For discussion
on 18 June 2013

Legislative Council
Panel on Commerce and Industry

Progress Report on Research and Development (R&D) Centres for 2012-13

PURPOSE

This paper is an annual update on the 2012-13 operation of the R&D Centres set up under the Innovation and Technology Fund (ITF).

BACKGROUND

2. In April 2006, the Administration set up five R&D Centres to drive and co-ordinate applied R&D in selected focus areas and to promote commercialisation –

(a) Automotive Parts and Accessory Systems R&D Centre (APAS);

(b) R&D Centre for Information and Communications Technologies under the Hong Kong Applied Science and Technology Research Institute (ASTRI);

(c) Hong Kong Research Institute of Textiles and Apparel (HKRITA);

(d) R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM); and

(e) Nano and Advanced Materials Institute (NAMI).

3. In December 2011, we briefed Members on the findings and recommendations of a comprehensive review on the operation and overall performance of the five R&D Centres in their initial five years of operation up to 31 March 2011 and consulted Members on our proposal to extend their operation. With the support of Members, the Finance Committee (FC) of

Legislative Council approved on 11 May 2012 additional funding to extend the operation of four R&D Centres[1] as follows –

(a) for NAMI and APAS which had met the interim industry contribution target of 15% in their first five-year period, their operation period was extended until 31 March 2017; and

(b) for HKRITA and LSCM which had not achieved an industry contribution of 15% in the first five years, their operation period was only extended to 31 March 2015. We undertook to closely monitor/review their performance after March 2013 (i.e. two years after the last review). If by then they managed to meet the industry contribution target of 18% and could satisfy us in terms of overall performance, we would consider whether and how to support and sustain their further operation for an appropriate period.

4. In this report, we will set out the overall performance and operation of the five R&D Centres and then highlight the key activities of each Centre in 2012-13. Detailed statistics and progress of realisation/commercialisation of the R&D Centre's projects are at **Annex A to Annex E** respectively. At the coming Panel meeting on 18 June 2013, we will also invite the representative of each Centre to make a short video presentation on the work of his Centre.

OVERALL PERFORMANCE IN 2012-13

(A) Operating Expenditure

5. The operating expenditure of the R&D Centres in 2011-12 and 2012-13 and their staffing situation (as at end-March 2013) are summarised as follows –

[1] The operating expenditure of ASTRI will continue to be funded by an annual recurrent Government subvention for historical reasons.

Operating Expenditure[#] and Staff Strength
(in $million)

	2011-12	2012-13	% change over 2011-12	Staffing Strength as at End-March 2013 [*Establishment*]
APAS	19.4	15.8	-19%	24 [*33*]
ASTRI	122.7	130.2	+6%	561 [*605*]
HKRITA	16.0	19.1	+19%	25 [*27*]
LSCM	19.1	20.9	+9%	53 [*55*]
NAMI	35.3	38.1	+8%	53 [*69*]

 # After netting off administrative overhead for in-house R&D projects.

6. In 2012-13, all R&D Centres, with the exception of APAS, have reported an increase in operating expenditure partly due to one-off spending on new equipment/facilities. For instance, the overall operating expenditure for HKRITA has increased by 19% ($3.1 million) mainly due to an expenditure of $1 million for setting up and operating a new showroom to promote commercialisation of its R&D outcomes and $0.5 million for setting up a new project management information system, which accounted for about half of its increase of operating costs from $16.0 million to $19.1 million. The overall operating expenditure for NAMI has also increased by 8% ($2.8 million) mainly contributed by the costs for renovating its laboratory ($1.4 million) and acquiring new equipment ($1.4 million).

7. Meanwhile, the operating expenditure for APAS has dropped by 19% (from $19.4 million to $15.8 million) mainly due to the operational savings arising from the merger with the Hong Kong Productivity Council (HKPC) (estimated at $0.43 million) and temporary vacancy of the Chief Executive Officer (CEO) post (savings of $1 million in salary) after the departure of the former CEO in July 2012.

(B) Level of Industry Contribution Achieved

8. R&D Centres are platforms for co-ordinating applied research in designated technology areas and facilitating technology transfer to the industry, and as such the level of industry contribution remains the most important indicator to show the degree of interest of the industry in their work.

9. The performance of the R&D Centres in 2011-12 and 2012-13 is summarised as follows –

Level of Industry Contribution
(based on approved funding commitment)[Note 1]

	2011-12	2012-13	Change in Percentage Point (pp) over 2011-12
APAS	13.9%	30.5%	+16.6 pp
ASTRI [Note 2]	20.2%	25.3%	+5.1 pp
HKRITA	23.0%	26.8%	+3.8 pp
LSCM	15.4%	18.7%	+3.3 pp
NAMI	35.9%	39.0%	+3.1 pp

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

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

Note 2: Due to historical reason, ASTRI adopted a different method of calculating industry contribution. We will align ASTRI's method with that of all other R&D Centres in next year's report (see paragraph 31 below).

10. As illustrated from the above table, all R&D Centres have demonstrated considerable improvements in the level of industry contribution, which showed increasing support and recognition of the value of the Centres' work. The performance of NAMI (39.0%) continues to stand out among all R&D Centres as it has secured a larger number of collaborative projects (7 projects in 2012-13, with a total project cost of some $59.8 million) in which the industry sponsor will contribute at least 30% of the total project cost. Despite APAS's merger with HKPC in November 2012, which caused some disruption to its operation, APAS achieved a satisfactory industry contribution level of 30.5% in 2012-13, a marked improvement compared to the 13.9% in the previous year.

11. As mentioned in paragraph 3 above, for the two R&D Centres which have not yet achieved an industry contribution target of 15% in the first five years, namely HKRITA and LSCM, they have achieved the level of industry contribution of 26.8% and 18.7% respectively in 2012-13. This, together with their performances in 2011-12 (23% and 15.4% respectively) would mean that the overall industry contribution for HKRITA and LSCM for the two-year observation period from 2011 to 2013 is 25.6% and 18.1% respectively, which has achieved the target level of 18%.

12. We are pleased to note their satisfactory performance in achieving industry contribution target, undertaking more R&D projects and realisation/commercialisation of R&D results in the past two years. Subject to their sustaining satisfactory performance, we will consult this Panel again with a view to making a firm recommendation to support and sustain their further operation. When seeking FC's approval to extend the Centres' operation in May 2012, we also indicated that the new target industry contribution of 20%, as applicable to APAS and NAMI in their second five-year period of operation, will also be applicable to HKRITA and LSCM if they satisfactorily complete the observation period.

(C) R&D Projects and Expenditure

13. The numbers of R&D projects of the R&D Centres in 2011-2012 and 2012-13 are summarised as follows –

No. of New Projects *(Notes 1&2)* which Commenced in 2012-13 and No. of On-going Projects as at End-March 2013

	No. of New Projects Commenced			No. of On-going Projects		
	2011-12	2012-13	% change over 2011-12	As at Mar 2012	As at Mar 2013	% change over Mar 2012
APAS	6(2)	6(1)	0	18(3)	13(4)	-28%
ASTRI	27(4)	38(1)	+41%	51(6)	52(4)	+2%
HKRITA	14(2)	19(4)	+36%	24(2)	35(6)	+46%
LSCM	5(1)	13(2)	+160%	17(2)	20(3)	+18%
NAMI	15(5)	22(7)	+47%	29(9)	38(11)	+31%

Note 1: Under the ITF, there are broadly two types of R&D projects:

(i) platform projects which require industry contribution of at least 10% of the project cost. The industry sponsors (minimum of two) will not own the project intellectual property (IP); and

(ii) collaborative projects which require industry contribution of at least 30% (for R&D Centre projects only) or 50% (for non-R&D Centre projects) of the project cost. The industry sponsor(s) will be entitled to utilise the project IP exclusively for a defined period or own the project IP.

The ITF also supports seed projects for the R&D Centres which are capped at $2 million per project. These are more forward-looking and exploratory projects and aim to provide foundation work for future platform/collaborative projects. No industry contribution is required.

