

**Legislative Council
Panel on Commerce and Industry**

Review of Operating Costs of R&D Centres

PURPOSE

This paper reports to Members the findings and observations from the review of operating costs of Research and Development (R&D) Centres set up under the Innovation and Technology Fund (ITF).

BACKGROUND

Setting up of R&D Centres in 2006

2. In April 2006, Government set up five R&D Centres to drive and coordinate applied R&D in selected focus areas with a view to promoting application of the R&D results in the industries –

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

3. Except for ICT which forms part of ASTRI, the other four R&D Centres were set up as a subsidiary of its hosting organization(s) –

Hosting organization(s)	
APAS	Hong Kong Productivity Council (HKPC)
HKRITA	Hong Kong Polytechnic University (PolyU)
LSCM	University of Hong Kong (HKU), Chinese University of Hong Kong (CUHK) and Hong Kong University of Science and Technology (HKUST)
NAMI	HKUST
ICT	ASTRI

Mid-Term Review in 2009

4. In April 2009, we briefed Members of the outcome of the Mid-Term Review of the R&D Centres, covering the performance of R&D Centres from April 2006 to December 2008. With Members' support, we obtained Finance Committee (FC)'s approval in June 2009 for increasing the funding commitment by \$369 million and extending the operation of the R&D Centres by three years up to March 2014 (except for ASTRI which was set up in 2000 and receives annual recurrent subvention from Government to meet its operating cost). In that context, we undertook to –

- (a) conduct a review in 2010 to look into the *modus operandi* of the R&D Centres to see if there is any room for achieving greater savings and higher cost-effectiveness;
- (b) conduct a comprehensive review in 2011 on the R&D Centres' operation and overall performance for the first five-year period, taking full account of their experience in technology transfer and commercialisation; and
- (c) review the targeted level of industry contributions (which was adjusted from 40% set in 2005 to 15% in the context of the 2009 Mid-Term Review).

5. In June 2010, we submitted our recommendations on the scope of the comprehensive review to the Panel, including the objectives, issues to be examined and the timeframe. For details, please refer to Annex A. We also confirmed that a report would be submitted to the Panel in November/ December 2010 on the operating costs of the Centres.

REVIEW OF OPERATING COSTS OF R&D CENTRES

Objectives of the Review

6. The main objectives of this review are –
- (a) to analyse the cost structure of the R&D Centres; and
 - (b) to help the R&D Centres to make improvements as necessary.

Funding Model

7. Before presenting the review findings, we will first explain the funding model of the R&D Centres. In brief, a dual stream of funding approach is adopted for the R&D Centres –

(a) Operating Expenditure

In June 2005, FC approved a commitment of \$273.9 million to meet the operating costs of four R&D Centres (i.e. APAS, HKRITA, LSCM and NAMI) in their first five-year period up to March 2011. In June 2009, FC approved an additional commitment of \$369 million to extend their operation by 3 years up to end-March 2014, making a total funding commitment of \$642.9 million for 8 years (or around \$80 million a year for the four Centres).

[Note: The only exception is ICT/ASTRI, the operating cost of which is met from Government's annual recurrent subvention to ASTRI which was founded in 2000. The total Government subvention to ASTRI from 2006-07 to 2010-11 (viz. five years) is \$550.4 million.]

(b) Project Expenditure

R&D projects undertaken by R&D Centres, including ASTRI, are all funded under ITF. There are two major types of projects:

- (i) Platform projects which require industry contribution of at least 10% of the project cost. The R&D Centres will own the project intellectual property (IP); and
- (ii) Collaborative projects which require industry contribution of at least 30% (for R&D Centres projects) or 50% (for non-R&D Centres projects) of the project cost. The industry sponsor(s) will be entitled to exclusive right of using the project IP for a defined period or own the project IP. R&D Centres will negotiate with the industry sponsors on benefit sharing arrangements.

In addition, there are seed projects (which do not require industry contribution and fully funded by ITF to provide foundation work for future platform or collaborative projects) and contract research services (which are funded entirely by the industry).

