and technology development in five technology areas:

- (a) automotive parts and accessory systems;
- (b) logistics and supply chain management enabling technologies;
- (c) nanotechnology and advanced materials;
- (d) textiles and clothing; and
- (e) information and communications technologies (ICT).

1.12 To take forward the strategic framework, in June 2005, the Government obtained the FC's approval to establish five R&D centres to undertake R&D projects in the five technology focus areas. In April 2006, the centres were set up. They were:

- (a) Nano and Advanced Materials Institute (NAMI);
- (b) Automotive Parts and Accessory Systems R&D Centre (APAS);
- (c) Hong Kong Research Institute of Textiles and Apparel (HKRITA);

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- (d) Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM); and
- (e) R&D Centre for ICT which was subsumed under the Hong Kong Applied Science and Technology Research Institute (ASTRI — Note 2).

1.13 As at 30 June 2013, the five R&D centres had in aggregate a workforce of 760, comprising research and administrative staff. Each of the centres is headed by a full-time Chief Executive Officer (CEO). The centres are hosted by local universities/ASTRI/HKPC. Their operating costs and the R&D projects undertaken by them are funded by the ITF, except the operating cost of the R&D Centre for ICT, which was funded by recurrent subvention provided to ASTRI from the Government's general revenue. Table 2 shows the operating expenditure of the R&D centres and approved R&D project costs managed by them.

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**Note 2:** *ASTRI is an applied research institute wholly owned by the Government and was set up as a limited company in 2000. The Government provides annual subvention from the General Revenue to ASTRI. ASTRI's CEO is responsible for overseeing and managing the operation of the R&D centre for ICT.*

**Table 2**  
**Funding for R&D centres**

R&D centre	Hosting organisation	Operating expenditure (2012-13)		Approved project amount (April 2006 to June 2013) (\$ million)
		Amount (\$ million)	Source of funding	
NAMI	A local university	38.1	ITF	361.3
APAS (Note 1)	HKPC	15.8	ITF	192.3
HKRITA	A local university	19.1	ITF	277.5
LSCM	Jointly hosted by three local universities	20.9	ITF	309.4
R&D Centre for ICT (Note 2)	ASTRI	130.2	General revenue	2,103.8
Total		224.1		3,244.3

Source: ITC records

Note 1: APAS was initially set up as an independent legal entity. In November 2012, it merged with and became a division of the HKPC in order to encourage synergy between the HKPC and APAS, rationalise overlaps in functions and achieve higher cost-effectiveness. The centre will be funded by the ITF until March 2017.

Note 2: The role of the R&D Centre for ICT was taken up by ASTRI in April 2006. Since ASTRI was an applied research institute set up as a limited company wholly owned by the Government in 2000, the organisation and management structure was already in place. Unlike the other four R&D centres, which were newly formed as limited companies, the R&D Centre for ICT was subsumed as a unit within ASTRI. In this Audit Report, the R&D Centre for ICT is hereinafter referred to as ASTRI except otherwise stated.

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1.14 Table 3 shows a breakdown of the ITF expenditure of \$6,551 million incurred from its inception (1999-2000) to the end of 2012-13.

**Table 3**  
**Expenditure of ITF**  
**(1999-2000 to 2012-13)**

	<b>Amount</b> <b>(\$ million)</b>
ITSP projects (1999-2000 to 2005-06)	1,768
ITSP projects (2006-07 to 2012-13)	
• R&D centre projects	2,294
• Non-R&D centre projects	1,025
	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/>
	3,319
Operating costs of four R&D centres (excluding the R&D Centre for ICT)	484
SERAP	359
GSP	392
UICP	205
Funding support to local laboratories (Note)	24
<b>Total</b>	<b>6,551</b>

*Source: ITC records*

*Note: Since April 2011, the ITF has provided financial assistance to local laboratories for conducting research work under an initiative announced in the 2010 Policy Address. These laboratories are hosted by universities in Hong Kong.*

## **Audit review**

1.15 The Audit Commission (Audit) has recently conducted a review of the ITF. The audit findings are contained in two separate Audit Reports:

- (a) ITF: Overall management (the subject matter of this Chapter); and
- (b) ITF: Management of projects (Chapter 10 of the Director of Audit's Report No. 61).

1.16 As mentioned in paragraph 1.10, the ITSP had accounted for 84% of the approved funds of the ITF, followed by the GSP and the SERAP, each of which has accounted for 6% of the ITF funds. The audits only covered the ITSP and SERAP projects.

1.17 This Chapter focuses on the following areas:

- (a) review of ITF and performance monitoring (PART 2);
- (b) performance of R&D centres (PART 3);
- (c) commercialisation of ITF project results (PART 4); and
- (d) way forward (PART 5).

## **General response from the Administration**

1.18 The Commissioner for Innovation and Technology welcomes the audit review of the ITF and agrees with the audit recommendations. She has said that the review can help improve the overall management and operational effectiveness of the ITF.

## **Acknowledgement**

1.19 Audit would like to acknowledge with gratitude the full cooperation of the staff of the ITC and the R&D centres during the course of the audit review.

## **PART 2: REVIEW OF ITF AND PERFORMANCE MONITORING**

2.1 This PART examines the following issues relating to the review of the ITF and performance monitoring:

- (a) review of the ITF (paras. 2.2 to 2.10);
- (b) post-completion evaluation of ITSP projects (paras. 2.11 to 2.15); and
- (c) performance measurement at programme level (paras. 2.16 to 2.19).

### **Review of ITF**

2.2 The ITF's mission is as follows:

*“As part of the Government’s innovation and technology support programme, the ITF seeks to finance projects that contribute to innovation or technology upgrading in industry, as well as those that contribute to the upgrading and development of industry, to be undertaken by government or non-government entities.”*

2.3 To supplement the mission, the ITF has adopted a set of broad principles governing its operation. These principles include:

- (a) the projects to be supported should be relevant to the needs of the economy;
- (b) the ITF should not distinguish between manufacturing and service industries as the line between the two is increasingly difficult to draw in a modern globalised economy;
- (c) the projects to be supported should be focused on areas where Hong Kong can do well, so as to optimise the impact of public investments;

## **Review of ITF and performance monitoring**

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- (d) the ITF should as far as possible seek to cultivate and foster technological entrepreneurship; and
- (e) the administration of the ITF should be publicly accountable, and a credible mechanism for both project assessment and overall evaluation of its effectiveness should be put in place.

2.4 In July 1999, when the Administration sought the FC's approval for the establishment of the ITF, the then Trade and Industry Bureau (now the CEDB — Note 3) pledged that it would review the ITF periodically, say, once every three years with the first review to be conducted three years after sufficient operational experience had been gained. As indicated by the Administration, periodic review of the ITF would help develop a management tool to make the ITF better meet its mission and operate more efficiently. It would enable the ITF to adjust to the changing needs of the community and would also help meet the many external requirements and requests for programme results.

2.5 In July 1999, the Administration also informed the FC that impact studies might be conducted for selected projects to examine the projects' accomplishment in the longer term. In such impact studies, the Administration would look into the following:

- (a) the economic benefits generated by the project results (such as the number of jobs created, the amount of investment/turnover generated) as well as indirect and intangible returns (such as the project's contribution to broadening the knowledge base of Hong Kong); and
- (b) the measurement of non-financial benefits which was particularly important for midstream research that entailed higher risks. It was considered that even if these projects failed at the commercialisation end, for example, they might still broaden the technological horizon or strengthen the technological capability, thereby contributing to innovation and technology upgrading and leading to spillovers in the long run.

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**Note 3:** *In 2000, the Trade and Industry Bureau was renamed the Commerce and Industry Bureau. In 2002, the Commerce and Industry Bureau merged with the Information Technology and Broadcasting Bureau to form the Commerce, Industry and Technology Bureau. In 2007, the Commerce, Industry and Technology Bureau took up part of the functions of the Economic Development and Labour Bureau and formed the CEDB.*

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The Administration further informed the FC that the overall review and impact studies should provide a clearer picture on the usefulness of the ITF as a whole over a longer period of time. Nonetheless, the Administration also indicated that when considering the effectiveness of the ITF, it had to accept the fact that not all projects would be able to accomplish all the goals, namely innovation and technology upgrading, knowledge creation, timely commercialisation of products and services, etc.

2.6 On the basis, among others, of the commitments made by the Administration in paragraphs 2.4 and 2.5, the FC approved the setting up of the ITF, which started operation in November 1999.

2.7 In March 2002, the Government completed a review on the ITF. In February 2003, the Government informed the Legislative Council Panel on Commerce and Industry (LegCo Panel) that ITF projects would be evaluated at project and programme levels and through impact studies. In 2004, the Government reviewed the development of innovation and technology and introduced a new strategic framework (see para. 1.11). By November 2013, the ITF would have operated for 14 years.

2.8 However, Audit noted that since 2004, apart from the conduct of a mid-term review of the five R&D centres in 2009, and a comprehensive review of the five centres' operation and performance in 2011 (discussed in PART 3), the ITC had not conducted an overall comprehensive review of the ITF periodically as the Administration had pledged in 1999 (see para. 2.4). In June 2013, the ITC informed the LegCo Panel that:

- (a) up to the end of March 2013, the ITF had already supported over 3,250 projects at a total commitment of about \$7.4 billion; and
- (b) by 2015-16 when the ITF would be fully committed, the ITF would have been operated for more than one and a half decades. As such, it was considered opportune to conduct a comprehensive review of the ITF and explore areas for improvements. The ITC would take a critical look at the long-term funding arrangements for R&D projects/activities and the R&D centres funded by the ITF. In particular, the ITC would cover the following key areas in the review:



## **Review of ITF and performance monitoring**

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- (i) ***Funding scope.*** The ITC had already expanded the funding scope of the ITF, such as to support the production of samples/prototypes and conduct of trials in the public sector. The ITC would need to examine whether it was necessary to further improve/liberalise the funding mechanism of the ITF;
- (ii) ***Support for private sector R&D.*** One comment on the present system was that the ITF focused too much on supporting the industry through the designated local research institutes, e.g. universities and R&D centres;
- (iii) ***Intellectual properties (IPs) arrangements.*** The ITC would explore if there was scope for further liberalising the arrangements for IPs (including patents, technologies and knowhow, etc.) generated from ITF projects to facilitate transfer to the private sector, as well as stimulate private investment and collaboration between the local universities/R&D centres and their overseas counterparts; and
- (iv) ***Evaluation mechanism.*** In order to better assess the effectiveness of the ITF and make improvements as necessary, the ITC would put in place a more robust evaluation and monitoring mechanism.

2.9 The ITC had not conducted an overall comprehensive review of the ITF. Moreover, the ITC had not regularly conducted impact studies of selected projects except for engaging a consultant to conduct an impact study of the ITF in 2004. During the study, the consultant collected feedback from stakeholders (including successful project applicants, project sponsors, users and potential users of project results) on matters such as whether the ITF programmes were beneficial to Hong Kong, to industries and to universities/research institutes. The survey results provided an indication of the impact and usefulness of the ITF projects. Since then, the ITC has not conducted any impact studies.

2.10 Audit considers that the ITC needs to conduct an overall comprehensive review of the ITF without delay. In particular, it should work out a timetable with a target completion date for the review, so that the ITF can be timely fine-tuned to meet the changing needs of the community and meet the many external requirements and requests for programme results.

### **Post-completion evaluation of ITSP projects**

2.11 Over 80% of the funds under the ITF were spent on ITSP projects. The ITC conducts post-completion evaluation for each project six months after project completion (both for R&D centre projects and non-R&D centre projects) on the following aspects of the projects:

- (a) technology breakthrough;
- (b) successful commercialisation;
- (c) adoption of technology/infrastructure by industry;
- (d) whether the project is rated as “successful”; and
- (e) whether reassessment is required in the future.