Note 2: Figures in brackets denote the number of collaborative projects.

14. During 2012-13, except APAS, there has been a healthy growth in both the number of new and ongoing projects undertaken by the R&D Centres. The total number of new projects commenced by the R&D Centres in the year has increased by 46% from 67 to 98 whereas the total number of on-going projects increased by 14% from 139 to 158. Some Centres, particularly LSCM and NAMI, recorded very significant increase in the number of new projects commenced.

15. The number of new projects commenced by LSCM has increased the most by 160% (from 5 to 13) since it has stepped up efforts in fostering networks and collaboration with its partners and stakeholders, including Government departments, trade associations, academia and the R&D teams in universities and other R&D Centres. These efforts have shortened the lead time for commencing a new project and created more opportunities for collaboration and conducting trials of its R&D outcomes in the public sector.

16. NAMI also continued to put up a good performance and its number of new projects has increased by 47% (from 15 to 22) since it has enhanced its overall research capacity and continue to diversify its portfolio of projects. For the new projects commenced by NAMI during the year, we have seen increases for all types of projects – platform projects have increased from 3 to 5, collaborative projects from 5 to 7 and seed projects from 7 to 10.

17. Both ASTRI and HKRITA registered a growth in the number of new projects commenced in 2012-13, by 41% and 36% respectively compared to the previous year as they continued to reach out to the industry partners and drive R&D projects which were more in line with the needs of the industry. ASTRI has conducted more seed projects in 2012-13 to build up its technology capabilities. Seed projects are exploratory and forward-looking in nature and conducive to the long term development of the R&D Centres, but they involve a lower cost per project than platform and collaborative projects.

18. APAS has kept up its effort in terms of the number of new projects while the number of on-going projects decreased as previously commenced projects concluded. It is hoped that the number of new projects for APAS will pick up again after the benefits of its merger with HKPC started to realise in the coming years.

19. As regards R&D expenditure, the situation is as follows -

R&D Expenditure
(in $million)

	2011-12	2012-13	% change over 2011-12
APAS	17.7	16.3	-8%
ASTRI	295.6	267.4	-10%
HKRITA	37.5	28.0	-25%
LSCM	48.0	35.4	-26%
NAMI	50.1	47.8	-5%

20. In 2012-13, the R&D expenditure of all R&D Centres has dropped despite the significant increase in the number of new and on-going projects in the year (paragraph 13 above). One of the main reasons was due to the cash flow of the project expenditures which were expended in stages and could straddle different financial years. For example, the majority of new projects conducted by LSCM and HKRITA in 2012-13 were commenced in the last quarter of the financial year and, hence, the R&D expenditure of these projects will be reflected in the coming years.

21. Some R&D Centres have put a much stronger emphasis on commercialisation and conduct of trials for the R&D results of completed projects. For example, HKRITA and LSCM have increased efforts on realisation/commercialisation and reached out to a broader segment of the supply chain and logistics industry through marketing and promotion and have identified some new industrial collaborative partners and sponsors. Another reason is that some Centres, such as ASTRI and NAMI, have conducted more seed projects in the year which involve lower cost per project than platform and collaborative projects.

REPORT ON INDIVIDUAL CENTRES

22. In the ensuing paragraphs, we will highlight the key activities of each R&D Centre, as well as their progress in realisation and commericalisation of R&D results.

(A) APAS

23. In 2012-13, the performance of APAS in terms of industry contribution has shown significant improvements (increased from 13.9% to 30.5%). APAS was formally merged with HKPC on 1 November 2012 and has become the APAS Division of HKPC. With the successful merger, APAS will be able to better drive applied R&D by leveraging on HKPC's wide industry network and resources. We hope that with the recruitment of the new CEO (re-titled General Manager of APAS Division of HKPC) and enhancement of its in-house R&D capability, APAS will be in a better position to develop its businesses.

24. In 2012-13, APAS has devoted effort to commercialise the R&D outcomes of five projects. In one of these projects, namely the 'Infotainment System for Mass Transportation Vehicles', licensing arrangement was under discussion with the industry sponsor to install the system on long distance buses in Thailand. APAS has also signed a licensing agreement with a local watch company which has adopted a piston ring manufacture process technique in its production line. That will greatly enhance the surface hardness and scratch resistance of its products.

25. On public sector trials, the 'Advanced Driver Assistant Systems' (covering lane assist, frontal collision avoidance & pedestrian prevention systems) will be installed on 16 vehicles of the Government and other non-governmental organisations. This trial would give valuable user feedback and provide reference for further commercialisation efforts.

26. In the future, APAS's goal is to offer end-to-end R&D services to the industry, and will stay focused with market-led R&D, strengthen partnership with small and medium enterprises and commercialise R&D results. It is hoped that APAS will engage in more collaborative projects in the future and these projects will shorten the path from development to adoption of the R&D results.

(B) ASTRI

27. During 2012-13, ASTRI has shown steady improvements in terms of industry contribution (increased from 20.2% to 25.3%) and the number of new projects (increased from 27 to 38).

28. ASTRI has also made progress in commercialisation and licensing technologies to the industry. In 2012-13, it has received a total of $68 million

industry income, including $46.1 million of sponsorship for R&D projects and $21.9 million of additional licensing, royalty and contract service income. Key examples of commercialisation include –

(a) TD-LTE (4G wireless) technologies – ASTRI has licensed an award-winning 'LTE Release 9 Evolution and Performance Enhancement' technology to two companies and received a total of more than $11 million income. One of the licensees launched the first commercial grade TD-LTE small cellular base station reference design in 2012. The other company set up a new R&D Centre in the Hong Kong Science Park and 26 ASTRI R&D staff were transferred to work in the company. This technology was also awarded the Grand Award as well as a Gold Award in the Best Lifestyle of the 2012 Hong Kong ICT Awards.

(b) e-Learning - Based on the R&D outcomes of the projects 'Collaborative e-Learning for e-Schoolbag Pilot' and 'Cloud-Facilitated e-Learning', a classroom control system for managing learning activities and e-Learning devices was launched in late 2012, whereas a leading telecom company has launched a cloud-based e-Learning service based on the latter. ASTRI has received a total of $4.5 million licensing income from these technologies.

(c) 2D-to-3D 1080p high-definition video – This technology can instantly convert 2D images from any video sources into natural and high quality 3D visuals. This technology was licensed to a US partner, which has embedded it in a television conversion box. This product is available in the US and European markets.

(d) Intelligent lighting sensor module - Technology agreements valuing $1.5 million were signed with 8 companies in Hong Kong and the Mainland. The Wireless Motion Sensing Module is now on trial run in different outlets in both Hong Kong and the Mainland. This technology has won a Merit Award at the HKICT Awards 2013.

29. ASTRI has also worked closely with various Government departments and non-governmental organisations to conduct trials in the public sector. For example, with the support from the Architectural Services Department, Hong Kong Housing Authority and Hong Kong Housing Society, ASTRI has installed and tested the LED lamps and control system at various

Government premises and housing estates. Some of these initiatives are multi-disciplinary in nature and require cross-domain co-operation within ASTRI.

30. In the future, ASTRI will continue to introduce initiatives to engage industrial partners with the focus on matching their needs with its technological capabilities and resources. ASTRI will leverage the commercialisation platform developed and dedicate additional efforts to achieve more major contracts with a view to further enhance ASTRI's brand name and improve its contribution to the society.

31. ASTRI has been in operation for about 13 years. We consider it an opportune time to review its performance and mode of operation, so as to identify any improvements required and recommend the way forward. For this purpose, we have set up a Review Committee comprising major stakeholders such as representatives from the industry and academia to participate in the review exercise. In the context of this review, we will also align the approach for calculating industry contribution for all R&D Centres (due to historical reasons, the present calculation method adopted by ASTRI is slightly different from that of other R&D Centres) to facilitate better monitoring and comparison of performance among the Centres.