Findings of the Review

8. To understand the expenditure pattern of the R&D Centres, we have obtained –

- (a) Cumulative figures from 2006-07 to 2009-10 – these are more macro in nature; and
- (b) Figures for the year 2009-10 – these are more detailed with breakdown in different areas to better understand the situation.

(A) Cumulative figures from 2006-07 to 2009-10

9. The figures are as follows -

Table 1: Operating Expenditure
(in \$million)

	(I) Total funding approved by FC (2006-07 to 2013-14)	(II) Total expenditure from 2006-07 to 2009-10 [% of (II)/(I)]
APAS	167.6	54.8 (33%)
HKRITA	153.6	34.3 (22%)
LSCM	131.9	49.2 (37%)
NAMI	189.8	59.1 (31%)
Total:	642.9	197.4 (31%)

In the case of ASTRI, the total recurrent subvention from Government for the five-year period from 2006-07 to 2010-11 is \$550.4 million. Its total operating expenditure from 2006-07 to 2009-10 (viz. four years) is \$412.9 million, or 75% of the five-year provision.

Table 2: Project Expenditure
(in \$million)

	(I) Estimated R&D expenditure (2006-07 to 2013-14)	(II) Total approved R&D expenditure from 2006-07 to 2009-10 [% of (II)/(I)]
APAS	500.5	125.5 (25%)
HKRITA	489.1	142.0 (29%)
LSCM	569.9	198.3 (35%)
NAMI	872.2	134.9 (15%)
ASTRI	2,317.4	1,054.7 (46%)
Total:	4,749.1	1,655.4 (35%)

(B) Figures for the year 2009-10

10. The figures are as follows -

Table 3: Operating Expenditure in 2009-10: breakdown by cost components
(in \$million)

	Staff cost	Accommodation	Equipment	Other expenses	Total
APAS	7.4 (43%)	1.6 (9%)	6.4 (38%)	1.7 (10%)	17.1
HKRITA*	8.5 (84%)	0.5 (5%)	-	1.2 (11%)	10.2
LSCM	8.5 (51%)	2.8 (17%)	1.5 (9%)	3.8 (23%)	16.6
NAMI	14.5 (54%)	1.6 (6%)	9.0 (33%)	2.0 (7%)	27.1
ASTRI	62.0 (54%)	15.6 (13%)	11.9 (10%)	26.8 (23%)	116.3
Total:	100.9 (54%)	22.1 (12%)	28.8 (15%)	35.5 (19%)	187.3

* *HKRITA did not undertake any in-house research.*

Table 4: Operating Expenditure in 2009-10: breakdown by core activities
(in \$million)

	Direct research	Vetting of non-Centre projects	Commercialization	Administrative support	Total
APAS	6.0 (35%)	4.8 (28%)	3.3 (19%)	3.0 (18%)	17.1
HKRITA	-	4.8 (47%)	2.1 (21%)	3.3 (32%)	10.2
LSCM	3.5 (21%)	2.0 (12%)	5.4 (33%)	5.7 (34%)	16.6
NAMI	14.7 (54%)	2.0 (8%)	4.1 (15%)	6.3 (23%)	27.1
ASTRI [^]	59.4 (51%)	-	19.7 (17%)	37.2 (32%)	116.3
Total:	83.6 (45%)	13.6 (7%)	34.6 (18%)	55.5 (30%)	187.3

[^] *ASTRI did not vet ICT project proposals from other research institutions.*

Table 5: Project Expenditure in 2009-10

	R&D expenditure (in \$million)	No. of ITF projects		
		New projects commenced	On-going projects	Total
APAS	41.1	17	13	30
HKRITA	29.7	13	20	33
LSCM	39.9	9	12	21
NAMI	32.4	18	12	30
ASTRI	272.8	48	45	93
Total:	415.9	105	102	207