2.12 Audit selected 25 ITSP projects (five from each R&D centre) completed in the period from May 2008 to December 2012 (with project cost ranging from \$1 million to \$19 million and on average \$6.4 million) for examination of their performance at project level. Audit found that the ITC had concluded in its records that the 25 projects had been satisfactorily completed because the Final Reports and audited accounts for the projects had been received and all project milestones had been achieved. However, Audit noted the following:

- (a) up to 30 June 2013, 13 of the 25 projects had not been evaluated after project completion in accordance with the aspects laid down in paragraph 2.11. Of these 13 projects, 11 were overdue for evaluation for three months or more (with the longest overdue by 33 months);
- (b) for all the remaining 12 projects with post-completion evaluations conducted, the evaluation results indicated that there were no “technology breakthrough” or “successful commercialisation”, and the majority of the projects were not adopted by industry (see Table 4);

## Review of ITF and performance monitoring

**Table 4**

### Results of post-completion evaluations of 12 ITSP R&D centre projects

Project	R&D centre	Project cost (\$ million)	Technology breakthrough	Successful commercialisation	Adoption by industry	Rated as "successful"	Reassessment in the future
1	LSCM	1.6	✘	✘	✓	✓	✘
2	LSCM	3.1	✘	✘	✘	✓	✘
3	LSCM	10.9	✘	✘	✘	✓	✘
4	LSCM	11.0	✘	✘	✘	✓	✘
5	NAMI	1.2	✘	✘	✘	✘	✘
6	NAMI	1.6	✘	✘	✘	✘	✘
7	NAMI	2.1	✘	✘	✘	✘	✘
8	NAMI	4.0	✘	✘	✘	✘	✘
9	ASTRI	18.7	✘	✘	✘	✓	✘
10	HKRITA	2.6	✘	✘	✓	✓	✘
11	HKRITA	4.8	✘	✘	✘	✓	✘
12	HKRITA	4.9	✘	✘	✘	✓	✘

Legend: ✓ denotes Yes or achieved.  
✘ denotes No or not achieved.

Source: Audit analysis of ITF records

- (c) although Projects 1 and 10 were rated as having been adopted by industry, it was noted that:
- (i) the ITC did not have records showing the details of how Project 1 had been adopted by the industry; and
  - (ii) the company concerned only used the Project 10 results on a trial basis. It subsequently informed the R&D centre that it would not adopt the project results;
- (d) the ITC had not communicated/followed up with the centres on the results of its post-completion evaluation;

## **Review of ITF and performance monitoring**

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- (e) none of the 12 projects had achieved technology breakthrough or successful commercialisation and only the results of two projects had been adopted by industry. However, eight were still rated as “successful” by the ITC because they had met the project milestones; and
- (f) given that the results of R&D projects may take some time to flourish, six months was far too short to determine the success of a project. The ITC therefore should not have concluded that these R&D projects required no reassessment in the future.

2.13 Audit considers that conducting post-completion evaluation after a period of six months may be too soon for completing an effective post-completion evaluation. The ITC needs to review the appropriateness of the timeframe and consider setting a longer timeframe or conducting, in worthwhile cases, a follow-up evaluation. The ITC should also critically review its methodology adopted for post-completion evaluation of ITSP projects and improve it, including the following:

- (a) performing more comprehensive post-completion evaluation, including impact studies, for selected projects, e.g. projects involving large sums of money (say, with project cost over \$5 million) and projects which are expected to bring forth significant impact on the industries;
- (b) exploring how the different aspects of the projects (e.g. technology breakthrough, successful commercialisation, adoption by industry) can be more objectively evaluated, with technical input sought, where necessary;
- (c) setting clear criteria on how a project can be regarded as “successful”;
- (d) co-developing with the R&D centres the benchmark for measuring project results; and
- (e) laying down circumstances under which follow-up evaluations should be conducted.

## **Review of ITF and performance monitoring**

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2.14 In April 2013, the ITC devised a new evaluation form whereby ITF grantees are required to:

- (a) evaluate by themselves the performance of the projects, including their own assessment of various project aspects, e.g. “impact on the community” and “opportunities for training or jobs created in relation to commercialisation of project results”, “technology breakthrough”, “successful commercialisation” and “industry adoption”; and
- (b) report the progress of technology transfer and commercialisation activities two years and five years after project completion.

As at September 2013, the evaluation form was in use on a trial basis.

2.15 Audit welcomes the ITC’s recent adoption of the new evaluation form, but considers that it still needs to provide clear guidelines to assist the grantees to evaluate projects more effectively. As the Administration had pointed out as early as in July 1999 when seeking funds for establishing the ITF:

- (a) to facilitate project assessment, ITF grantees would be asked to set out, where possible, quantifiable objectives that the proposed project was expected to achieve; and
- (b) these objectives would also form the basis for the evaluation of the results of the projects.

Only projects which meet the needs of the economy and can bring forth innovation and technology upgrading, knowledge creation or timely commercialisation (see para. 2.5) should be funded by the ITF. Therefore, notwithstanding the adoption of the new evaluation form, there is a need for the ITC to establish a more structured and coordinated approach in assessing the effectiveness of the projects in achieving their R&D objectives.

## **Performance measurement at programme level**

### ***Existing performance information***

2.16 At programme level, to measure the performance of the four programmes of the ITF (namely the ITSP, the SERAP, the UICP and the GSP), the ITC has reported:

- (a) in the Government's annual Estimates performance indicators for each programme. Such indicators comprise the number of applications received and processed, the number of projects funded and being monitored, and the number of new projects; and
- (b) in the annual progress report submitted to the LegCo Panel performance indicators comprising, for each of the five R&D centres, the number of new projects, the amount of project costs for newly approved projects, the operating expenditure, the percentage of industry contribution to projects and the amount of industry income (i.e. licence fee and royalty income and sponsorship) received.

### ***Need for more performance indicators***

2.17 Audit has performed a research of the performance indicators used by overseas R&D institutes. Audit found that the ITC's performance indicators could be enhanced to provide more comprehensive information on the performance of the ITF at programme level. Examples of performance indicators used by overseas R&D institutes are shown in Table 5.

**Table 5**

**Examples of performance indicators used by overseas R&D institutes**

	<b>Performance indicator</b>
Australia	<ul style="list-style-type: none"> <li>● Number of commercialisation outputs:               <ul style="list-style-type: none"> <li>■ Invention disclosures</li> <li>■ Licences executed</li> <li>■ Patents filed</li> <li>■ Start-up companies formed</li> </ul> </li> <li>● Number of PhD students receiving stipends and research support</li> <li>● Number of Masters students receiving stipends and research support</li> <li>● Number of overseas PhD students involved in the project</li> <li>● Number of research associates/assistants funded</li> </ul>
Singapore	<ul style="list-style-type: none"> <li>● Number of PhD students trained and graduated</li> <li>● Number of research institute staff spun out to locally-based industry as research scientists and engineers</li> <li>● Number of patents filed</li> <li>● Number of research papers published</li> <li>● Number of industry projects</li> <li>● Industry funding</li> <li>● National gross expenditure on R&amp;D</li> <li>● Business expenditure on R&amp;D</li> <li>● Number of licences or spin-offs arising from commercialisation of technology</li> <li>● Number of PhD post-graduates who work in Singapore upon graduation</li> </ul>
An international institute based in France	<ul style="list-style-type: none"> <li>● Gross domestic expenditure on R&amp;D</li> <li>● R&amp;D expenditure as a percentage of gross domestic product</li> <li>● Number of patents in the ICT sector</li> <li>● Number of researchers per thousand labour force</li> <li>● Number of R&amp;D staff per thousand labour force</li> <li>● Business enterprise expenditure on R&amp;D</li> <li>● Number of government R&amp;D personnel</li> </ul>

*Source: Audit research*

2.18 Apart from making reference to the performance indicators used by overseas R&D institutes, in Audit's view, the ITC could also consider co-developing with R&D centres and adopting performance indicators such as:

## **Review of ITF and performance monitoring**

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- (a) number and extent of technology breakthrough;
- (b) number and extent of technologies/products adopted by industries;
- (c) number of visitors to the ITC's website showing information on completed projects;
- (d) number of industry enquiries to completed projects of R&D centres;
- (e) number of exhibitions organised and number of participants in the exhibitions;
- (f) percentage of projects that achieved commercialisation within a stated timeframe;
- (g) number of contract researches generated;
- (h) number of partnerships/alliances formed among private sector firms/universities/research institutes; and
- (i) other qualitative measures.

2.19 Audit considers that the ITC needs to review and improve its performance measurement of the ITF, so as to enable it to regularly monitor how the ITF has contributed to innovation and technology upgrading in industry.



## **PART 3: PERFORMANCE OF R&D CENTRES**

3.1 This PART examines the issues relating to the performance of the R&D centres.

### ***Background***

3.2 In June 2005, the CEDB sought the FC's approval for adopting a new funding approach for innovation and technology development through the establishment of R&D centres under the ITF and funding R&D projects under specific focus themes which could upgrade and enhance the competitiveness of the industries.

3.3 In April 2006, five R&D centres were set up to drive and coordinate applied R&D in the selected technology focus areas and to promote commercialisation of R&D results and technology transfer (see para. 1.12).

### **Performance of R&D centres**

3.4 In June 2005, when seeking approval for the allocation of \$273.9 million (excluding the allocation to the R&D Centre for ICT which was separately subvented) from the ITF for setting up the five R&D centres, the then Commerce, Industry and Technology Bureau informed the FC that:

- (a) each R&D centre would have an initial term of operation of five years. The ITF would provide funding for setting up and maintaining the operation of the centres for the initial five years, subject to the arrangement to be made for providing recurrent subvention to ASTRI to support the extra operating expenses for its R&D centre in the order of \$60 million per annum over the five-year period. Since the main objective of a centre was to conduct industry-oriented R&D, each centre was required to entice industry participation and contributions to the R&D projects undertaken by it;
- (b) each R&D centre was required to evaluate its performance regularly according to a set of performance indicators, including:

## **Performance of R&D centres**

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- (i) industry participation as measured by the number of companies involved in R&D projects and the level of contribution made by them;
  - (ii) project performance as measured by whether the pre-set milestones were met in a timely manner and cost-effectively;
  - (iii) quality of R&D programme as measured by the number of patents granted, other IPs generated, etc.;
  - (iv) utilisation of research output as measured by the adoption of research output by the industry and the number of licensing agreements signed and consulting services offered, etc.;
  - (v) amount of revenue generated from R&D projects;
  - (vi) number of researchers trained and participated in R&D projects; and
  - (vii) overall contribution to the economy of Hong Kong;
- (c) the projected operating cost for each R&D centre would represent on average 16% of the total R&D expenditure for R&D projects undertaken by it;
- (d) based on initial business plans of the R&D centres submitted, many of them were expected to be able to have up to 40% contributions from the industry as they ramped up to the fifth year of operation;
- (e) if an R&D centre was to continue operation beyond the five-year period, it was expected to do so on a self-financing basis, counting on its ability to obtain adequate industry contributions and generate income to meet its operating cost; and
- (f) the Administration would undertake a study to analyse the economic and social benefits generated from the R&D centres with a view to assessing the overall impacts of these initiatives on the development of Hong Kong's industries.

3.5 In 2008, the ITC conducted a mid-term review on the operation of the R&D centres and reported in April 2009, among others, the following major findings to the LegCo Panel:

- (a) by the end of 2008, the R&D centres had undertaken 316 projects with an estimated cost of \$1,344.6 million. The centres' project expenditures had lagged behind their original estimate drawn up in 2005; and
- (b) the centres had secured a total contribution of \$140.9 million from the industry in support of 208 platform projects and collaborative projects (Note 4) funded under the ITF, representing about 11% of the total project cost estimate.

3.6 In June 2009, the CEDB sought the FC's approval for a further allocation of \$369 million from the ITF to support the continued operation of the five R&D centres up to 2013-14. The CEDB informed the FC that given the then prevailing financial climate, it was considered that the centres would have genuine difficulty in increasing the proportion of industry contribution substantially in the near future and, having regard to the feedback from the centres and the industry, the Government decided to adjust the centres' target of soliciting industry contributions from 40% to 15% pending future review.

3.7 In December 2011, the ITC reported to the LegCo Panel the result of its comprehensive review of R&D centres after their first five years of operation from 2006-07 to 2010-11. In May 2012, the CEDB sought the FC's approval for another allocation of \$275.3 million from the ITF to support the continued operation of the R&D centres. In brief, it was approved that:

- (a) for APAS and NAMI, which had achieved more than 15% industry contribution in their first five-year period, the target was set at 20% for their second five-year period; and

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**Note 4:** *Platform projects require industry sponsorship from at least two private sector companies covering at least 10% of the project cost. Collaborative projects require industry contribution of at least 30% of the project cost.*

## Performance of R&D centres

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- (b) for HKRITA and LSCM, which had not achieved the industry contribution of 15%, they were required to achieve an industry contribution target of 18% in the two-year period ending 31 March 2013.