32. To further facilitate ASTRI in building up its research capabilities in new and emerging technologies that are ahead of industry interest, we plan to introduce a new type of 'clustered-seed' projects for ASTRI. In line with the 'cluster approach' introduced for other ITF projects in 2011, up to a cluster of 10 seed projects (capped at $2.8 million[2] each) could be submitted to ITC for approval en-bloc once per year ($28 million each year). This would simplify the approval process, thus allowing ASTRI to bring together R&D personnel from different technology areas to work on selected focus areas in a speedy manner. We will implement the new approach for ASTRI on a trial basis for two years starting from 2014.

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[2] We will also take the opportunity to increase the funding ceiling for seed projects from $2 million to $2.8 million (and that for Tier 3 projects under the Innovation and Technology Support Programme undertaken by universities and designated local public research institutions from $1 million to $1.4 million) starting from the coming round of invitation for ITF project applications in July 2013. This is to be generally in line with FC's approval of the increase in the financial ceiling of the delegated authority for minor capital works projects (from $21 million to $30 million).

(C) HKRITA

33. In 2012-13, HKRITA has conducted 13 new projects and 6 public sector trials. This is the highest annual number of projects HKRITA has ever taken on. The level of industry contribution has also improved significantly to 26.8%. Cumulatively, HKRITA has been granted 26 patents and signed 22 licences for 15 commercialisation projects. Commercialisation income stands at about $10 million.

34. HKRITA has also engaged in several exciting projects during the year. The most significant one is the 'performance sportswear' project designed for the elite athletics of the Hong Kong Sports Institute. The outputs from this project have been used in the production of the training sportswear for the Hong Kong cycling athletes participating in the 2012 London Olympic Games, and have been licensed to relevant manufacturers for production. In 2013-14, HKRITA will develop new projects for our elite athletics in other sporting events.

35. HKRITA is also working on several projects like the 'Electrolytic Ozone Spray Finishing System for Denim Wear' and 'Supercritical CO2 for Dyeing of Textiles'. These projects provide novel, green, and clean alternatives to traditional production methods that require the use of hazardous chemicals and large amounts of water and electricity. For the R&D outcomes of the former project, a non-exclusive licence costing $100,000 has been granted.

36. Several public sector trials projects produce useful uniform improvements for our public servants. These include a comprehensive redesign of working uniforms for our firemen and enhanced functionality of outerwear for officers in the Correctional Services Department. These outcomes help improve work quality and efficiency of the public service. The 'Wearable Electronics for Better Quality Community Care of the Elderly' is HKRITA's first joint centre project in collaboration with LSCM and ASTRI. An outerwear made of Nu-Torque fabric and embedded with the RFID system will be developed to provide better monitoring of the elderly in our community care centres, particularly those who might be more susceptible to losing their way due to Alzheimer's disease.

37. There are also several projects that produce useful products for patient care. These include new medical textiles for eczema patients, smart pressure suits for the treatment of hypertrophic scars, and a phototherapy blanket for the neonatal care of jaundiced babies.

38. In view of the feedback from the industry and stakeholders, HKRITA will place a stronger focus on delivering solutions to promote sustainable development and reduction of labour and material costs in the industry. They are now collaborating with various local universities and research institutions and have broadened and diversified their research content and application outputs.

39. In 2013-14, HKRITA aims to conduct 24 new projects and 6 public sector trials. Almost half of these new projects will be collaborative projects and hence it anticipates that its level of industry contribution will increase.

(D) LSCM

40. Capitalising on a vibrant logistics industry in Hong Kong, LSCM has significantly expanded its project pipeline in 2012-13. The number of new ITF projects initiated by LSCM has more than doubled (increased from 5 projects in 2011-12 to 13 projects in 2012-13). These new projects also enjoy increased industry support, with the cumulative level of industry contribution for the 2 years from 2011 to 2013 amounting to 18.1% against the 12.3% for LSCM's first 5 years of operation.

41. LSCM has also expanded its commitment to facilitate the effective transfer of Centre technologies to the private sector. In 2012-13, LSCM has signed 11 licensing agreements (up from a total of 4 cases from 2006-07 to 2011-12). LSCM's technologies are licensed to a variety of business sectors such as logistics companies, IT solution providers, printing companies, etc., including a labelling company has licensed LSCM's RFID tag design for making labels for a branded wine.

42. During the year, LSCM has spearheaded new technology initiatives to realise/commercialise its R&D results in collaboration with the logistics sector (e.g., 'E-Lock-Based Enabling Technology for Container Cargo Trans-shipment Process'), retail sector (e.g., 'Product Authentication at Retail Points'), cultural services sector (e.g., 'Sensing Technologies for Real-time Environmental Monitoring'), airport (e.g., 'Indoor Navigation Location Based Services'), the construction sector (e.g., 'Building Information Management and Real Time Locating Service to Improve Construction Site Logistics and Safety'), the private hospital sector (e.g., 'RFID Positioning for Patient Monitoring and Baby Tag') and others.

43. To increase the awareness of the Centre's identity, LSCM has organised a series of events including the LSCM Logistics Summit (September 2012), the LSCM Logistics Workshop (February 2013) and the LSCM Logistics Roadshow (February 2013). By leveraging its unique position as a liaison platform among the Government, industry, academia and research institutions, LSCM has been able to create opportunities for collaboration by bringing together many interested parties at these events.

44. In future, to maximise impact and value to Hong Kong's logistics and supply chain businesses, LSCM has, based on the advice of its Board, broadened its technological capabilities by targeting five major technology areas –

(a) Infrastructure Information Technology System;
(b) Internet-Of-Things (IoT) and RFID technology;
(c) Location Based Service (LBS) technology;
(d) Logistics and Supply Chain Analytics/Applications; and
(e) Supply Chain Security.

45. With the positive momentum gained, LSCM is well positioned to support the logistics and supply chain industry in going forward.

(E) NAMI

46. In 2012-13, NAMI has maintained a high momentum in engaging the industry in its research projects, with its level of industry contribution reaching 39% in 2012-13. During this period, 15 collaborative projects were undertaken. This shows that NAMI continues to win the support and confidence of the industry and more collaboration opportunities should be forthcoming. On Centre operation, NAMI has grown steadily and built up its in-house research capability and resources to meet industry demand.

47. In 2012-13, NAMI has received $0.35 million from licensing arrangements. For example, licences were granted for technologies involving high brightness LED, thermal insulation coating material and others. NAMI has also identified several projects with high potential and will accorded priority for commercialisation in the coming year.

48. NAMI has also been working actively in conducting trials to realise its R&D results in the public sector, including the planned public trial of environment-friendly mirror-like coating on steel and zinc alloy at Hong Kong Science Park as well as the trial demo of a photobioreactor for air treatment

using microalgae in the Project Information Centre of the Hong Kong – Zhuhai – Macao Bridge.

49. NAMI has built up a cluster of research interest and efforts in photovoltaic (PV) technology and related areas. For example, in addition to a large-scale project on CIGS solar cells, NAMI has recently commenced its second large-scale project on thin-film PV technology. The effort will continue with aggressive targets set for a-Si and CIGS thin film technologies as well as Organic PV, and the focus will expand to battery technologies as well. Progress has also been made in other market sectors including solid state lighting and display, environmental technologies, construction/building materials and bio/health care products. In view that the coating industry is gravitating towards the use of solution printing to replace traditional coating techniques and after extensive consultation with industry, NAMI has chosen printed electronics with low entry barrier as its first focus sector in the coming year.

OVERALL AND WAY FORWARD

Overall View

50. We are delighted that after some seven years of operation, the R&D Centres have gradually become more mature. For instance –

(a) they have taken up a significant role in acting as the focal point for technology collaboration among the Government, industry, academia and research sectors. In 2012-13, the total research funding provided to the R&D Centres is $314.9 million, accounting for some 45% of total R&D funds disbursed under the ITF;

(b) in terms of commercialisation, some of the R&D Centres have started to receive more income other than industry sponsorship for ITF projects, including contract service income and licensing fees/royalties, as reported in **Annex A** to **Annex E**. During 2012-13, such incomes received by all five Centres increased by 37% from $18.4 million to $25.2 million. While this is a good indication that the work of the Centres has gained more recognition from the industry, we are mindful that the baseline for this figure is still small and could fluctuate greatly due to one or two deals; and

(c) they have made great efforts in conducting trials in the public sector. Over the past few years, they have conducted over 50 trial projects, of which 22 are conducted under the Public Sector Trial Scheme launched in March 2011.