Table 6: Types of ITF and contract research projects undertaken in 2009-10

	Types of projects			Contract research
	Platform	Seed	Collaborative	
APAS	25	5	-	-
HKRITA	32	-	1	-
LSCM	19	-	2	1
NAMI	14	6	10	3
ASTRI	54	31	8	69
Total:	144	42	21	73

Table 7: Level of Industry Contribution

	2006-07 to 2009-10	2009-10
APAS	13.5%	11.0%
HKRITA	12.5%	11.4%
LSCM	12.3%	13.2%
NAMI	24.7%	29.3%
ASTRI [^]	12.9%	16.9%

[^] *In the case of ASTRI, its income from contract research and licensing is counted towards industry contribution.*

General Observations

11. This Review has adopted a structured approach to analyse the operating expenditure of R&D Centres against their core activities. The cost breakdown in Table 4 indicates that general administrative expenses of the R&D Centres do not account for an excessively high proportion of their operating budget. This has included expenditure for a wide range of activities like disbursing ITF grants to research institutions, monitoring R&D project progress and expenditure, and corporate governance matters. Other observations are as set out in the following –

- (a) The operating expenditure of R&D Centres is supporting a wide range of activities, including direct research, building R&D platform, commercialisation and administrative support. It is not limited to the expenditure for the administrative, financial and management staff.

- (b) The expenditure pattern of R&D Centres does vary significantly because of their unique mode of operation. For instance, ASTRI has a large in-house research team but does not conduct vetting for non-Centre projects. HKRITA does not have a research team and focuses on platform building with stakeholders, assisting ITC in vetting of projects, and commercialisation. Hence, the variations of expenditure patterns should be seen in perspective.
- (c) Apart from ASTRI which has a relatively large set-up, the other four R&D Centres are small in size. Yet they need to deliver various corporate governance functions and hence have a relatively high expenditure on administrative support.
- (d) While R&D Centres generally spent about half of the operating expenditure on staff costs, a significant portion is for R&D staff (ranging from 21% to 54%).
- (e) R&D Centres have invested in building their research infrastructure except HKRITA. They need to acquire laboratory facilities and equipment to support their R&D work.
- (f) As R&D Centres become mature with more completed R&D projects, they are expected to invest more in commercialization and building R&D platform with relevant stakeholders in the coming years.
- (g) The number of collaborative projects (which have higher chance of commercialisation) was small in the early years. With the introduction of the Focused Project Facilitation Programme (FPFP) in ITC and provision of ITF funding for the production of samples and prototypes and conduct of trial schemes by Government departments (see details in the separate submission to the Panel ref. LC Paper No. CB(1)389/10-11(05)), we hope the number of collaborative projects will increase.
- (h) There is a possibility of reducing the operating costs of R&D Centres through the provision of central supporting services on co-location. We shall explore these options after the comprehensive review on the overall performance of R&D Centres when their future roadmap is clearer.

- (i) As R&D Centres launch more R&D projects after the start-up period, we expect the proportion of their operating costs to project expenditure to drop over time, reflecting economies of scale.

12. A list of the specific findings and observations on individual R&D Centres is at **Annex B**. We will discuss with the Centres on areas of improvements in the light of these findings.

WAY FORWARD

13. The current review on operating costs has provided objective data for all R&D Centres to review their own performance, compare against other Centres to soul search and consider possible areas of improvements. In the coming year, we will proceed with the comprehensive review on the overall performance of the Centres so that a decision can be made on the way forward in early 2012 (i.e. two years before the end of funding commitment voted by LegCo for their operating cost on 31 March 2014). For each Centre, there will be the following options –

- (a) maintaining the status quo;
- (b) refinement/improvement through merging with other organizations and widening/narrowing their scope of activities; or
- (c) disbandment.

14. To assist R&D Centres to deliver a better performance, particularly in stepping up efforts to achieve commercialisation of their R&D results, ITC has recently taken forward the following initiatives –

- (a) introducing the FPPF to expedite the processing of high-potential project proposals identified by Centres, in particular collaborative projects; and
- (b) promoting “Innovation and Technology in Public Sector” which encourages government departments and public bodies to adopt home-grown techniques. Additional funding from ITF will cover the production of samples and prototypes to facilitate the conduct of trial schemes.