The ITC undertook to closely monitor and review the centres' performance and continue to report progress to the LegCo Panel every year. As regards the R&D Centre for ICT, because its operating cost was funded separately by the Government through recurrent subvention to ASTRI, there was no reporting of the centre's performance to the FC.

## Audit findings

3.8 R&D centres are platforms for coordinating applied R&D in designated technology areas and facilitating technology transfer to the industry. Therefore, the level of industry contribution is an important indicator to show the degree of interest of the industry in their work. Up to March 2013, the operating costs of the R&D centres, not counting the cost of the R&D Centre for ICT, amounted to \$484 million (see para. 1.14) and the costs of R&D projects they managed amounted to \$3.2 billion (see para. 1.13). In 2012-13, the operating cost of the R&D Centre for ICT amounted to \$130.2 million (see para. 1.13). In view of the significant amount involved, Audit examined the performance of the R&D centres, including their level of industry contribution achieved. Audit noted that the cost-effectiveness of the R&D centres was a major concern of the LegCo Panel.

## *Performance of APAS*

3.9 APAS started operation in April 2006. According to the FC paper of June 2005, the following targets were set and estimates were made for APAS:

- (a) APAS should be able to solicit up to 40% contributions from the industry by the fifth year of operation (target industry contribution was adjusted from 40% to 15% in June 2009 — Note 5);

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**Note 5:** *The level of industry contribution was calculated as follows:*

$$\frac{\text{Industry contribution pledged}}{\text{Approved project expenditure}} \times 100\%$$

- (b) APAS should be able to continue operation on a self-financing basis after the five-year period;
- (c) an amount of \$100 million was approved for the establishment and the operation in the first five years;
- (d) APAS was expected to conduct about 110 projects of different nature with corresponding R&D expenditure of about \$441 million in the five-year period;
- (e) APAS would comprise five key staff and eight supporting staff; and
- (f) projected operating costs of the centre were expected to be, on average, 16% of its total R&D expenditure for R&D projects in the first five-year period of operation (Note 6).

3.10 By March 2013, APAS had operated for seven years. In November 2012, APAS was merged with the HKPC and became the APAS Division of the HKPC. Based on information submitted to LegCo and APAS's records, APAS's performance over the seven years from 2006-07 to 2012-13 are summarised as follows:

- (a) the operating expenditure and industry income were as follows:

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**Note 6:** *Such operating costs included staffing, accommodation, equipment, commercialisation/technology transfer expenditure and other administrative/miscellaneous expenses. The ratio was calculated as follows:*

$$\frac{\text{Actual operating costs of an R\&D centre}}{\text{Actual total R\&D expenditure for R\&D projects of the centre}} \times 100\%$$

## Performance of R&D centres

### APAS Operating expenditure (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Staffing	1.9	7.4	7.0	7.4	6.8	13.0	9.9	53.4
Accommodation	1.5	1.5	1.5	1.6	1.5	1.5	1.5	10.6
Equipment	0.3	4.8	1.2	6.4	5.9	2.5	0.3	21.4
Others	5.9	2.4	3.0	1.5	0.9	2.4	4.1	20.2
Total	9.6	16.1	12.7	16.9	15.1	19.4	15.8	105.6

Source: LegCo and APAS records

### APAS Industry income received (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Industry sponsorship for projects	0	4.10	3.90	4.14	4.62	3.24	1.42	21.42
Licence fee and royalty income	0	0	0	0	0	0.05	0.01	0.06
Contract services	0	0	0.07	0	0	0	0.03	0.10
Others	0	0.03	0.15	0.21	0.34	0.15	0.15	1.03
Total	0	4.13	4.12	4.35	4.96	3.44	1.61	22.61

Source: LegCo and APAS records

## Performance of R&D centres

It can be seen that APAS's operating expenditure (\$105.6 million) was far higher than the industry income (\$22.61 million) it received in the seven years. The chance of achieving the self-financing target in the near future is remote;

- (b) against the original target of 40%, revised to 15% in 2009 and to 20% for the second five-year period, APAS achieved the following levels of industry contribution in the period from 2006-07 to 2012-13:

### APAS Level of industry contribution (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Target	40% (revised to 15% in 2009)					20% for 2nd five-year period (i.e. 2011-12 to 2015-16)	
Actual	0	19.6%	11.0%	11.7%	28.1%	13.9%	30.5%

*Source: LegCo and APAS records*

The level of industry contributions showed significant improvement in 2012-13. As the ITC reported to the LegCo Panel in June 2013, with the successful merger of APAS with HKPC in November 2012, APAS would be able to better drive applied R&D by leveraging on the HKPC's wide industry network and resources and would be in a better position to develop its businesses;

- (c) although APAS was expected to conduct about 110 projects of different nature with the corresponding R&D expenditure of about \$441 million over the first five-year period (see para. 3.9), it transpired that:
- (i) APAS had conducted only 59 projects in the seven-year period from 2006-07 to 2012-13; and

## Performance of R&D centres

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### APAS Number of projects conducted (2006-07 to 2012-13)

Planned	From 2006-07 to 2010-11 (five years)	2011-12	2012-13	Total
110	47	6	6	59

Source: LegCo Panel papers

- (ii) total project costs in the seven years from 2006-07 to 2012-13 amounted to \$123.9 million, i.e. \$2.1 million per project;

### APAS R&D project costs (2006-07 to 2012-13)

Planned	From 2006-07 to 2010-11 (five years)	2011-12	2012-13	Total
(\$ million)				
441	89.9	17.7	16.3	123.9

Source: LegCo Panel papers

- (d) according to the paper submitted by the Administration in June 2005 to the FC, the number of staff for APAS would be minimised at a level of 11 and expanded to 13 later. However, Audit noted that despite the fact that both the number of projects undertaken and project costs were much lower than planned, the actual staff strength for APAS had increased from 9 in 2006-07 to 29 in 2011-12, and then decreased to 24 in 2012-13. The ITC needs to look into the reasons behind the staff increase with a view to improving the cost-effectiveness of APAS; and



**Performance of R&D centres**

**APAS  
Staff strength  
(2006-07 to 2012-13)**

<b>Planned</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>
13	9	14	18	21	25	29	24

*Source: LegCo and APAS records*

- (e) although APAS was expected to achieve a ratio of 16% for “centre operating cost to R&D expenditure” (see para. 3.9), it transpired that the ratio for the seven years from 2006-07 to 2012-13 was persistently much higher than the planned level of 16% in all seven years (as shown below). This indicates that the cost-effectiveness of APAS’s operation calls for improvement.

**APAS  
Ratio of operating expenditure to R&D project costs  
(2006-07 to 2012-13)**

	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>
	(\$ million)						
Operating expenditure	9.6	16.1	12.7	16.9	15.1	19.4	15.8
R&D project costs	0	6.4	16.5	37.0	30.0	17.7	16.3
Ratio (estimate was 16%)	—	251%	77%	46%	50%	110%	97%

*Source: LegCo and APAS records*

## Performance of R&D centres

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### *Performance of HKRITA*

3.11 HKRITA started operation in April 2006. According to the FC paper of June 2005, the following targets were set and estimates were made for HKRITA:

- (a) HKRITA should be able to solicit up to 40% contributions from the industry by the fifth year of operation (adjusted in June 2009 from 40% to 15%);
- (b) HKRITA should be able to continue operation on a self-financing basis after the five-year period;
- (c) an amount of \$60.3 million was approved for the establishment and the first five-year operation of the centre;
- (d) HKRITA was expected to carry out 105 projects in five years;
- (e) HKRITA would comprise four key staff and six supporting staff in the first year rising to 16 in the fifth year; and
- (f) projected operating costs of HKRITA were expected to be, on average, 16% of the total R&D expenditure for R&D projects in the first five-year period of operation.

3.12 By March 2013, HKRITA had operated for seven years. Based on the information submitted to LegCo and HKRITA's records, HKRITA's performance over the seven years from 2006-07 to 2012-13 are summarised as follows:

- (a) the operating expenditure and industry income were as follows:

## Performance of R&D centres

### HKRITA Operating expenditure (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Staffing	4.5	6.1	7.5	8.5	9.7	11.8	12.9	61.0
Accommodation	0.1	0.4	0.3	0.5	0.5	1.3	1.9	5.0
Equipment	0.7	1.5	0.2	0	0.1	0	1.2	3.7
Others	0.4	1.4	1.4	1.2	2.0	2.9	3.1	12.4
Total	5.7	9.4	9.4	10.2	12.3	16.0	19.1	82.1

Source: LegCo and HKRITA records

### HKRITA Industry income (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Industry sponsorship for projects	0	5.02	3.28	8.85	12.59	3.67	7.52	40.93
Licence fee and royalty income	0	0	0	0.07	5.19	0.57	1.02	6.85
Total	0	5.02	3.28	8.92	17.78	4.24	8.54	47.78

Source: LegCo and HKRITA records

## Performance of R&D centres

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It can be seen that HKRITA's operating expenditure (\$82.1 million) was much higher than the industry income (\$47.78 million) in the seven years from 2006-07 to 2012-13. The chance of achieving the self-financing target in the near future is remote;

- (b) while the original target was 40%, revised to 15% in June 2009 and to 18% for the two-year period ending 31 March 2013, HKRITA achieved the following levels of industry contribution in the seven years from 2006-07 to 2012-13:

**HKRITA**  
**Level of industry contribution**  
**(2006-07 to 2012-13)**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Target	40% (revised to 15% in 2009)					18% (Note)	
Actual	0	11.6%	14.9%	11.6%	12.3%	23.0%	26.8%

*Source: LegCo and HKRITA records*

*Note: The industry contribution target for HKRITA for the period from 2011-12 to 2012-13 was 18% and for the period from 2011-12 to 2015-16 was 20%.*

Audit noted that HKRITA had improved its level of industry contribution substantially in 2011-12 and 2012-13;

- (c) HKRITA was expected to conduct 105 projects in five years from 2006-07 to 2010-11 (see para. 3.11). It had conducted only 84 projects in the seven-year period from 2006-07 to 2012-13;

**HKRITA  
Number of projects conducted  
(2006-07 to 2012-13)**

<b>Planned</b>	<b>From 2006-07 to 2010-11 (five years)</b>	<b>2011-12</b>	<b>2012-13</b>	<b>Total</b>
105	51	14	19	84

*Source: LegCo Panel papers*

- (d) according to the paper submitted by the Administration to the FC in June 2005, the number of staff for HKRITA would be 10 for the first year rising to 20 for the fifth year. However, despite the fact that the number of projects undertaken by HKRITA was lower than planned, the centre's staff strength increased from 11 in 2006-07 to 19 in 2010-11 and further to 25 in 2012-13. The ITC needs to look into the reasons behind the staff increase with a view to improving the cost-effectiveness of HKRITA; and

**HKRITA  
Staff strength  
(2006-07 to 2012-13)**

<b>Planned</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>
10 in the 1st year 20 in the 5th year	11	14	17	17	19	22	25

*Source: LegCo and HKRITA records*

- (e) although HKRITA was expected to achieve on average a ratio of 16% for "centre operating cost to R&D expenditure" (see para. 3.11), it transpired that the ratio for the seven years from 2006-07 to 2012-13 was persistently much higher than the planned level of 16% (as shown below). This indicates that the cost-effectiveness of HKRITA's operation calls for improvement.

## Performance of R&D centres

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### HKRITA Ratio of operating expenditure to R&D project costs (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
	(\$ million)						
Operating expenditure	5.7	9.4	9.4	10.2	12.3	16.0	19.1
R&D project costs	0	11.1	35.8	31.8	19.3	37.5	28.0
Ratio (estimate was 16%)	—	85%	26%	32%	64%	43%	68%

Source: LegCo and HKRITA records

### *Performance of ASTRI*

3.13 The R&D Centre for ICT under ASTRI started operation in April 2006. According to the FC paper of June 2005, the following targets were set and estimates were made for the centre:

- (a) the centre should be able to solicit up to 40% contributions from the industry by the fifth year of operation (adjusted in June 2009 from 40% to 15%);
- (b) the centre planned to conduct about 100 R&D projects covering four technology areas (namely, communications technologies, consumer electronics, IC design and opto-electronics);
- (c) the centre should be able to continue operation on a self-financing basis after the five-year period; and
- (d) the centre required extra operating expenses in the order of \$60 million per annum over the five-year period.