51. In particular, all the R&D Centres have already exceeded their respective interim industry contribution targets (see paragraph 3 above) and we will continue to support their operation as approved by FC. As regards their future operation, we will continue to monitor their performance and put forward our recommendation at an appropriate juncture taking into account –

(a) whether their performance has shown sustained development, and if yes, if such development will continue in the future. In arriving at this conclusion, we will take into account factors such as their level of industry contribution, income from commercialisation, ability to realise their R&D outcomes in the public sector setting, etc;

(b) state of the market by then; and

(c) prevailing Government policies.

Implications on the ITF

52. Both the operating costs and expenditure for the R&D Centres' projects are supported by the ITF. The ITF was set up in 1999 with an initial capital of $5 billion. Up to end March 2013, the fund has already supported over 3,250 projects at a total commitment of about $7.4 billion. Taking into account the funding approved by FC for the operation of the R&D Centres, the uncommitted ITF balance of around $1.3 billion is expected to be fully committed in around 2015-2016 (but the actual timing will depend on the quantity and expenditure levels of projects to be approved in the coming few years). By then, the ITF would also have been operated for more than one and a half decade. As such we consider it opportune to conduct a comprehensive review on the ITF and explore areas of improvements. We will 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, we will cover the following key areas in the review –

(a) Funding scope – In recent years, we have 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. We

need to examine whether it is necessary to further improve/liberalise the funding mechanism;

(b) Support for private sector R&D – One comment on the present system is that the ITF focuses too much on supporting the industry through the designated local research institutions, e.g. universities and R&D Centres. Support to companies' in-house research is only via the Small Entrepreneur Research Assistance Programme which has its limitations, e.g. terms not attractive enough, scope a bit too narrow, etc.;

(c) Intellectual properties (IPs) arrangements – We will explore if there is 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

(d) Evaluation mechanism - In order to better assess the effectiveness of the ITF and make improvements as necessary, we will also put in place a more robust evaluation and monitoring mechanism.

53. We will consult this Panel again in due course.

ADVICE SOUGHT

54. Members are invited to note the latest progress of the R&D Centres as set out above.

Innovation and Technology Commission
June 2013

Annex A

Automotive Parts and Accessory Systems R&D Centre (APAS)
Highlight of Operation in 2012-13

I. New R&D Projects and Industry Contribution (in $million)

	2011-12			2012-13		
	No. of New Projects	Project Cost	Industry Contribution	No. of New Projects	Project Cost	Industry Contribution
Platform	-	-	-	2	7.3	1.4 (19.5%)
Collaborative	2	3.2	1.0 (30.2%)	1	5.5	3.1 (55.3%)
Seed	2	3.8	n/a	1	1.9	n/a
Total:	4	7.0	1.0 (13.9%)	4	14.7	4.5 (30.5%)
Public Sector Trial Scheme Projects	2	0.9	n/a	2	1.6	n/a

Note: Figures in brackets denote the level of industry contribution.

II. Operating Expenditure (in $million)

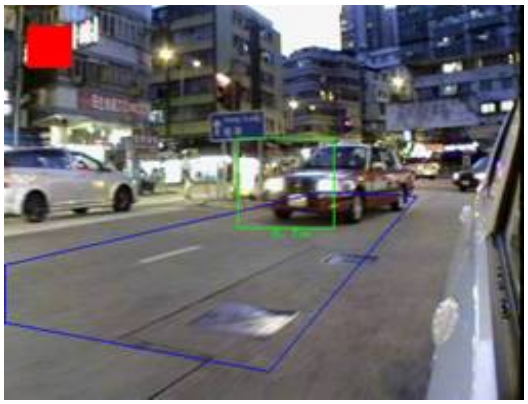
	2011-12	2012-13
Staffing	13.0	9.9
Accommodation	1.5	1.5
Equipment	2.5	0.3
Others	2.4	4.1
Total:	19.4	15.8

III. Industry Income Received (in $million)

	2011-12	2012-13
Sponsorship for projects	3.24	1.42
Licensing/Royalty	0.05	0.01
Contract Services	-	0.03
Others	0.15	0.15
Total:	3.44	1.61

IV. Progress of Commercialisation and Use of R&D Deliverables in the Public Sector

Project Name	Status / Progress
20kW Fast Charging Station with Professional E-payment System  	The on-site user trial of the fast charging station was conducted at the Electrical and Mechanical Services Department (EMSD)'s headquarters from February 2012 to August 2012. Another user trial at a local auto company is being conducted. As at January 2013, the performance of the two trials has been satisfactory – ● total 224 times of fast charging; ● more than 980kWh of electric power has been charged; and ● respective electric power can drive an electric vehicle to cover 7 400km (equivalent to 180 trips from Tin Shui Wai to the Hong Kong International Airport) .

Project Name	Status / Progress
ADAS - Advanced Driver Assistant Systems (consist of lane assist, frontal collision avoidance & pedestrian prevention systems)  	The ADAS project has led to two consultancy projects for the project team with a total sum of $600,000 and expanded the Centre's technology leadership in this area. APAS has gained support from a commercial company to plan for a collaborative project for further refinement of the technology developed. APAS has commenced 2 Public Sector Trial Scheme projects to conduct trial run of the project results on 16 vehicles. The project results have inspired research collaboration between the Chinese University of Hong Kong and Hong Kong Productivity Council to evaluate the Sleep Apnea Syndrome study by utilising technology developed.
Infotainment System for Mass Transportation Vehicles  	A project sponsor has conducted trial run of the Infotainment System in Thailand and secured the first order of the system in overseas market. Noting the market potential, the sponsor has indicated interest to develop the next generation of the system with remote-update capability with the project team. Locally, the project team has launched a Public Sector Trial Scheme project to explore the local market opportunities with two non-government organisations, namely 'Hong Kong Society for Rehabilitation' and 'Neighbourhood Advice-Action Council'. Four buses will be selected for the trials.

Project Name	Status / Progress
Development of Electronic Control Unit for Power Management Platform of EV  	After the successful road trial at Correctional Services Department's Hei Ling Chau Facilities in 2011, APAS launched another trial at the Hong Kong International Airport in cooperation with a local electric vehicle company and Hong Kong Airport Authority (AA). An AA's electric car was installed with APAS developed Battery Management System and began running within airport area since March 2012. The trial was completed at the end of December 2012.
Application of Quasi-DC Plasma Immersion Technique to the Enhancement of Surface Properties of Automotive Components  	The project was completed in 2012. With the joint efforts of the City University of Hong Kong and APAS, the project result was successfully commercialised. A licensing agreement was signed with a local watch supplier.

Project Name	Status / Progress
A Prototype of Vehicle Safety and Passenger Information Services: a Road Trial Run Programme  	APAS has installed prototypes in 12 Kowloon Green Minibuses on 9 routes in mid-2011 for road trial. The road trial received positive responses from the 2 green minibus operators and their passengers – ● 97% of 200 passengers in the September 2011 survey, and 93% of 300 passengers in the March 2012 survey rated the system as 'Excellent' to 'Fair'. ● The project was completed successfully on 19 January 2012. ● The trial programme had generated a lot of media publicity. A few local and overseas companies have approached the project team to explore areas of collaboration.