We are also conducting a review of the ITF mechanism with a view to streamlining the funding procedures and speeding up the process.

ADVICE SOUGHT

15. Members are invited to note the findings and observations on the review on the operating costs of the R&D Centres.

Innovation and Technology Commission
November 2010

**Scope of the Comprehensive Review
of R&D Centres to be conducted by end-2011**

(A) Objectives

The comprehensive review will evaluate critically whether the Centres can meet the objectives and targets set when they were approved for establishment in 2005. In doing so, we will compare their achievements vis-à-vis the resources put in. We would also look into how the Centres' work can create greater synergy in innovation and technology development and build up a good eco system for further development, covering all stakeholders i.e. the Government, industry, R&D institutions and universities (viz. 官產學研).

(B) Key Issues to be Looked at

(a) Operating Cost

- (i) breakdown of operating budgets;
- (ii) need for central support (e.g. providing basic information for annual salary adjustment) and common guidelines on individual areas (e.g. policy on IP/benefits sharing);
- (iii) desirability of co-location e.g. in Science Park Phase 3;

(b) Institutional Setup

Relationship among the four major players –

- (i) Hosting organization(s);
- (ii) Board of Directors;
- (iii) Centre CEO and his senior staff; and
- (iv) ITC;

and whether there is any need for change;

(c) Role of the R&D Centres

Relative priority of various roles including undertaking direct research, building R&D platform and assisting ITC in vetting of 'non-Centre' projects, commercialization, etc.;

(d) Achievements and Cost-effectiveness

We need to review this to see if funds have been well spent by making reference to both financial (e.g. level of industry contribution and level of income such as licensing fees, royalty, etc.) and non-financial indicators (e.g. R&D positions created, sharing of knowledge, contribution to Government policies and initiatives, soft power, etc.)

(C) **Timeframe:** to be completed by end-2011/early 2012.

**Specific Findings/Observations
For Individual R&D Centres**

(1) APAS

Level of Industry Contribution and Project Profile (from April 2006 to March 2010):
<ul style="list-style-type: none">• Industry contribution: 13.5%• No. of platform (including seed) projects: 42• No. of collaborative projects: 1• No. of contract research: 0
Observations:
<p>(a) In 2009-10, APAS spent relatively more money on equipment for R&D projects/providing test services to industry (\$6.4 million).</p> <p>(b) One of the objectives of setting up APAS is to tap the business opportunities in the Mainland. However, it appears to be more difficult than originally expected.</p> <p>(c) Under the “Innovation and Technology (I&T) in Public Sector” Programme, APAS will work with Government departments such as Transport Department, Environmental Protection Department and Government Logistics Department to develop possible products. However, one difficulty is that APAS only researches/produces sample components (rather than an entire product) and it will be more difficult for it to conduct pilot schemes in the public sector. Also the need to go through the “road worthiness” test makes it more complex to try out the product in reality.</p> <p>(d) APAS has relatively high staff turnover rate and hence the vacancy position is most serious among all Centres.</p> <p>(e) It is necessary to review its relation with the Automotive and Electronic Division Section of the Hong Kong Productivity Council (which has a staffing of 27 working on automobile matters) to see if there can be any room for synergy.</p>