## Performance of R&D centres

3.14 By March 2013, the centre had operated for seven years. Based on the ITC's and the centre's records, ASTRI's performance over the seven years are summarised as follows:

(a) the operating expenditure and industry income were as follows:

### ASTRI Operating expenditure (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Staffing	69.1	65.5	50.2	62.0	64.0	69.8	76.7	457.3
Accommodation	12.0	12.9	13.5	15.6	20.0	22.1	23.6	119.7
Equipment	5.5	1.7	5.8	11.9	2.2	6.2	2.9	36.2
Others	19.0	19.7	21.7	26.8	27.2	24.6	27.0	166.0
Total	105.6	99.8	91.2	116.3	113.4	122.7	130.2	779.2

Source: LegCo and ASTRI records

## Performance of R&D centres

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### ASTRI Industry income (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Industry sponsorship for projects	5.20	13.8	36.0	38.60	44.10	43.50	46.07	227.27
Licence fee and royalty income	0.60	0	0.1	4.50	10.70	10.15	9.12	35.17
Contract services	0.10	0	3.3	2.90	5.50	6.84	12.22	30.86
Others	0	0	0	1.20	0.70	0.38	0.62	2.90
Total	5.90	13.80	39.40	47.20	61.00	60.87	68.03	296.20

Source: LegCo and ASTRI records

It can be seen that the centre's operating expenditure in the seven years from 2006-07 to 2012-13 (\$779.20 million) were well above its industry income (\$296.20 million), indicating that the self-finance target cannot be achieved in the near future;

- (b) while the original target was 40%, revised to 15% in June 2009, the centre achieved the following levels of industry contribution in the seven years, exceeding the target for five years:



**ASTRI**  
**Level of industry contribution**  
**(2006-07 to 2012-13)**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Target	40% (revised to 15% in 2009)					20% for 2nd five-year period (i.e. 2011-12 to 2015-16)	
Actual	4.0%	7.8%	16.1%	16.9%	20.3%	20.2%	25.3%

*Source: LegCo and ASTRI records*

- (c) the centre was expected to conduct about 100 R&D projects covering its four technology areas (see para. 3.13). Based on LegCo Panel papers, it had conducted 261 projects in the seven-year period from 2006-07 to 2012-13. The number of projects conducted by the centre had far exceeded the planned number; and

**ASTRI**  
**Number of projects conducted**  
**(2006-07 to 2012-13)**

Planned	From 2006-07 to 2010-11 (five years)	2011-12	2012-13	Total
100	196	27	38	261

*Source: LegCo Panel papers*

- (d) while the average target ratio was 16% for “centre operating cost to R&D expenditure”, the centre’s ratios for the seven years from 2006-07 to 2012-13 ranged from 38.2% to 74.6% (around 40% in more recent years), indicating that the cost-effectiveness of the centre’s operation calls for improvement.

## Performance of R&D centres

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**ASTRI**  
**Ratio of operating expenditure to R&D project costs**  
**(2006-07 to 2012-13)**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
	(\$ million)						
Operating expenditure	105.6	99.8	91.2	116.3	113.4	122.7	130.2
R&D project costs	141.5	168.2	238.6	272.8	292.9	295.6	267.4
Ratio (estimate was 16%)	74.6%	59.3%	38.2%	42.6%	38.7%	41.5%	48.7%

Source: LegCo and ASTRI records

### ***Performance of NAMI***

3.15 NAMI started operation in April 2006. According to the FC paper of June 2005, the following targets were set and estimates were made for NAMI:

- (a) NAMI should be able to solicit up to 40% contributions from the industry by the fifth year of operation (adjusted in June 2009 from 40% to 15%);
- (b) NAMI should be able to continue operation on a self-financing basis after the five-year period;
- (c) an amount of \$61.4 million was approved for the establishment and the first five-year operation of the centre;
- (d) NAMI planned to conduct 75 projects in five years;
- (e) NAMI would comprise six key staff; and
- (f) projected total operating costs of the centre were expected to be, on average, 16% of the total R&D expenditure for R&D projects in the first five-year period of operation.

## Performance of R&D centres

3.16 By March 2013, NAMI had operated for seven years. Based on information submitted by the ITC to LegCo and NAMI's records, NAMI's performance over the seven years are summarised as follows:

- (a) the operating expenditure and industry income were as follows:

### NAMI Operating expenditure (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Staffing	6.9	7.3	8.0	14.5	18.8	26.0	26.8	108.3
Accommodation	0.8	0.8	0.8	1.6	4.1	2.4	3.7	14.2
Equipment	0.3	0.1	0.3	8.7	0.4	0.5	2.9	13.2
Others	2.4	2.5	1.8	2.0	2.4	6.4	4.7	22.2
Total	10.4	10.7	10.9	26.8	25.7	35.3	38.1	157.9

Source: LegCo and NAMI records

## Performance of R&D centres

### NAMI Industry income (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Industry sponsorship for projects	0	1.60	4.60	10.13	33.52	7.57	21.30	78.72
Licence fee and royalty income	0	0	0	0.06	0.04	0	0.35	0.45
Contract services	0.40	1.40	0.80	0.03	0	0.11	1.43	4.17
Total	0.40	3.00	5.40	10.22	33.56	7.68	23.08	83.34

Source: LegCo and NAMI records

It can be seen that NAMI's operating expenditure (\$157.9 million) was much higher than the industry income (\$83.34 million) in the seven years. The chance of achieving the self-financing target in the near future is remote;

- (b) while the original target was 40%, revised to 15% in June 2009 and 20% for the second five-year period, NAMI achieved the following levels of industry contribution in the seven years from 2006-07 to 2012-13:

### NAMI Level of industry contribution (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Target	40% (revised to 15% in 2009)					20% for 2nd five-year period (i.e. 2011-12 to 2015-16)	
Actual	0	33.3%	11.8%	29.7%	41.1%	35.9%	39.0%

Source: LegCo and NAMI records

NAMI had shown the best performance among all centres with its level of industry contribution at a level exceeding or close to the target level;

- (c) NAMI was expected to conduct 75 projects in the five-year period 2006-07 to 2010-11 (see para. 3.15). Based on LegCo Panel papers, it had conducted only 45 projects in five-year period from 2006-07 to 2010-11;

**NAMI  
Number of projects conducted  
(2006-07 to 2012-13)**

Planned	From 2006-07 to 2010-11 (five years)	2011-12	2012-13	Total
75	45	15	22	82

*Source: LegCo Panel papers*

- (d) according to the paper submitted by the Administration to the FC in June 2005, the number of staff in the first year would be about 17. However, despite the fact that the number of projects conducted was lower than that planned, the staff strength for NAMI had increased from the original estimate of 17 staff in 2005 to 53 in 2012-13. The ITC needs to look into the reasons behind the staff increase with a view to improving the cost-effectiveness of NAMI; and

**NAMI  
Staff strength  
(2006-07 to 2012-13)**

Planned	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
17 in the 1st year	14	15	21	39	45	47	53

*Source: LegCo and NAMI records*

## Performance of R&D centres

- (e) although the R&D centres were expected to maintain a ratio of 16% for “centre operating cost to R&D expenditure” (see para. 3.15), it transpired that the ratios of NAMI for the seven years were persistently much higher than the planned level of 16% in all seven years (as shown below), indicating that the cost-effectiveness of the centre’s operation calls for improvement.

**NAMI**  
**Ratio of operating expenditure to R&D project costs**  
**(2006-07 to 2012-13)**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
	(\$ million)						
Operating expenditure	10.4	10.7	10.9	26.8	25.7	35.3	38.1
R&D project costs	0	1.7	11.4	31.0	45.4	50.1	47.8
Ratio (estimate was 16%)	—	629%	96%	86%	57%	70%	80%

Source: LegCo and NAMI records

## Performance of LSCM

3.17 LSCM started operation in April 2006. According to the FC paper of June 2005, the following targets were set for the centre:

- (a) the centre should be able to solicit up to 40% contributions from the industry by the fifth year of operation (adjusted in June 2009 from 40% to 15%);
- (b) the centre should be able to continue operation on a self-financing basis after the five-year period;
- (c) an amount of \$52.2 million was approved for the establishment and the first five-year operation of the centre;
- (d) the centre planned to conduct 80 projects in five years;

## Performance of R&D centres

- (e) the centre would comprise six key staff. The total headcount would rise to 14 in the fourth year; and
- (f) projected total operating costs of the R&D centres were expected to be, on average, 16% of their total R&D expenditure for R&D projects in the first five-year period of operation.

3.18 By March 2013, LSCM had operated for seven years. Based on information submitted by the ITC to LegCo and the LSCM's records, LSCM's performance over the seven years from 2006-07 to 2012-13 are summarised as follows:

- (a) the operating expenditure and industry income were as follows:

### LSCM Operating expenditure (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Staffing	5.1	9.6	7.9	8.5	10.3	11.4	11.6	64.4
Accommodation	0.2	0.3	1.8	2.8	3.6	3.8	3.7	16.2
Equipment	0.9	0.2	0.6	1.5	0.5	0.3	0.7	4.7
Others	1.9	2.3	2.0	1.2	3.1	3.6	4.9	19.0
Total	8.1	12.4	12.3	14.0	17.5	19.1	20.9	104.3

*Source: LegCo and LSCM records*

## Performance of R&D centres

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### LSCM Industry income (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total
	(\$ million)							
Industry sponsorship for projects	0	2.42	5.92	5.65	7.96	3.78	7.97	33.70
Licence fee and royalty income	0	0	0	0	0	0.07	0.16	0.23
Contract services	0.03	0.04	0	0.01	0	0	0.15	0.23
Others	0	0	0	17.63	0.13	0	0	17.76
Total	0.03	2.46	5.92	23.29	8.09	3.85	8.28	51.92

Source: LegCo and LSCM records

It can be seen that the LSCM's operating expenditure (\$104.3 million) was much higher than the industry income (\$51.92 million) in the seven years. The centre would unlikely achieve the self-financing target in the short term;

- (b) against the original target of 40%, revised to 15% in 2009-10, and further revised to 18% for 2011-12 to 2012-13, LSCM achieved the following levels of industry contribution in the seven years from 2006-07 to 2012-13:



**LSCM  
Level of industry contribution  
(2006-07 to 2012-13)**

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Target	40% (revised to 15% in 2009)					18% (Note)	
Actual	0	11.7%	11.8%	13.4%	12.1%	15.4%	18.7%

*Source: LegCo and LSCM records*

*Note: The industry contribution target for LSCM for the period from 2011-12 to 2012-13 was 18% and for the period from 2011-12 to 2015-16 was 20%.*

- (c) LSCM was expected to conduct 80 projects in the five-year period 2006-07 to 2010-11 (see para. 3.17). Based on LegCo Panel papers, it had conducted only 47 projects in the period from 2006-07 to 2012-13;

**LSCM  
Number of projects conducted  
(2006-07 to 2012-13)**

Planned	From 2006-07 to 2010-11 (five years)	2011-12	2012-13	Total
80	29	5	13	47

*Source: LegCo Panel papers*

- (d) according to the paper submitted by the Administration to the FC in June 2005, the number of staff would be 6 initially and increased to 14 in the fourth year. However, despite the fact that the number of projects undertaken was much lower than that planned, the staff strength for the R&D centre increased from 13 in 2006-07 to 53 in 2012-13. The ITC needs to look into the reasons behind the staff increase with a view to improving the cost-effectiveness of LSCM; and

## Performance of R&D centres

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### LSCM Staff strength (2006-07 to 2012-13)

Planned	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
6 in the 1st year and 14 in the 4th year	13	21	31	40	37	44	53

Source: LegCo and LSCM records

- (e) the ratio for the centre's operating expenditure versus its R&D project costs (as shown below) was persistently higher than the 16% which the R&D centres were expected to achieve (see para. 3.4(c)), indicating that the cost-effectiveness of the centre's operation calls for improvement.

### LSCM Ratio of operating expenditure to R&D project costs (2006-07 to 2012-13)

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
	(\$ million)						
Operating expenditure	8.1	12.4	12.3	14.0	17.5	19.1	20.9
R&D project costs	0	8.5	40.5	49.0	41.4	48.0	35.4
Ratio (estimate was 16%)	—	145.9%	30.4%	28.6%	42.3%	39.8%	59.0%

Source: LegCo and LSCM records

*Audit comments*

3.19 Audit conducted an assessment of the performance of individual R&D centres (see paras. 3.9 to 3.18). Audit has noted that:

- (a) the cost-effectiveness of the centres' operations calls for improvement. The centres had operated for more than seven years and the performance results have deviated significantly from the estimated position as set out in 2005 when the approval for the setting up of the centres was sought from the FC;
- (b) in particular, the level of industry contribution for the centres should be subject to review. The level was initially set at 40% for the 5th year of operation. However, it was drastically adjusted downwards to 15% in June 2009, having regard to the then financial climate and feedback from the centres and the industry (see para. 3.6). It is opportune to review the level in the forthcoming comprehensive review of the ITF, taking into account the experience gained in the past seven years; and
- (c) the chance of achieving the self-financing target in the near future is remote. The ITC needs to critically review the operations of the centres, and set more realistic performance targets for their operations.