智能系統監察小巴超速

【明報專訊】專線小巴因超速而生意外時有發生，有大學和研究機構就研發出一套「小巴安全及乘客資訊服務系統」，將陸續在12輛小巴試行，除可以記錄小巴的車速和位置等資料，亦可透過車廂內顯示屏，向乘客報告下一站和新聞資訊，小巴營辦商亦能監察司機有否超速。

城大創新署攜手研發

系統由香港城市大學和創新科技署轄下的汽車零件部研究及發展中心合作研發，並獲創新科技基金資助64.1萬元。中心業務發展經理蕭幸全指出，本港部分巴士亦有應用類似的「全球衛星定位系統技術」，做出「報站」效果，但由於小巴站與站之間相隔較近，且速度較快，要求的技術會高一點。

可報站供新聞資訊

城大資訊系統學系副教授廖少毅就表示，系統除可以「報站」外，亦可以讓小巴營運商上網監察各小巴的位置和速度，由於每個司機「換車」或「換線」都要拍卡，透過紀錄可以追蹤超速司機，亦可讓小巴營運商及早調配車輛。

現時捷運汽車有限公司和李惠珍運輸有限公司，共有5輛小巴已裝有這套系統。蕭幸全說，未來3個月會增多爲7輛小巴加裝系統，材料成本每輛約2500元，未包安裝費。他希望日後營運商可在小巴的顯示屏上賣廣告，賺回成本甚至創造收益。

現時已加裝系統的小巴，主要行走來往紅磡黃埔花園和九龍塘、尖沙嘴的4條路線（2、2A、6、6A），以及來往荃灣和葵興、葵盛等地的5條路線（89、89A、89B、89M、98）。

城大及創新科技署合作研發的「小巴安全及乘客資訊服務系統」，可透過車廂內顯示屏，向乘客報告下一站和新聞資訊。（李澤彤攝）

Project Name	Status / Progress
Long Vehicle Wireless Backup Monitor System  	Four Government departments have installed the prototypes on 10 of their vehicles for a road trial of over 6 months. The drivers using the prototypes have provided detailed feedbacks which have helped to optimise the system design for further licensing. A licence has been granted to a local company.

Details of the R&D projects undertaken by APAS are available at *http://www.apas.hk/index.php?option=com_content&view=article&id=9&Itemid=18&lang=en*.

Automotive Parts and Accessory Systems R&D Centre
June 2013

Annex B

Hong Kong Applied Science and Technology Research Institute (ASTRI)
Highlight of Operation in 2012-13

I. R&D Projects and Industry Contribution (in $million)

No. of Projects
(Including projects completed during the year)

	2011-12			2012-13		
	No. of Project	Project Cost	Industry Contribution	No. of Project	Project Cost	Industry Contribution
Platform	58	252.3	36.4 (14.1%)	52	226.6	43.2 (18.8%)
Collaborative	10	23.1	7.1 (32.9%)	7	11.6	2.9 (29.9%)
Seed	22	20.2	n/a	28	27.9	n/a
Contract Service		-	6.8 (100%)		-	12.2 (100%)
Licensing, Royalty and Others		-	10.6		-	9.7
Total:	90	295.6	60.9 (20.2%)	87	266.1	68.0 (25.3%)
Public Sector Trial Scheme Projects	-	-	n/a	2	1.3	n/a

Note: *Due to historical reason, income from contract service, licensing and royalty is also counted towards the calculation of industry contribution (figure in brackets). The project cost includes accrual adjustments in the following year ($5.2M and $3.1M for 2011-12 and 2012-13 respectively) but excludes the project cost of two Public Sector Trial Projects.*

II. Operating Expenditure (in $million)

	2011-12	2012-13
Staffing	69.8	76.7
Accommodation	22.1	23.6
Equipment	6.2	2.9
Others	24.6	27.0
Total:	122.7	130.2

III. Industry Income Received (in $million)

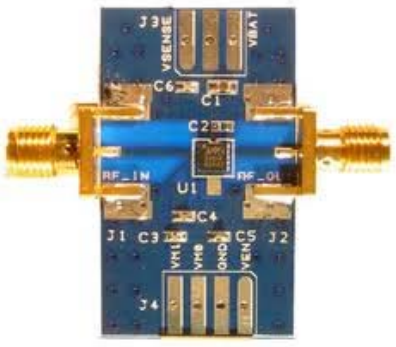
	2011-12	2012-13
Sponsorship for projects	43.50	46.07
Licensing/Royalty	10.15	9.12
Contract Services	6.84	12.22
Others	0.38	0.62
Total:	60.87	68.03

IV. Progress of Commercialisation and Use of R&D Deliverables in the Public Sector

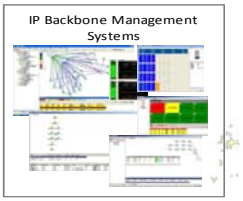
Project Name	Status / Progress
'Collaborative e-Learning for e-Schoolbag Pilot' and 'Cloud-Facilitated e-Learning' 	Based on the R&D outcomes of the projects 'Collaborative e-Learning for e-Schoolbag Pilot' and 'Cloud-Facilitated eLearning', ASTRI has received a total of $4.5 million income from these technologies. The cloud-facilitated eLearning technologies were incorporated and launched by a leading telecom company in their cloud-based networking infrastructure to provide cloud-based e-learning service to the public. At the same time, a classroom control system developed from the e-Schoolbag Pilot Project was launched in late 2012, and by early 2013, eight schools have installed the system and are ready to deploy it on-site.
'Intelligent Display - Personalised Advertising Display System' and 'Interactive Displays for e-Classroom'   	Several licensing agreements and service contracts were signed with companies in Hong Kong, the Mainland, India and Jordan for technologies related to optical touch, interactive whiteboard, digital signage and intelligent audience analysis. ASTRI has received over $2.8 million income from the industry from these 2 projects. The Intelligent Audience Analysis Technology developed was showcased in a number of exhibitions, e.g. 2012 Hong Kong Book Fair where it was highlighted at the 'Future Reading Experience Zone' and attracted more than 5,000 visitors to try the product. e-Classroom is a collaborative project between Education Bureau, a local university, ASTRI and 5 industry partners. The project includes plans to deploy and test the technology in at least 15 local schools. The Interactive Touch Frame used in this project won the Best Lifestyle Bronze Award at the 2012 HKICT Awards.

Project Name	Status / Progress
High Speed Digital Pathology System 	The project aims at promoting faster and better pathology services and practices in Hong Kong hospitals meeting pathologists' requirements in – (1) digital slides for convenient, ubiquitous analyses and consultations; and (2) virtual slide management and computer-aided diagnosis on diseases such as tuberculosis and cancers.
Cardio-Vascular Monitoring Devices for Tele-Care System 	Two contracts were signed with tier-one healthcare equipment manufacturers in Hong Kong and the Mainland. The outcome of the project is the first product in the market to measure 4 parameters at the same time. Measurement results can be automatically uploaded to a cloud system.
Advanced Compact Camera Module for Cellular Phone Applications  	The project has developed a next-generation compact camera module with functions not previously available in mobile phones. The module is targeted at the market in which 1.6 billion mobile phones are produced annually. It has been adopted in a model of a top smartphone brand newly launched in March 2013.

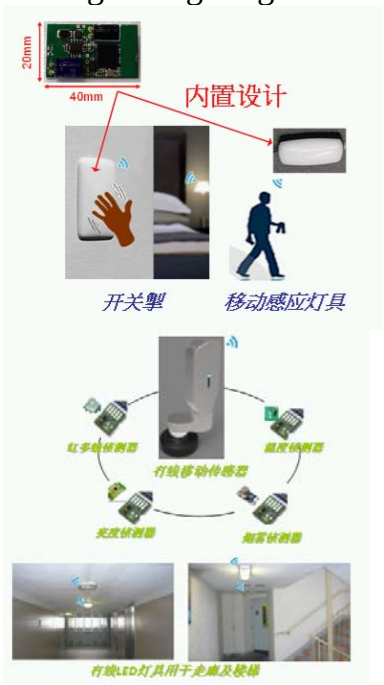
Project Name	Status / Progress
Compact Optical Zoom Module  	The project addresses increasing market needs for optical zoom function in the mobile phone users. Four patents have been filed. The module is targeted at high-end Android OS handset market. Expansion into the tablet market is being explored.
LTE Release 9 Evolution and Performance Enhancement  *ASTRI & Innofidei Exclusive Licensing Agreement Signing Ceremony (Aug 2012)*  *Group picture of R&D Team*	The technology developed and its derivatives were transferred to 2 companies. One of the companies launched the first commercial grade TD-LTE small cellular base station reference design in 2012. The other company later signed an agreement with ASTRI to exclusively license ASTRI's Baseband LTE User Equipment Technologies, and an R&D team of 26 ASTRI staff was transferred to the company's R&D Centre established in Hong Kong Science Park. The company has continuously sought for transfer of technologies from ASTRI to enter high-value-added LTE networking market. The income received from the industry by this project has exceeded $11 million.