(2) HKRITA

Level of Industry Contribution and Project Profile (from April 2006 to March 2010):
<ul style="list-style-type: none">• Industry contribution: 12.5%• No. of platform (including seed) projects: 40• No. of collaborative projects: 1• No. of contract research: 2
Observations:
<p>(a) HKRITA is different from all other Centres in that it does not conduct any direct research work. It also has a narrower “clientele” in universities because in Hong Kong, only Hong Kong Polytechnic University (PolyU) is focusing on clothing and textiles research.</p> <p>(b) An important role of HKRITA is to build up the R&D platform, identify and assess suitable proposals, and submit recommendations to CIT for funding approval.</p> <p>(c) HKRITA has also accorded priority to its role in commercialization and has set up 10 project-based “commercialisation panels to consider licensing terms and related issues. For example, a project (undertaken by PolyU and HKRITA under different phases) has recently been commercialised successfully, attracting the interest of at least 2 companies with some \$4 million in licensing fees. It is hoped that more companies will be attracted to take up non-exclusive licenses for this project.</p> <p>(d) Under the “I&T in Public Sector” Programme, HKRITA will work with Government departments on possible products e.g.</p> <ul style="list-style-type: none">• anti-heat protection clothing (with Fire Services Department); and• uniform for corpse collection teams (Food and Environmental Hygiene Department).

(3) LSCM

Level of Industry Contribution and Project Profile (from April 2006 to March 2010):
<ul style="list-style-type: none">• Industry contribution: 12.3%• No. of platform (including seed) projects: 24• No. of collaborative projects: 2• No. of contract research: 3
Observations:
<p>(a) A significant number of LSCM's projects are undertaken by the University of Hong Kong (HKU) with close involvement of HKU's commercial arm for technology transfer of e-commerce technologies. Senior staff members of HKU have been seconded to LSCM to fill a number of key posts to facilitate the setting up of the Centre. With the passage of time, the situation should be reviewed.</p> <p>(b) Under the "I&T in Public Sector" Programme, LSCM is now working with Government departments e.g.</p> <ul style="list-style-type: none">• E-lock (with Customs and Excise Department (C&E));• RFID in inventory control (with C&E, RTHK and others); etc. <p>(c) It is necessary to review whether LSCM's hosting arrangement could be simplified (e.g. having a single host like other R&D Centres).</p> <p>(d) There are huge potentials in both the public and private sectors. Taking medical and welfare sectors as examples, LSCM should see how it can better tap into these areas.</p>

(4) NAMI

Level of Industry Contribution and Project Profile (from April 2006 to March 2010):
<ul style="list-style-type: none">• Industry contribution: 24.7%• No. of platform (including seed) projects: 20• No. of collaborative projects: 12• No. of contract research: 7
Observations:
<p>(a) NAMI's industry contribution (25%) and number of collaborative projects (12) are the highest.</p> <p>(b) NAMI has expanded its technical staff team and set up new laboratories at the Science Park to meet industry demands.</p> <p>(c) NAMI has been building a cluster in photovoltaic (PV) technologies. In addition to the collaboration with DuPont, NAMI has started a large-scale project on CIGS solar cells and is actively planning another project on organic PV. It has also made progress in other market sectors including display and solid state lighting, environmental technologies, and building materials.</p> <p>(d) Under the "I&T in Public Sector" Programme,, NAMI is now working with Government departments on -</p> <ul style="list-style-type: none">• anti-corrosive paint (with Architectural Services Department, Water Supplies Department and other works departments); and• Galvanized steel (with Housing Department).

(5) ASTRI

Level of Industry Contribution and Project Profile (from April 2006 to March 2010):
<ul style="list-style-type: none">• Industry contribution: 12.9%• No. of platform (including seed) projects: 144• No. of collaborative projects: 8• No. of contract research: 175
Observations:
<p>(a) It has recently been agreed that the level of industry contribution will be increased to 20% by 2014. In particular it will consider how best to push ahead with collaborative projects.</p> <p>(b) ASTRI has made encouraging progress recently. It signed a US\$2 million contract recently on anti-shaking technologies for digital camera. Under the “I&T in Public Sector” Programme, it is undertaking various projects:-</p> <ul style="list-style-type: none">• LED lighting (with Highways Department, Electrical and Mechanical Services Department and Housing Department);• E-books (with Education Bureau);• Mobile surveillance system (with the Police), etc. <p>(c) ASTRI is reviewing the performance of its various technology areas, so that resources will in future be channelled from those with less business potentials to those with high business potentials.</p> <p>(d) ASTRI will examine how best to make use of the spin-off model to further its objectives.</p>