## **PART 4: COMMERCIALISATION OF ITF PROJECT RESULTS**

4.1 This PART examines the issues relating to the commercialisation of ITF projects results. It covers:

- (a) commercialisation of ITSP project results (paras. 4.4 to 4.18); and
- (b) commercialisation of SERAP project results (paras. 4.19 to 4.30).

### ***Background***

4.2 Commercialisation refers to the R&D results (such as an R&D product) launched or sold commercially. It is an important aspect of the management of the ITF because it is an indicator of the extent that the Government's investment offers value for money. However, not all R&D projects can be commercialised and this should be taken into consideration in evaluating the effectiveness of the ITF.

4.3 According to the ITC, while monetary return is not the primary consideration for its support to ITF projects, commercialisation is a useful performance indicator as it demonstrates whether the R&D results are relevant to the industry. Furthermore, commercialisation is important for SERAP projects as the aim of SERAP is to provide pre-venture and venture capital funding to small technology-based and entrepreneur-driven companies and the Government expects to recoup the funding gradually if the project is commercially successful.

### **Commercialisation of ITSP project results**

#### ***Licence fee income of R&D centres***

4.4 For the period from April 2006 (establishment of the R&D centres) to March 2013, the number of completed ITSP projects and those with licences granted to commercial entities for authorised use of the centres' technologies or know-how are as follows:

**Table 6**  
**ITSP R&D centre projects with licences granted**  
**(April 2006 to March 2013)**

<b>R&amp;D centre</b>	<b>Number of completed projects</b>	<b>Number of completed projects with licences granted</b>
APAS	48	7 (14.6%)
ASTRI	214	86 (40.2%)
HKRITA	49	13 (26.5%)
LSCM	31	6 (19.4%)
NAMI	47	7 (14.9%)
Overall	389	119 (30.6%)

*Source: R&D centre records*

*Remarks: An R&D centre may grant two types of licences, namely exclusive licences and non-exclusive licences.*

4.5 According to the ITC, performance of the R&D centres in commercialisation can be measured by the amount of licence fee (Note 7) generated from the licences granted. However, Audit found that in the years from 2009-10 to 2012-13, total licence fee income collected per year by the five R&D centres altogether ranged from \$0.2 million to \$12 million, representing less than 1% to some 9% of the total R&D project costs for the year (see Table 7).

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**Note 7:** *Licence fee includes an up-front fee and/or royalties which are based on a percentage of the licensee's net sales or an amount per unit of the licensed product sold.*

## Commercialisation of ITF project results

Table 7

### Licence fee income of R&D centres (2009-10 to 2012-13)

R&D centre	2009-10 (Note 1)		2010-11		2011-12		2012-13	
	Gross (Note 2)	Net (Note 2)	Gross	Net	Gross	Net	Gross	Net
	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)
APAS	–	–	–	–	100.0	50.0	50.0	7.5
ASTRI (Note 3)	84.9	84.9	6,853.9	6,853.9	6,658.4	6,658.4	7,379.6	7,379.6
HKRITA	50.0	35.0	5,159.2	861.6	560.3	172.3	2,883.0	808.1
LSCM	–	–	1.6	0.5	65.0	30.0	161.0	143.0
NAMI	55.0	46.8	35.5	34.7	–	–	350.8	328.0
Total licence fee (a)	189.9		12,050.2		7,383.7		10,824.4	
Total R&D project costs (b)	28,762.6		140,015.3		251,934.7		293,142.6	
Percentage of return: (c) = (a) ÷ (b) × 100%	0.7%		8.6%		2.9%		3.7%	

Source: R&D centre records

Note 1: The R&D centres were established in 2006 and it usually took two years to complete an R&D project (i.e. the results of a project could be commercialised and generated licence fee income at least two years after commencement of the project). As such, Table 7 did not include licence fee income for the period prior to 2009-10.

Note 2: Licence fee is normally shared between an R&D centre (that drives and coordinates applied R&D) and a research institute (that conducts the R&D work) according to a pre-determined ratio (see para. 4.9 for details). The gross licence fee refers to the total licence fee received and the net licence fee refers to the amount accrued to the R&D centre after sharing the licence fee with the research institute. As the R&D centres are publicly funded, the net licence fees have to be reverted by the centres to the Government.

Note 3: ASTRI does not have to share licence fees with the research institutes because it usually engages research institutes to conduct R&D work by paying them a contract-out fee.

## Commercialisation of ITF project results

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4.6 Audit examined the commercialisation of 15 ITSP R&D centre projects, three from each of the five R&D centres. Audit has the following findings:

- (a) there were differences among R&D centres' practices in setting licence fees (paras. 4.7 and 4.8);
- (b) there were variations in income sharing arrangements between the R&D centres and the public research institutes (paras. 4.9 to 4.12); and
- (c) there were scope for improvement in the collection of licence fees (para. 4.13).

Audit considers that the ITC needs to step up its control over the commercialisation of projects handled by the R&D centres.

### *Practices of R&D centres in setting licence fees*

4.7 As shown in Table 8, the R&D centres have adopted different practices for setting their licence fees.

**Table 8**

**Practices for setting licence fees adopted by R&D centres**

R&D centre	Practice
APAS	<ul style="list-style-type: none"> <li>• Factors considered include market response, project cost, the applicant's background, proposed licensing terms and sales forecast.</li> <li>• Licencees who have sponsored the project are not required to pay up-front fee.</li> <li>• Licence fees were approved by the Commercialisation Committee of APAS. Since merger with the HKPC, licence fees are approved by the Business Development Committee of the HKPC.</li> </ul>
ASTRI	<ul style="list-style-type: none"> <li>• Factors considered include the applicant's credit worthiness, justifications on proposed licence fee, licensing period, target market, territory for use of licence and relevant cost incurred by ASTRI.</li> <li>• Approved by the CEO.</li> <li>• Approval by the Board of Directors is required for licence fee income exceeding \$7.5 million in each of the first three years of the licensing period.</li> </ul>
HKRITA	<ul style="list-style-type: none"> <li>• In August 2013, HKRITA informed Audit that it had conducted trial use of a methodology to set licence fee with reference to the project cost, number of potential licensees, market potential and support from research project team, etc.</li> <li>• Provides discount on licence fee based on the industry sponsors' share of contribution.</li> <li>• Approved by the Board of Directors.</li> </ul>
LSCM	<ul style="list-style-type: none"> <li>• Factors considered include market size, number of potential licensees, project cost and revenue forecast.</li> <li>• 50% discount on licence fee offered to industry sponsors.</li> <li>• Approved by the Finance and Administration Committee.</li> </ul>
NAMI	<ul style="list-style-type: none"> <li>• Factors considered include the sales income estimated by the applicant for the proposed licensing period, the recovery of project cost, nature of technology and level of capital investment.</li> <li>• Approved by a panel of management staff, the Technology Committee, or the Board of Directors depending on the types of licences and projects.</li> </ul>

Source: R&D centre records and Audit enquiries



## Commercialisation of ITF project results

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4.8 The setting of licence fee is a complicated matter as it involves assumptions and variables and would require techniques such as market research and discounted cash flow analysis. The factors taken into consideration and approaches used in setting licence fees varied among the centres. In the case of HKRITA, it was only in 2013 that it started to use a methodology (on a trial basis) for setting its licence fees. For APAS, HKRITA and LSCM, they offer preferential terms to industry sponsors as a matter of course. Audit considers that the R&D centres' system of setting licence fees can be rationalised as follows:

- (a) principles and guidelines should have been set by the ITC, in collaboration with the R&D centres, for determining the licence fee to be collected, and any significant deviations from the principles and guidelines should be approved by the centres' Board of Directors and/or the ITC; and
- (b) there should be proper documentation on the rationale and the commercial considerations in setting licence fees. Audit noted that there were instances where the rationale and commercial considerations were not properly documented (Cases 1 and 2 are examples).

### Case 1

1. In May 2011, HKRITA completed an ITSP project at a project cost of \$1.9 million. In June 2011, HKRITA's Board of Directors approved a licence fee of \$50,000 for use of the technology by licensees.

#### *Audit comments*

2. Audit noted that the licence fee of \$50,000 represented only 2.6% of the project cost of \$1.9 million. However, there was no explanation on the basis of how the licence fee was determined.

*Source: Audit analysis of HKRITA records*

### Case 2

1. In November 2008, HKRITA completed an ITSP project at a project cost of \$2.3 million. The licence fee for the technology developed was calculated on the basis of the number of spindles owned by the licensee. For example, the licence fee would be \$1 million for 50,000 spindles and \$2 million for 50,001 to 200,000 spindles.

2. In September 2010, a free licence was granted to the company which owned the earlier generation of the technology, on the basis that the company had invested some \$5.7 million to develop the technology.

#### *Audit comments*

3. In June 2010, the research institute which conducted the R&D work had promised HKRITA that it would verify the correctness of the amount of the \$5.7 million. Audit found no evidence that the verification had been performed. There was no evidence that HKRITA had followed up with the research institute on the issue.

*Source: Audit analysis of HKRITA records*

### *Sharing of licence fee income*

4.9 Income on licence fees is usually shared between the R&D centre and the research institute such as a local university. Audit found that in the absence of principles/guidelines set by the ITC, the income sharing arrangements varied among the centres (see Table 9 below).

Table 9

Licence fee income sharing arrangements of R&D centres

R&D centre	Income sharing arrangement
APAS	The party who commercialised the relevant IP and concluded the agreement with the licensee would share 70% of licence fee.
ASTRI	Not applicable as ASTRI usually engages research institutes to conduct R&D work by paying them a contract-out fee.
HKRITA	The party who concluded an agreement with the licensee would share 70% of licence fee.
LSCM	The party who concluded an agreement with the licensee would share 70% of licence fee.
NAMI	The research institute shares 15% or 30% of sales revenue depending on whether the institute has put in project resources.

Source: R&D centre records

Audit could not ascertain the bases on which the sharing arrangements in Table 9 are determined.

4.10 In Case 3, Audit was unable to ascertain whether the sharing arrangement agreed between the R&D centre and the public research institute was fair and whether the public interest was protected (Note 8).

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**Note 8:** *R&D projects are substantially funded by the Government and according to the relevant agreements, licence fee incomes received by the R&D centres have to be ploughed back to the Government.*

### Case 3

1. In June 2009, HKRITA agreed that a research institute should take the lead in the commercialisation of the project, and that the usual income-sharing ratio of 30:70 (70% of the licence fee accruing to the party who concluded the licensing agreement with the licensee which, in this case, was the research institute) should apply (see Table 9).

2. The research institute appointed a company to act as its agent to deal with HKRITA on commercialisation of the project. From September to December 2010, the agent granted licences to three companies for \$5 million. In May and November 2012, it granted licences to another two companies for \$3 million.

3. In March 2011, contrary to the pre-determined sharing ratio of 30:70, the research institute proposed to share income with HKRITA at a ratio of 15:85. HKRITA accepted the proposal. In May 2011, HKRITA and the agent signed an agreement on this sharing arrangement.

4. According to the agreement, HKRITA should be given 15% of licence fee income, taking into account its “funding contribution” of \$2.38 million to the project to the “total development funding amount” (Note) of \$16.17 million.

5. The agreement took retrospective effect and covered all the licensing deals finalised under the project.

#### *Audit comments*

6. Audit had reservations on the appropriateness of the income-sharing ratio of 15:85 because HKRITA could not produce the supporting documents for the total development funding amount of \$16.17 million to justify the deviation from the pre-determined ratio of 30:70.