Project Name	Status / Progress
LCD TV Display Enhancement Controller 	ASTRI has two important deliverables regarding video effects enhancement: (1) 'LCD TV Display Enhancement Controller' (LDEC) is a Frame Rate Converter for 120Hz TV applications. It reduces motion blur on LCD TV by inserting interpolated frames and thereby delivering higher overall image fidelity. Using novel prediction based motion estimation, LDEC performs advanced computations and accurately converts 24Hz film and 50/60Hz PAL/NTSC video contents to 100/120Hz. (2) 'Real Time 2D/3D video conversion' can instantly convert 2D images from any video sources into natural and high quality 3D visuals. It can also be configured to suit a great variety of 3D display devices. These kinds of flexibility greatly facilitate the wide adoption of 3D technologies. The solution has fascinated many industry players since it was launched in the market in 2011.
Radio Frequency Power Amplifiers using Gallium Arsenide Hetero-junction Bipolar Transistors 	ASTRI started this industry collaborative project with a new start-up SANA Semiconductors Ltd in Hong Kong in 2010. The project aimed to develop the world's smallest radio frequency amplifiers for smart phones. The project team has been successful in realizing a 2.4G radio frequency power amplifier module for mobile phones which is first of its kind in Hong Kong. The accomplishment enabled SANA to start its operation in Hong Kong with 10 employees. SANA is planning to ship the product in volume to tier-one manufacturers in the third quarter of 2013.

Project Name	Status / Progress
Multi-role Configurable USB3.0 Application Processor  *USB 3.0 Application Processor (U3AP) supports super speed data transmission and read-write performance*	The project was successfully completed in December 2011. Velosti and ASTRI work together in building sales channels for USB3.0 products worldwide. Velosti started paying ASTRI revenue per chip sale from June 2012. U3AP Chip is in mass production.
Clustering Based Surveillance Video Summary and Object Retrieval System 	In this project, ASTRI developed a series of highly-efficient video analysis algorithms for an industry partner in Hong Kong, including video summarization, object segmentation and retrieval algorithms. These algorithms are core technologies for intelligent video surveillance system, which enable automation of many labour-intensive procedures involved in monitoring and analyzing vast amount of surveillance video clips. With the technologies developed by ASTRI, its partner has already deployed its video analysis system in 10 provinces in the Mainland.

Project Name	Status / Progress
Access Gateway Platform for LTE Access Networks  *The platform developed from the project integrates and inter-operates with the commercial LTE base stations and terminal devices developed by partners and third-party companies*   *A commercial deployment leveraging technologies developed from this project - Chunghwa Telecom's IP VPN backbone network*	The technology developed and its derivatives were transferred to manufacturers and system integrators in Hong Kong, Taiwan and the Mainland. Leveraging on related R&D results, software solutions were developed and deployed in commercial telecommunication network and outdoor WiFi network systems. The technologies generated from this project also aroused interests from local cellular operators and equipment vendors in the region. The achievement has led to additional collaborations and technology transfers in the follow-on R&D projects. The income received from the industry by this project is about $3.5 million.
AMS IP Platform for MEMS Sensor 	ASTRI's 3-channel analog front-end for G-sensor IC is an application specific IC for 3D positioning sensing for consumer electronic products. Low-cost and low-power IC is an essential component in high volume consumer electronic products, such as smart phones, tablets, game controllers and healthcare equipment. The design has made use of high performance analog and mixed signal IP developed at ASTRI. Our customer developed a System-on-Chip (SoC) by integrating ASTRI's IP. More than 4.2 million units of this product were shipped in the first 6 months of product offering.

Project Name	Status / Progress
'Document Digital Rights Management System for e-Learning' (Doc DRM) and 'Digital Asset Management' (DAM) 	This project aimed at developing technologies for e-Publishing and e-Learning. The Doc DRM technology was licensed to a publishing company in Hong Kong, and a trial run was conducted by a third-party. The DAM technology, on the other hand, was co-developed by ASTRI and another local industry partner.
Android Digital Home Technology Platform 	The technologies developed from this project have been licensed and transferred to 6 local and Mainland companies, including a tier-one communication service provider in Hong Kong and a leading consumer electronics enterprise in the Mainland. Customers' products incorporating the technologies have either been launched or will soon be launched in the markets in Hong Kong and the Mainland. ASTRI signed a number of contracts with customers during 2009 to 2012 with total income over $2.5 million.

Project Name	Status / Progress
Intelligent Lighting Sensor Module 	Technology agreements were signed with 8 companies in Hong Kong and the Mainland with a total contract value of over $1.5 million. The Wireless Motion Sensing Module is now on trial run at a centre under Hong Kong Housing Society, offices of two licensees in Hong Kong as well as a café in the Mainland. This technology has won a Merit Award at the HKICT Awards 2013. In 2012, the 'Hybrid Mode Real-time Locationing System using LED' - an extended technology derived from this project, won Silver Award at the HKICT Awards and a Merit Award at the Hong Kong RFID Awards. The technology was showcased in the Hong Kong International Lighting Fair 2013 (Spring Edition).

Details of the projects undertaken by ASTRI are available at *http://www.astri.org/main/index.php?contentnamespace=technologies:home*.

Hong Kong Applied Science and Technology Research Institute
June 2013

Annex C

Hong Kong Research Institute of Textiles and Apparel (HKRITA)
Highlight of Operation in 2012-13

I. New R&D Projects and Industry Contribution (in $million)

	2011-12			2012-13		
	No. of New Projects	Project Cost	Industry Contribution	No. of New Projects	Project Cost	Industry Contribution
Platform	6	15.8	2.2 (13.9%)	9	33.9	5.6 (16.5%)
Collaborative	2	5.3	2.6 (50.0%)	4	14.0	7.2 (51.7%)
Seed	-	-	n/a	-	-	n/a
Total:	8	21.1	4.8 (23.0%)	13	47.9	12.8 (26.8%)
Public Sector Trial Scheme Projects	6	7.0	n/a	6	4.8	n/a

Note: Figures in brackets denote the level of industry contribution.

II. Operating Expenditure (in $million)

	2011-12	2012-13
Staffing	11.8	12.9
Accommodation	1.3	1.9
Equipment	-	1.2
Others	2.9	3.1
Total:	16.0	19.1

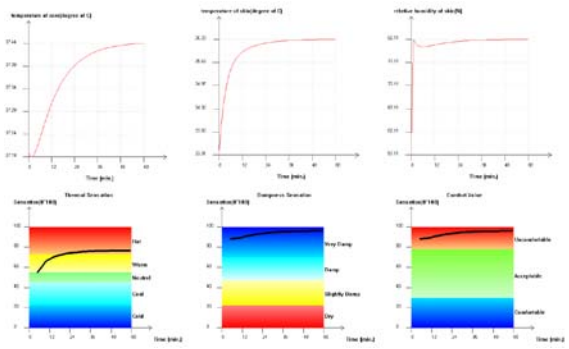
III. Industry Income Received (in $million)

	2011-12	2012-13
Sponsorship for projects	3.67	7.52
Licensing/Royalty	0.57	1.02
Contract Services	-	-
Others	-	-
Total:	4.24	8.54

IV. Progress of Commercialisation and Use of R&D Deliverables in the Public Sector

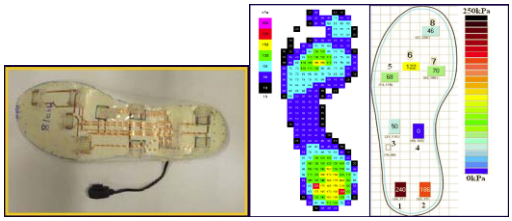
Project Name	Status / Progress
Finer Nu-Torque Cotton Yarn Production  	Globally, Nu-torque has been one of the most significant advancements in spinning of singles ring yarns in the last decade. To date, this technology, which has received wide industry acceptance, has resulted in close to $9 million licensing income. There are several more licensing discussions ongoing. The current licensees could produce Nu-Torque yarns at a total capacity up to 700,000 spindles and they are actively using this technology in their production lines in the Mainland, Thailand, Malaysia and India. Nu-torque has gone through 5 generations of development. More refinement and research are in progress. Nu-torque is now protected by a family of patents including 5 US, 4 PRC, and 3 PCT, in which 3 US and 1 PRC patents have been granted. The technologies have also won innovation awards from various associations/authorities from Hong Kong and the Mainland.