*Source: Audit analysis of HKRITA records*

*Note: The “funding contribution” of \$2.38 million of HKRITA was the grant from the ITF for the project cost. The project was for the development of a new generation of a technology. The “total development funding amount” referred to the costs borne by a private sector company and research institute(s) for the development of technologies of previous generations.*

4.11 In August 2013, the ITC promulgated a set of revised guidelines on IP arrangement for ITSP projects (the IP Guidelines). The purpose of the IP Guidelines was to provide local research institutes (including the R&D centres and other research institutes such as the local universities) a clear, transparent and fair, yet flexible, framework for their IP arrangements. According to the ITC:

- (a) it encouraged the respective Board of Directors of the R&D centres to, having regard to the IP Guidelines, develop their own commercialisation policy and procedures taking into account the unique circumstances for individual projects; and
- (b) it has not set a fixed formula for the level of licence fees and other terms of licensing such as benefit-sharing. The R&D centres may offer more favourable terms to industry sponsors commensurate with their level of contribution with a view to recognising the industry sponsors' support and assisting the R&D centres to build up a good client base. It is the responsibility of the local research institutes to ensure that interested companies are treated on an equitable and proportional basis and in accordance with the institutes' policies and practices.

4.12 According to the IP Guidelines, the R&D centres can enjoy a high degree of flexibility in the setting of licence fees and sharing of licence fee income (Note 9). Audit appreciates that not all achievements in innovation and technology can be measured in monetary terms and the ITC is not seeking to maximise monetary return. Nonetheless, in the light of the low level of licence fee generated and the audit findings in paragraphs 4.8 to 4.10, there is scope for the ITC to step up monitoring and control, and enhance consistency and transparency in the way the R&D centres enter into licence fee arrangements with third parties. In particular, Audit considers that the ITC should:

- (a) in collaboration with the R&D centres, develop a set of principles and policies on the calculation of the costs associated with inventing and marketing IP rights, and on the determination of how such costs should be recouped through licensing the IP rights;

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**Note 9:** *According to the IP Guidelines, the R&D centres only need to seek prior approval of the ITC if exclusive licence is granted, or under special circumstances not covered by the guidelines (e.g. spin-offs).*

## Commercialisation of ITF project results

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- (b) develop a comprehensive system to capture the information on the income generated from R&D centre projects; and
- (c) periodically review selected cases of licence fee setting and income sharing to ensure that they comply with the principles and policies.

### *Collection of licence fees*

4.13 An R&D centre is usually responsible for collecting licence fees from licensees, sharing the income between itself and the research institute and distributing the net income to the Government. Of the 15 projects examined (see para. 4.6), Audit found that in six projects, the centres had not taken adequate action to collect the licence fees. Examples are shown in Cases 4 to 6 below.

#### Case 4

1. In December 2010, NAMI granted to a company a three-year licence for the use of its technology in the production of sensors. In return, the company would pay royalties. The company was also required to provide to NAMI a statement setting out the calculation of royalties and pay the royalties accordingly.

2. In December 2010, a customer of the company informed NAMI that it had placed an order of 10,000 sensors with the company. Accordingly, in March 2011, NAMI sent an invoice to the company demanding royalty payment of \$5,500. The company settled the invoice. Up to May 2013 (time of audit inspection), NAMI had not received any royalty statements or further payments from the company (in addition to the \$5,500 payment for the 10,000 sensors). Nevertheless, NAMI had not taken any follow-up action.

#### *Audit comments*

3. Given the fact that NAMI was aware of the sales activity in 2010, NAMI should have taken more proactive follow-up action to confirm whether there was any additional income arising from the licence.

*Source: Audit analysis of NAMI records*

Case 5

1. In June 2011, APAS completed a project for developing a charging station for electric vehicles. In the same month, APAS granted a licence to a company for five years from the date of first sale of the charging station. The company was required to pay royalties based on the number of units of the stations produced and sold. The company was also required to submit, regardless of whether there were actual sales or not, a royalty statement every three months after the first sale of the station.

2. In the period from June 2011 to May 2013, APAS did not receive any royalty statements, nor did it follow up with the company. On the day before Audit's visit to APAS on 28 May 2013, APAS sent an e-mail to the company to enquire about the sales of the charging station.

*Audit comments*

3. APAS should have followed up on the sales and related royalties on a regular basis.

*Source: Audit analysis of APAS records*

### Case 6

1. In September 2010, ASTRI granted to a company eight licences covering eight technologies developed by an ITSP project for a licence period of ten years.
2. Under the licence agreement, the company was required to:
  - (a) keep accurate books of account which should be open for inspection by ASTRI during business hours;
  - (b) submit to ASTRI within 30 days after the end of each royalty payment interval (every four months in the initial three years and every six months thereafter) a royalty statement (setting out the quantity of the units sold and the sales revenue of the units) prepared and certified by the company's accountant; and
  - (c) have the royalty statements audited by the company's auditor at the end of each calendar year and submit the audited statement to ASTRI.

#### *Audit comments*

3. Audit found that in the period from 30 September 2010 (the effective date of the licences) to 30 June 2013:
  - (a) royalty statements were only received up to 30 June 2012;
  - (b) no audited statements were submitted by the company; and
  - (c) there were delays, ranging from 10 days to 9.5 months, in receiving royalty payments.
4. Following Audit's enquiry, ASTRI contacted the company on 5 September 2013 and received the outstanding 5% of the royalty payment on 12 September 2013. ASTRI also contacted the company on 10 September 2013 regarding the submission of the outstanding royalty statements and audited statements.

*Source: Audit analysis of ASTRI records*



### *Commercialisation of ITSP non-R&D centre projects*

4.14 In the period from 2009-10 to 2012-13, the ITC had managed the following number of ITSP non-R&D centre projects and their actual project costs.

**Table 10**

**ITSP non-R&D centre projects  
(2009-10 to 2012-13)**

<b>Year</b>	<b>Number of projects</b>	<b>Actual project costs (\$ million)</b>
2009-10	116	138
2010-11	65	122
2011-12	79	124
2012-13	84	132
<b>Total</b>	<b>344</b>	<b>516</b>

*Source: ITC records*

As shown in Table 3 in paragraph 1.14, from 1999-2000 to 2012-13, ITF expenditure on ITSP non-R&D centre projects managed by ITC directly amounted to \$2.8 billion, comprising \$1.8 billion for ITSP projects before the R&D centres were set up in 2006 and \$1 billion since then.

4.15 However, in response to Audit's enquiries, the ITC indicated that it did not have a system to capture commercialisation information on the ITSP non-R&D centre projects. The ITC also indicated that since the setting up of the ITF, only 12 ITSP non-R&D centre projects which were completed in the period from September 2004 to August 2012 had been commercialised. Audit checked five of the 12 projects and found that:

## Commercialisation of ITF project results

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- (a) for three projects, the records indicated that there was no commercialisation; and
- (b) for one project, according to the ITC's records, the project results had been "marketed" through three overseas companies. However, the ITC had not followed up with the licensees to ascertain whether the results had actually been sold in these markets.

4.16 In respect of the number of completed ITSP non-R&D centre projects with licences granted and the amount of licence fee income generated from the projects, the ITC informed Audit that it had not kept track of such information (Note 10).

4.17 Audit noted that the R&D centres had kept track of the number of completed projects with patents registered. In the period from April 2006 to end of March 2013, of the 389 completed R&D centre projects, 210 (54%) had patents registered. However, Audit found that the ITC did not keep track of similar patent information in respect of completed non-R&D centre projects it managed.

4.18 In order to measure the progress made in promoting and supporting applied research by the use of the ITF, it is imperative that the ITC develops and maintains a system to track the key performance statistics of the ITSP R&D centre projects managed by the R&D centres and equally the key performance statistics of the ITSP non-R&D centre projects that it manages. Such information should be summarised and regularly submitted to the senior management of the ITC and the Steering Committee on Innovation and Technology.

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**Note 10:** *The ITSP non-R&D centre projects are conducted by designated public research institutes or private sector companies. For projects conducted by the public research institutes, the ITC does not require a share of the licence fee income. The income can be retained by the institutes for further R&D and other public causes. Since 2006, only one project has been conducted by private sector companies.*

## Commercialisation of SERAP project results

### *Funding conditions*

4.19 SERAP provides pre-venture and venture capital on a dollar-for-dollar matching basis to small technology-based and entrepreneur-driven companies to undertake R&D projects that have a reasonable chance of success in the development of a new product, process or service that can be brought to the market. The maximum SERAP funding for each project is \$6 million. In general, funds are disbursed to the recipient companies on a quarterly basis, subject to satisfactory progress of the project.

4.20 Funding is recouped from the recipient company if the SERAP project is commercially successful, that is, the company is able to generate revenue from the project or attract follow-on investment by a third party. To further facilitate the commercialisation of project results, in April 2012, the Government expanded the funding scope of SERAP to include industrial designs, testing and certification of prototypes and clinical trials.

4.21 According to the SERAP guidelines and Fund Agreement, the following will be recouped from the recipients of the ITF until the Government's contribution is repaid in full:

- (a) 5% of the gross revenue generated from the project; and
- (b) 10% of investment made to the recipient company by a third party.

## Commercialisation of ITF project results

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### *Overall recoupment position*

4.22 SERAP was launched in November 1999. Up to 31 May 2013, the Government had disbursed \$334 million to fund 372 SERAP projects, of which 239 projects had been completed (Note 11). The first recoupment was received in 2003-04. Up to 31 May 2013, the cumulative amount of SERAP funds recouped was \$22.8 million (\$8.9 million from revenue generated and \$13.9 million from investment received). The recoupment of \$22.8 million (\$21.6 million from 239 completed projects and \$1.2 million from projects which did not proceed to phase II — see Note 11) represented an overall recoupment rate of 7% of the \$334 million SERAP fund disbursed.

4.23 Audit conducted an analysis of the recoupment of the 239 completed SERAP projects (see Figure 1). Audit noted that:

- (a) for 145 (60%) projects, no recoupment was received. The Government's total contribution for them was \$170 million;
- (b) for 61 (26%) projects, the recoupment rates were 10% or less. The Government's total contribution was \$78 million, but only a total of \$1.4 million (1.8%) was recouped;
- (c) for 22 (9%) projects, the recoupment rates ranged from 11% to 89%. The Government's total contribution was \$28 million. The total amount recouped was \$8.1 million; and
- (d) for the remaining 11 (5%) projects, the Government's contribution had been fully repaid (the total amount was \$12.1 million).

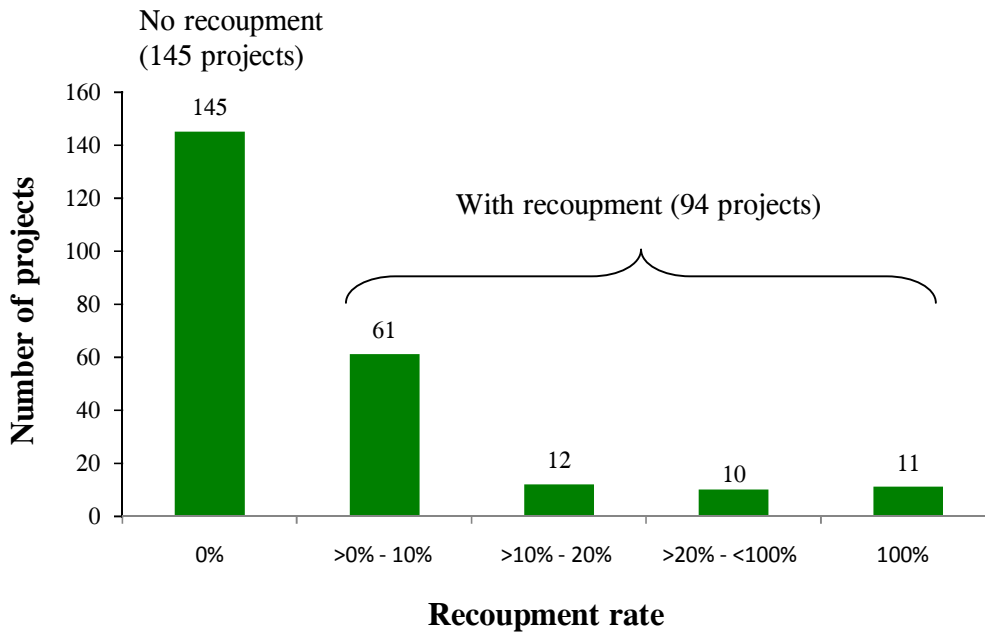
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**Note 11:** *As at 31 May 2013, of the 372 projects:*

- (a) *239 were completed;*
- (b) *98 completed phase I, but did not proceed to phase II (prior to 1 April 2008, each project had to be conducted in two phases);*
- (c) *11 were terminated/withdrawn; and*
- (d) *24 were in progress.*

Figure 1

**Recoupment of 239 completed SERAP projects  
(31 May 2013)**



Source: Audit analysis of ITC records

4.24 Audit noted that of the 239 completed projects, the recipient companies of 31 projects had been dissolved. The total amount of funds disbursed to these companies was \$38.7 million, but only \$0.8 million (2.1%) had been recouped.