Project Name	Status / Progress
Wearable Electronic for Better Quality Community Care of the Elderly 	This project, which is being led by HKRITA and with joint efforts from LSCM and ASTRI, was commenced on 1 March 2013. An outerwear made of Nu-Torque fabric and embedded with the RFID system, which is safe and comfortable, will be developed to provide better monitoring of the elderly in our community care centres, particularly those who might be more susceptible to losing their way due to Alzheimer's disease. The outerwear design, the testing of the RFID tags and the interface of the system are all progressing according to the original milestone schedule. The on-field trial will take place in 2 elderly care centres of the Tung Wah Group of Hospitals from May to September 2013.

Project Name	Status / Progress
Functional Design Optimization of Hong Kong Fire Services Department (FSD) Uniform   	Most computer-aided design (CAD) systems in the textiles and apparel market are focused on the design and aesthetic simulation of garment in virtual environment. This CAD system provides cutting-edge technology which could help the designer evaluate the functional performance, in terms of moisture management, thermal management and comfort, etc., of their garment design. It also helps the designer understand different properties of textiles materials through simulations in the system. Up to now, HKRITA has licensed this technology to three parties, in which two of them are education and training institutes and one is a large department store in Canada. Shinshu University, one of the licensees, is ranked top three in the area of textiles research in the world. HKRITA will produce 40 sets of prototypes of Hong Kong FSD Uniform No. 3 for field wear trial tests and 150 sets for comfort evaluation in daily routine activities. So far, HKRITA has conducted two trials with the proposed prototypes: ● 20 sets of preliminary prototypes have been evaluated in the first field wear trial in West Kowloon Training Centre of FSD; and ● 20 sets of second version prototypes have been analyzed in the wear trial in PolyU climatic chamber. Another trial will be conducted in the third quarter of 2013 in which the field wear will be tested by 150 staff of FSD.

Project Name	Status / Progress
Supercritical CO2 for Dyeing of Textiles	The project commenced on 1 October 2012. The development of a novel supercritical carbon dioxide dyestuff for dyeing natural textiles is on-going. At present, HKRITA is investigating 2 major challenges relevant to the novel dyestuff for natural textiles: ● The methodology of making reactive dyes to be SC-CO2 soluble; and ● increasing the reactive group of disperse dye.
Fast Fabric Hand Measurement Technology   	The Fabric Touch Tester is a breakthrough in the area of fabric hand feel evaluation. Similar fabric hand-feel evaluation systems exist in the market but are not widely adopted by the industry due to their complexity in fabric measurement and lack of recognised testing standards in the world. The Fabric Touch Tester provides objective evaluation method with a user friendly interface to measure fabric hand feel in one step. HKRITA is drafting the standard testing procedures and will apply for international industry standards in the area of fabric hand feel evaluation. Since project commencement, HKRITA has been working closely with one of the world renowned testing equipment manufacturers from US. A non-exclusive licence agreement has been successfully signed in 2013. The product is planned to be launched into the market in ShanghaiTex 2013, which is one of the biggest textiles machinery show in Asia. HKRITA will continue its effort in commercialising the testers with the support from the licensee and in return, royalties would be received per tester sold to the market. The innovation won gold medal with the congratulations of jury in the 41st International Exhibition of Inventions of Geneva in April 2013.

Project Name	Status / Progress
Performance Sportswear Support for Hong Kong Sports Institute Elite Athletes 	HKRITA has developed a new sportswear which involves new design, production and evaluation system. Apart from the proven functional performance, the design of the sportswear has also won various design awards in the Mainland. One of the top sportswear brands in China, which is also a listed company in Hong Kong, has taken up a licence in the running wear technology. Another licensee, who is the official sponsor to the Hong Kong cycling team, has taken up the cycling wear technology licence. The outputs from this project have been used in the production of the training sportswear for the Hong Kong cycling athletes participating in the 2012 London Olympic Games, and have been licensed to relevant manufacturers for production. Apart from the above, a related prototype project was completed in July 2012. The completed prototypes include 93 sets of high quality training wear with thermal and biomechanical functions, and 93 sets of high quality competition wear with thermal comfort and aerodynamic functions for elite athletes of the Hong Kong cycling and triathlon teams.

Project Name	Status / Progress
Monitoring Patients with Diabetic Foot Syndrome by Intelligent Footwear System 	A technology innovation company located in the Hong Kong Science Park has taken up a licence on the fabric sensor technology. They have collaborated with the Hong Kong Polytechnic University and a Hong Kong hospital to develop i-shoe for monitoring of foot pressure of diabetic patients. After a wearer trial in the hospital, the comments collected from the hospital were positive. The company has then taken up the follow-up knowhow licence to produce i-shoe for the market and in return, royalties will be received per pair of shoes/ insoles sold to the market.
Innovative Energy and Utility Management System in Textile Processing 	Carbon footprint is a hot topic in recent years and the industry is very concerned about energy usage in production. This project has attracted many enquiries from the industry, especially in the sector with high energy consumption such as dyeing and finishing plants. HKRITA will work with its current licensee, which is a Hong Kong-based supply chain solution provider, to promote the system and provide one-stop service for the industry. In return, royalties will be received per system sold to the market.

Project Name	Status / Progress
Electrolytic Ozone Spray Finishing System for Denim Wear    	Denim industry has always been identified as a heavy pollution sector in the textiles and apparel industry. The water and chemical pollutants discharged during the bleaching process will cause heavy impact to our environment. This technology can greatly diminish the discharge of pollutants and achieve comparable results to traditional bleaching process, thus has attracted much attention from the industry. The project has also won the 'Hong Kong Awards for Industries: Machinery and Machine Tools Design Certificate of Merit' from the Federation of Hong Kong Industries. A licence has been granted to a local textiles machinery manufacturer. It is now developing commercial products based on the knowhow arising from the R&D project. HKRITA will promote the product with its licensee and in return, royalties will be received per machine sold to the market.
Development of Shape Memory Knitted Fabrics/Garments    	One non-exclusive licence has been granted in March 2012; and licensing income of $500,000 has been received in 2012-13. The licensee is a subsidiary company of a textiles research centre in Zhejiang. It will adopt the knowhow developed from the Hong Kong Polytechnic University and provide shape memory finishing chemicals for the textiles industry.

Hong Kong Research Institute of Textiles and Apparel
June 2013

Annex D

Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies (LSCM) Highlight of Operation in 2012-13

I. New R&D Projects and Industry Contribution (in $million)

	2011-12			2012-13		
	No. of New Projects	Project Cost	Industry Contribution	No. of New Projects	Project Cost	Industry Contribution
Platform	2	13.6	1.7 (12.3%)	6	54.8	9.3 (16.9%)
Collaborative	1	1.2	0.6 (50.0%)	2	3.2	1.6 (50.8%)
Seed	-	-	n/a	-	-	n/a
Total:	3	14.8	2.3 (15.4%)	8	58.0	10.9 (18.7%)
Public Sector Trial Scheme Projects	2	5.6	n/a	5	9.9	n/a

Note: Figures in brackets denote the level of industry contribution.