***Monitoring of recoupment***

4.25 According to the SERAP guidelines and Fund Agreement, recipient companies are required to report to the ITC:

- (a) annually the revenue generated from the completed project (Note 12); and

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**Note 12:** For projects approved before 1 April 2012, recipient companies had to report on a half-yearly basis.

## Commercialisation of ITF project results

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- (b) within one month upon receipt of third party investments.

4.26 According to the standing practice of the ITC, it sends reminders every half-year (in January and July) to recipient companies of completed projects, reminding them to report revenue generated and investments received. For those reminders returned by post undelivered, the ITC will obtain the latest postal addresses from the Companies Registry.

4.27 The SERAP guidelines and Fund Agreement stipulate that recipient companies need to provide documents to support the reported amounts of revenue generated and investments received. Furthermore, upon request of the ITC, recipient companies have to provide further documentary proof (such as revenue statements, audited accounts and information on capital and shareholding) to substantiate the reported amounts.

4.28 The Fund Agreement also prescribes the time limit for making recoupment payments (e.g. within two months of receipt of investments). If a payment is not made within the prescribed time limit, there will be a late penalty of 5% on the amount due and unpaid. A further penalty of 10% and 15% will be imposed for amounts outstanding for more than six months and 12 months respectively.

4.29 Audit examined the adequacy of the ITC's work in following up recoupment of the Government's contribution in 20 completed SERAP projects. Audit's examination revealed that:

- (a) **Reminders omitted.** In 12 of the 20 projects, in the period from project completion dates to 31 January 2013, there were cases where the ITC staff had not sent out reminders to the recipient companies for one or more years. Some examples are given in Table 11.

**Table 11**

**Cases of reminders not sent to SERAP recipient companies**

<b>Company</b>	<b>Fund disbursed (\$ million)</b>	<b>Project completion</b>	<b>Years in which reminders not sent</b>	<b>First recoupment payment received</b>
A	2.0	July 2001	2002 to 2008	<ul style="list-style-type: none"> <li>• Received in December 2010</li> <li>• Amount: \$8,660</li> <li>• Period covered: January to August 2010</li> </ul>
B	1.9	April 2002	2003 to 2008	<ul style="list-style-type: none"> <li>• Received in November 2010</li> <li>• Amount: \$20,977</li> <li>• Period covered: April 2002 to July 2009</li> </ul>
C	1.9	December 2002	2003 to 2006 and 2008	<ul style="list-style-type: none"> <li>• Received in September 2011</li> <li>• Amount: \$45</li> <li>• Period covered: April 2010 to March 2011</li> </ul>

*Source: Audit analysis of ITC records*

For Company A and Company C, the recipient companies reported to the ITC revenue/investments after they had received reminders. However, in periods where no reminders were sent, they did not report to the ITC. It was therefore not known whether there were any revenue/investments during these omitted periods. It is all the more important for the ITC to send reminders to these companies regularly;

## Commercialisation of ITF project results

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- (b) ***Unsatisfactory rate of response to reminders.*** The ITC experienced difficulties in getting responses to the reminders sent to the companies. For the 20 projects examined, the ITC sent 124 reminders but received only 71 responses. The response rate was 57% only. For three projects, the recipient companies did not respond to any of the reminders. Audit noted that the ITC had not taken any further actions on companies which did not respond (such as making phone enquiries or paying visits to the companies);
  
- (c) ***Supporting documents not provided.*** Of the 20 projects examined, 16 projects had reported revenue/investments. For these 16 projects:
  - (i) supporting documents (such as copies of invoices and contracts) were provided for 7 (44%) projects; and
  
  - (ii) regarding the remaining 9 (56%) projects, there was no supporting documents, or the documents provided were statements prepared by the recipient companies themselves (such as a calculation sheet showing how the amount of revenue reported was arrived at). The ITC, however, had not taken any follow-up action; and
  
- (d) ***Collection of recoupment payments.*** Of the 20 projects examined, 15 (75%) had delays in paying the recoupment of revenue/investments.

4.30 In examining the recoupment of SERAP projects, Audit found that the ITC needs to be more vigilant in tracking the revenue and investments received by recipient companies and take more initiatives in detecting suspected abuses and safeguarding the public money (see Cases 7 to 9 at Appendices A to C). Cases 7 and 8 are two of the five cases (out of the 20 project cases examined by Audit) where Audit found that there were share allotments registered with the Companies Registry (i.e. indicating that there were third party investments). However, neither the ITC was informed of the investments by the recipient companies, nor had it monitored proactively third party investments made to the companies.



## **PART 5: WAY FORWARD**

5.1 This PART examines the way forward for the ITF.

### **Comprehensive review of ITF**

5.2 In June 2013, the ITC informed the LegCo Panel that the ITF was expected to be fully committed in around 2015-16 and by that time, the ITF would also have been in operations for more than 15 years. The ITC considered it opportune to conduct a comprehensive review on the ITF and explore areas of improvement.

5.3 As mentioned in PART 2, when the ITF was set up, the Administration committed to review the ITF periodically, say, once every three years and the Administration indicated that periodic review of the ITF would make it better meet its mission and operate more efficiently. Such periodic review will enable the ITF to keep up with the changing needs and expectations of the community.

5.4 In conducting the review, the ITC needs to take on board the audit findings and recommendations in this Audit Report as well as those in another Audit Report “Innovation and Technology Fund: Management of projects” (see para. 1.15 (b)). As the R&D centres have been set up for more than seven years (see PART 3), it is important for them to become more proactive in commercialisation and technology transfers. Their performance should be assessed by taking into account the number and extent of technology breakthrough and upgrades, income from licensing fees, royalty payments and contract research, and other quantitative and qualitative performance indicators (see also para. 2.18). The ITC may also need to set more aggressive performance targets for them.

5.5 The ITC also needs to develop a system to track the key performance statistics of the ITSP R&D centre projects as well as the ITSP non-R&D centre projects (see para. 4.18) and SERAP projects that it directly manages. Such information should be summarised and submitted on a regular basis to the senior management of the ITC and the Steering Committee of Innovation and Technology for review.

## **Audit recommendations and response from the Administration**

### ***PART 2: Review of ITF and performance monitoring***

**5.6 Audit has recommended that the Commissioner for Innovation and Technology should:**

- (a) conduct a comprehensive review of the ITF without delay and work out a timetable with a target completion date for the review (see para. 2.10);**
- (b) review and improve the existing mechanism for conducting post-completion evaluation of ITSP projects, and take steps to establish a more structured and coordinated approach in assessing the effectiveness of the projects in achieving their R&D objectives (see para. 2.15); and**
- (c) review and improve the existing performance measurement of the ITF, including the setting of more performance targets, on how the ITF has contributed to the industry (see para. 2.19).**

**5.7 The Commissioner for Innovation and Technology agrees with the audit recommendations. She has said that:**

- (a) the audit observations and recommendations are timely for the ongoing comprehensive review of the ITF, which commenced in mid-2013. The ITC will have due regard to the audit recommendations when conducting the review;**
- (b) since the establishment of the ITF in 1999, the ITC has been reviewing the operation of the ITF's various programmes from time to time and made improvements at various junctures in the light of experience, feedbacks from stakeholders as well as changing circumstances. This is an ongoing process and as a result different measures of improvement had been introduced over the years. For instance, since the introduction of the three-tier funding framework in 2005 and the establishment of the**

R&D centres in 2006, reviews have been conducted by the ITC including those pertaining to the ITF mechanism and R&D centres. For instance:

- (i) in 2008, the scope of SERAP was widened to cover companies with 20 to 99 employees and the two-phase system has been changed to a single-phase system;
- (ii) in November 2010, a new strategy was devised to develop a more conducive ecological environment to facilitate the realisation of R&D results;
- (iii) in March 2011, an enhanced Public Sector Trial Scheme was introduced to provide additional funding for the production of tools/prototypes/samples and the conducting of trials in the public sector;
- (iv) in April 2012, the funding ceiling of SERAP was increased from \$4 million to \$6 million and the scope widened; and
- (v) in July 2012, the Public Sector Trial Scheme was extended to all ITF-funded projects.

The recommendations and improvement measures arising from the reviews had been rolled out successfully in stages in the past few years;

- (c) the ITF is expected to be fully committed in around 2015-16 (based on the latest estimates of the number and expenditure levels of the projects to be approved in the coming few years) and by that time, the ITF would have been in operation for more than 15 years. The ITC considered it opportune to conduct a comprehensive review on the ITF and explore areas for improvement. The ITC aims to complete the comprehensive review and identify improvements to the ITF in good time before the remaining funds of the ITF is fully committed. The scope of the review will cover the funding scope and mechanism of the ITF, support for private sector R&D, IP arrangements for projects funded by the ITF and the evaluation mechanism to better assess and monitor the effectiveness of the ITF;

## Way forward

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- (d) in the past, much emphasis was placed on the assessment of project applications and she agreed entirely that evaluation of completed projects is equally important. Hence, earlier in 2013, the ITC has, in consultation with the R&D centres, developed a more comprehensive/systematic post-project evaluation framework to better assess the results of completed ITSP projects as well as keep track of the progress of realisation and commercialisation of R&D results (see para. 2.14). A trial run of the new evaluation framework among the R&D centres has just been completed. In the light of the outcome of this trial run as well as the latest audit recommendations, the ITC will further review the evaluation framework to see what further improvements should be made; and
  
- (e) the ITC will review the existing situation as well as performance indicators to see how to better assess the effectiveness of the ITF in upgrading the innovation and technology of the local industry. The ITC will suitably take into account the practices of other places as well as the audit recommendations. The ITC would, however, like to submit that suitable flexibility should be adopted in designating and evaluating such indicators, in the light of the quickly changing circumstances in the innovation and technology environment as well as the prevailing state of the economy.

### *PART 3: Performance of R&D centres*

#### **5.8 Audit has recommended that the Commissioner for Innovation and Technology should:**

- (a) **conduct a cost-effectiveness review of the five R&D centres, taking into account the performance results Audit identified (see paras. 3.9 to 3.19);**
  
- (b) **conduct a review on the target level of industry contribution for the R&D centres, and review the feasibility of achieving the self-financing target for individual centres in the longer term (see paras. 3.6 and 3.19); and**
  
- (c) **set realistic performance targets, including quantitative and qualitative ones, on the operation of the R&D centres (see para. 3.19).**

5.9 The Commissioner for Innovation and Technology agrees with the audit recommendations. She has said that:

- (a) since the establishment of the R&D centres, the ITC has been monitoring the operation of the centres including their operating costs, number of R&D projects undertaken, amount of R&D expenditure, etc., and reported them to the LegCo Panel annually;
- (b) the ITC recognises that the annual operating costs of the R&D centres still constitute a sizable proportion of their annual R&D expenditure. As part of the comprehensive review of the R&D centres for their first five years in operation, the ITC conducted a review on the cost-effectiveness of the R&D centres in 2010. Findings of the review were presented to the LegCo Panel on 16 November 2010. The outcome of the review indicated that the levels of operating expenditure of the R&D centres were generally reasonable as they had been supporting a wide range of activities including direct research, building R&D platform, commercialisation, etc., and were not limited to the expenditure for the administrative, financial and management staff. The ITC will continue to review the cost-effectiveness of the R&D centres and report to the LegCo Panel annually;
- (c) the ITC would continue to review and adjust from time to time the target level of industry contribution for the R&D centres having regard to their actual experience and performance (see paras. 3.6 and 3.7); and
- (d) the ITC will continue to work closely with the respective Boards of Directors/management of the R&D centres to review their existing set of performance indicators and targets to better measure their performance. The ITC will also review whether it is realistic to expect R&D centres to achieve the self-financing target given the experience in the past few years as well as a projection of their future operations.

### ***PART 4: Commercialisation of ITF project results***

5.10 Audit has *recommended* that the Commissioner for Innovation and Technology should:

- (a) 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 ITSP R&D centre projects and ITSP non-R&D centre projects (see para. 4.12);
- (b) 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 (see para. 4.12);
- (c) set up a proper system to monitor and follow up on the commercialisation of ITSP non-R&D centre projects (see paras. 4.17 and 4.18);
- (d) consider reporting regularly the progress of commercialisation of ITF project results to senior management of the ITC and the Steering Committee on Innovation and Technology (see para. 4.18);
- (e) step up the ITC's follow-up action on recoupment of the Government's contribution to SERAP projects (see paras. 4.29 and 4.30), including:
  - (i) regularly issuing reminders to all recipient companies about revenue and investments received;
  - (ii) taking timely follow-up action on companies which had failed to report revenue/investments;
  - (iii) for companies which did not comply with the Fund Agreement, consulting the Department of Justice about the feasibility of instigating legal action against them; and
  - (iv) consulting the Department of Justice for scope to improve the terms of the Fund Agreement to ensure that the Government's interest is protected; and

- (f) **take follow-up action on suspected under-recoupment SERAP cases (see para. 4.30).**

5.11 The Commissioner for Innovation and Technology agrees with the audit recommendations. She has said that:

- (a) the ITC has promulgated in August 2013 a set of revised guidelines on IP arrangements for ITSP projects (see paras. 4.11 and 4.12). The ITC will continue to improve the guidelines in collaboration with the R&D centres and other local research institutes in the light of actual experience;
- (b) the ITC will also review licensing and benefit-sharing cases periodically as suggested by Audit, with a view to further improving the arrangements;
- (c) while the ITC has been monitoring the progress of commercialisation of non-R&D centre projects manually, the ITC will improve the current administrative arrangements to make them more systematic and comprehensive;
- (d) as mentioned in paragraph 5.7(d) above, the ITC has earlier in 2013 developed a more comprehensive post-project evaluation framework. In the light of the current audit recommendations, the ITC will further review the evaluation framework to see what improvements should be made. The new framework will initially be applied to ITSP projects undertaken by R&D centres. Having regard to the experience of the new framework for R&D centre projects, it will be extended to non-R&D centre projects in due course; and
- (e) on monitoring of recoupment under SERAP:
  - (i) regular reminders will be sent;

## Way forward

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- (ii) for outstanding cases, the ITC will adopt a balanced approach to adequately protect the interests of the Government while acting appropriately and sympathetically to the companies concerned. The ITC will assess if there are reasonable explanations or cases of hardship and devise an appropriate way forward, e.g. demanding repayment, setting the timeframe for repayment, consulting the Department of Justice about the feasibility of instigating legal action and, in cases where recovery action is not warranted, seeking approval for write-off in accordance with prevailing government procedures. If deemed necessary, the ITC will also consult the Department of Justice for scope to improve the terms of the Fund Agreement to ensure that the Government's interests are protected; and
  
- (iii) indeed, after SERAP has been in place for over a decade, the ITC intends to comprehensively review it to see if it can suitably/adequately provide support to the industry in present-day circumstances, taking into account all factors including the measures adopted to support innovation and technology in places outside Hong Kong.



**Case 7**

1. In October 2001, the ITC approved the project of Company C (see Table 11 in para. 4.29(a)). In December 2002, the project was completed. The total fund disbursed was \$1.9 million. From 2003 to 2006, the ITC did not send out any reminders to Company C. In response to the ITC's reminder sent in February 2007, Company C reported that there was revenue of \$10,000 generated from the project deliverables, and a joint-venture company had been established with another company to manufacture and market such deliverables. Company C did not provide any documents to substantiate the revenue reported. Instead, it provided a copy of the Certificate of Incorporation of the joint-venture company and the patent registration of the deliverables. In May and August 2007, the ITC enquired of Company C about the follow-on investment but received no response. From August 2007 to January 2011, the ITC sent five reminders to Company C. Again, there was no response.

2. In July 2011, the ITC sent a reminder to Company C. In August 2011, Company C responded and reported, without providing any supporting documents, that a revenue of \$900 was received for the period from 1 April 2010 to 31 March 2011. The ITC did not make any enquiries (such as whether there was any revenue/investments prior to April 2010). In September 2011, the ITC demanded a recoupment amount of \$45 (being 5% of \$900), which was received in the same month. In February 2012, in response to the ITC's reminder sent in January 2012, Company C submitted a nil return for the period April 2011 to January 2012. Company C, however, did not respond to the ITC's reminders sent in July 2012 and January 2013.

3. In July 2013, Audit conducted a company search on Company C. According to the search results, from 2000 to 2003 and in 2010, there were investments received as evidenced by shares allotted to third parties amounted to \$2.9 million. However, such investments had not been reported by Company C to the ITC.

**Case 7 (Cont'd)**

*Audit comments*

4. The ITC should have:
- (a) sent reminders to Company C in a timely manner;
  - (b) taken more proactive actions (e.g. making telephone calls or conducting visits) to follow up with Company C in cases where it did not respond to the reminders;
  - (c) required Company C to provide supporting documents for the reported revenue; and
  - (d) regularly conducted company search to identify any unreported investments received by recipient companies.

*Source: Audit analysis of ITC records*

**Case 8**

1. In June 2008, the ITC approved SERAP fund of \$2 million for Company D's project. The project was completed in February 2011. In December 2010, Company D reported to the ITC that it had a follow-on investment amounting to \$2 million. Company D did not provide any supporting documents. In February 2011, the ITC asked Company D to pay a recoupment amount of \$200,000 (i.e. 10% of \$2 million) by March 2011. Company D made the payment in June 2011. In response to the ITC's reminders of July 2011 and January 2012, Company D reported no revenue/investments. It, however, did not respond to the ITC's reminder of July 2012. In January 2013, the ITC sent another reminder but was returned back by the Hong Kong Post for reason of "no such company". Since then, the ITC had not sent any reminders to the new address of Company D until late August 2013.

2. In July 2013, Audit conducted a company search and found that from January 2009 to March 2013, Company D had allotted shares of \$5 million to new shareholders. This indicated that there were investments received which should have been reported to the ITC. However, Company D only reported the share allocation of \$2 million to the ITC. The remaining \$3 million had not been reported.

***Audit comments***

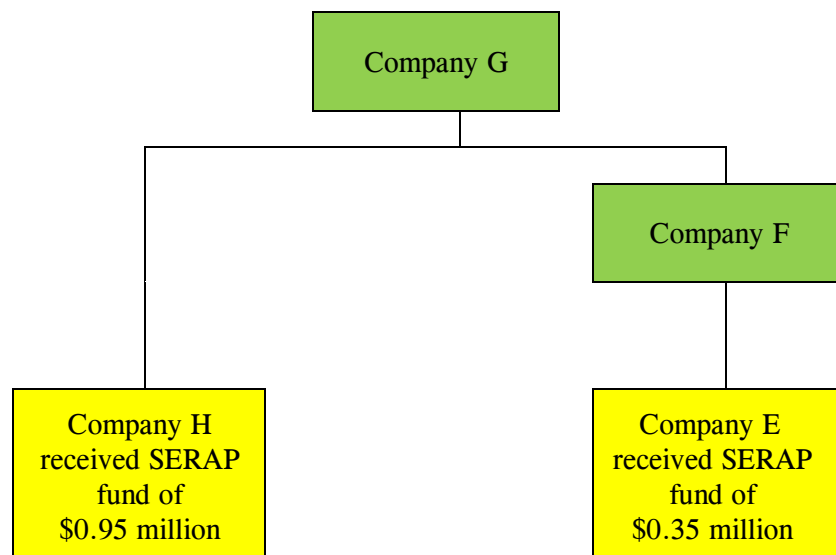
3. The ITC should have:

- (a) requested Company D to provide relevant documents to support the follow-on investments; and
- (b) taken proactive action in enquiring and investigating follow-on investments received by Company D (such as by conducting company search to ascertain any allotment of new shares and changes in shareholdings), and monitor the revenues and investments generated by the completed project.

*Source: Audit analysis of ITC records*

Case 9

1. In October 2003, the ITC approved Company E to conduct Phase I (Note) of a project. The phase was completed in May 2004. Company E was held by Company F. Company F was held by some other companies including Company G. In August 2005, the IP rights, title and benefits associated with the project were transferred (with the ITC's knowledge) from Company F to Company G for a sum of money. In September 2005, Company G set up a wholly-owned subsidiary, Company H. In January 2006, the ITC approved Company H to undertake Phase II of the project. The phase was completed in October 2007. The total fund disbursed for the two phases was \$1.3 million (see chart below).



2. In October 2009 and February 2010, Company H reported to the ITC that 4 and 18 units of the product developed were sold. The ITC received some \$80,000 as recoupment (i.e. 5% of the revenue).

3. In June 2010, according to a press report found in ITC's records, the CEO of Company H said that in 2009 the company sold some 200 units of the product developed, and was expected to sell 1,000 units each year. There were, however, no records indicating that the ITC had inquired or followed up with Company H on the significant difference between the reported sales and the information mentioned in the press report.

**Case 9 (Cont'd)**

4. In May 2010, according to media reports found in ITC's records, there was an acquisition of Company H at a consideration of millions of US dollars. In June 2010, the ITC sent an e-mail to Company H enquiring about the acquisition but received no response. From July 2010 to January 2013, the ITC issued six reminders to Company H asking for information on revenue generated and investments received. None of the reminders received a reply. There was no indication that the ITC had taken any further action.

*Audit comments*

5. In July 2013, in response to Audit's enquiry, the ITC said that it was uncertain whether Company H or its parent company had been acquired. The ITC also said that under the Fund Agreement, the Government could recoup from investments (10%) made to Company H, but not from investments made to Company H's parent company.

6. On Audit's enquiry, the ITC made an enquiry on 2 August 2013 with the management of Company H. The company informed the ITC on 15 and 30 August 2013 that:

- (a) there had been no change to the directors, shareholders and share capital, and no share was issued by Company H;
- (b) there was no income derived from any third parties' investment to Company H; and
- (c) during the period from February 2010 to January 2013, the company sold three units in March 2010. The revenue received was \$336,080 (with invoice copies attached).

7. Up to 31 August 2013, the Government could only recoup some \$80,000 out of its contribution of \$1.3 million. Despite the ITC's repeated reminders since 2010 (see para. 4), the Company H responded only after the ITC addressed its concern to the company's management in August 2013 (see para. 6). Audit considers that the ITC needs to:

**Case 9 (Cont'd)**

- (a) clarify with Company H because it reported to the ITC sales of 25 units (4+18+3 — see paras. 2 and 6(c)) which was significantly lower than the sales volume mentioned in the press report (see para. 3);
- (b) demand recoupment payment from Company H for the revenue of \$336,080 for products sold (see para. 6(c)); and
- (c) in the light of this case, consult the Department of Justice on whether the existing terms of the Fund Agreement can adequately protect the Government's interest. For example, the following matters need to be considered:
  - (i) the Fund Agreement is silent on whether the ITC can inspect the documents and records relating to the project after it has been completed. In this case, if it had included a provision in the Fund Agreement that the ITC had the right of inspection of revenue/investment records after project completion, the ITC would have been able to conduct post-completion inspections to ascertain whether Company H had any further revenue received;
  - (ii) since April 2008, a new clause has been added to the Fund Agreement whereby investments made to the parent company of a recipient company are also subject to recoupment. Whilst the Fund Agreement has provided that the parent or holding company incorporated outside Hong Kong is subject to recoupment, there are still some enforcement difficulties. For example, in this case, as Company G (the parent company of Company H) was incorporated overseas, even if the ITC can recoup payment from Company G, it will have difficulty in conducting company search to verify if there has been any investments received by Company G so that it can demand recoupment; and
  - (iii) the Fund Agreement does not include provisions on controls over the transfer of company ownerships by recipient companies.

*Source: Audit analysis of ITC records*

*Note: Before 1 April 2008, SERAP projects were conducted in two phases.*

### Acronyms and abbreviations

APAS	Automotive Parts and Accessory Systems R&D Centre
ASTRI	Hong Kong Applied Science and Technology Research Institute
Audit	Audit Commission
CEDB	Commerce and Economic Development Bureau
CEO	Chief Executive Officer
FC	Finance Committee
GSP	General Support Programme
HKPC	Hong Kong Productivity Council
HKRITA	Hong Kong Research Institute of Textiles and Apparel
ICT	Information and communications technologies
IP	Intellectual property
ITC	Innovation and Technology Commission
ITF	Innovation and Technology Fund
ITSP	Innovation and Technology Support Programme
LegCo	Legislative Council
LegCo Panel	Legislative Council Panel on Commerce and Industry
LSCM	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies
NAMI	Nano and Advanced Materials Institute
R&D	Research and development
SERAP	Small Entrepreneur Research Assistance Programme
UICP	University-Industry Collaboration Programme