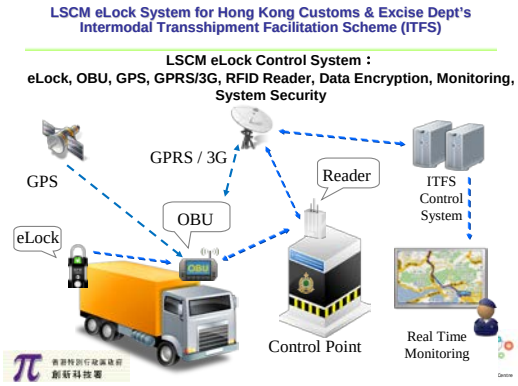
II. Operating Expenditure (in $million)

	2011-12	2012-13
Staffing	11.4	11.6
Accommodation	3.8	3.7
Equipment	0.3	0.7
Others	3.6	4.9
Total:	19.1	20.9

III. Industry Income Received (in $million)

	2011-12	2012-13
Sponsorship for projects	3.78	7.97
Licensing/Royalty	0.07	0.16
Contract Services	-	0.15
Others	-	-
Total:	3.85	8.28

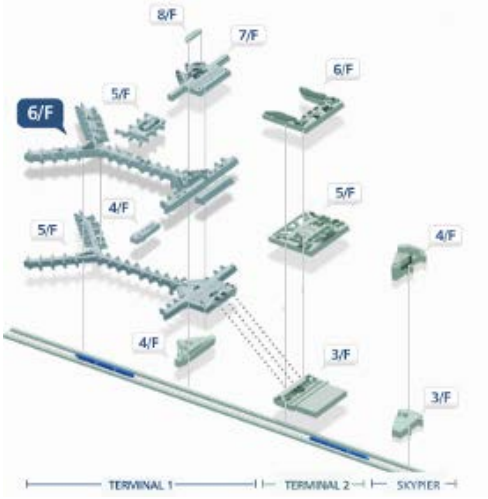
IV. Progress of Commercialisation and Use of R&D Deliverables in the Public Sector

Project Name	Status / Progress
E-Lock-Based Enabling Technology for Container Cargo Trans-shipment Process  *An E-locked Enabled ITFS*  *ITFS enabled control point*	Customs and Excise Department (C&ED) has adopted LSCM's cargo tracking platform in its Intermodal Trans-shipment Facilitation Scheme (ITFS) which reduces the number of Customs inspection on the cargoes at the entry control points and speeds up logistics flow. With the support of C&ED and ITC, the developed platform will be extended to other sea, air, river and boundary control points. Meanwhile, LSCM is working closely with C&ED to explore the feasibility of single-elock technology for cross-boundary between Hong Kong and Guangdong customs clearance. This project will have potentially significant impact to Hong Kong as the logistic hub serving the Pearl River Delta areas.

Project Name	Status / Progress
RFID Positioning for Patient Monitoring and Baby Tag  *The Babytag design (patent pending)*  *An illustration of alert system for baby monitoring*	Tamper-resistant and reusable strap locks will be integrated onto reusable active RFID baby tags to help hospitals in baby monitoring. The project commenced in September 2011 and on-site pilot run will be conducted in two hospitals in mid-2013.

Project Name	Status / Progress
Location-based Technologies for Asset Tracking and Risk Management    *Dangerous situations of outdoor works*	With the support of Hong Kong Housing Authority, Hong Kong Construction Industry Council and Occupational Safety and Health Council, a Proactive Construction Management System will be developed to provide pro-active warnings to workers when they are exposed to dangerous situations. The project commenced in January 2013 and on-site pilot run will be conducted in the second quarter of 2014.

Project Name	Status / Progress
Product Authentication at Retail Points – Infrastructure and Systems  *Product Authentication mechanism (patent pending)*  *Product authentication system at retail point*	The project aims to enhance product supply chain integrity at retail points. This project will provide secured RFID system and product tags such that consumers can verify product information easily. The project commenced in July 2012. On-site pilot run will be conducted in the third quarter of 2013.
Package-specific RFID Tagging and Embedding Technology  *LSCM's antenna design for wine bottles*	LSCM's tag design capabilities have been recognised by the industries since 2012. Several companies from different industries, such as label printing and IT system integrators, have licensed LSCM's antenna designs for different applications including wine, metal, garment and food products, etc.

Project Name	Status / Progress
Indoor Navigation Location Based Services  *Indoor Navigation Assistance for travellers in HKIA*	With the support of Airport Authority Hong Kong, indoor navigation assistance based on location based services (LBS) technologies will be developed on smartphone apps and will be provided to travellers. Project commenced in January 2013 and on-site pilot run will be conducted in the third quarter 2013.
Sensing Technologies for Real-time Environmental Monitoring  *Active tag for archive items*  *Sensor-integrated RFID tag prototype*	With the support of Leisure and Cultural Services Department, active RFID and sensor technologies will be deployed in the Hong Kong Museum of History and Hong Kong Film Archive. Real-time position information of displayed/archived items and environment data, such as humidity and temperature, will be monitored. Project commenced in January 2013 and on-site pilot run will be conducted in the third quarter of 2013.

Project Name	Status / Progress
Interoperability Technology and Applications for Container RFID and e-seal    *RFID-enabled Container Yard Management*	A RFID-enabled Container Yard Management System (CYMS) is licensed to a Hong Kong-based logistics company which possesses its own container terminals and yards in Hong Kong and the Mainland. The CYMS can help manage and streamline daily operations of thousands of containers.

Project Name	Status / Progress
RFID Tagging for Archive Item  *Using RFID for film archive*   *Archival item storage using RFID technologies*	Item-specific RFID tagging solutions will be designed for film archive items/collections in the Hong Kong Film Archive. Reading performance on metal/plastic/film objects will be improved. Production of samples was conducted in March 2013 and on-site pilot run will be conducted in the second quarter of 2013.

Annex E

Nano and Advanced Materials Institute (NAMI)
Highlight of Operation in 2012-13

I. New R&D Projects and Industry Contribution (in $million)

	2011-12			2012-13		
	No. of New Projects	Project Cost	Industry Contribution	No. of New Projects	Project Cost	Industry Contribution
Platform	3	7.3	0.7 (10.1%)	5	10.7	1.9 (17.7%)
Collaborative	5	43.6	22.1 (50.6%)	7	59.8	33.1 (55.3%)
Seed	7	12.5	n/a	10	19.2	n/a
Sub-total:	15	63.4	22.8 (35.9%)	22	89.7	35.0 (39.0%)
Public Sector Trial Scheme Projects	-	-	n/a	-	-	n/a

Note: Figures in brackets denote the level of industry contribution.

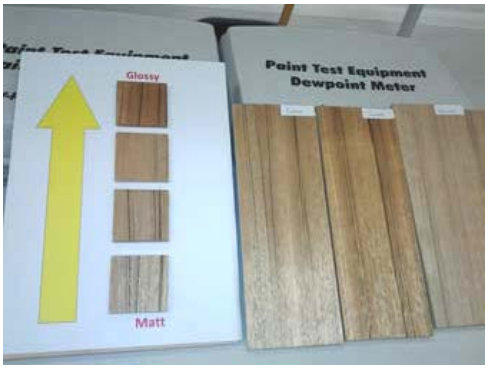
II. Operating Expenditure (in $million)

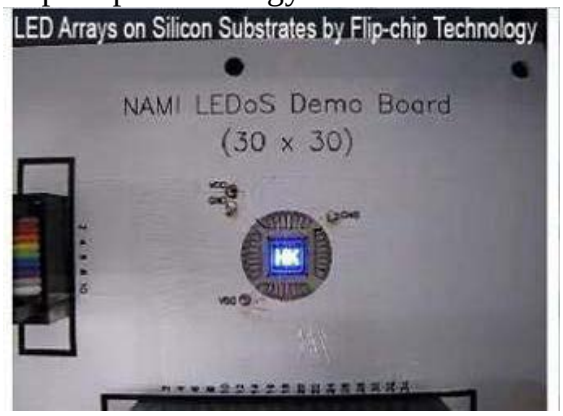
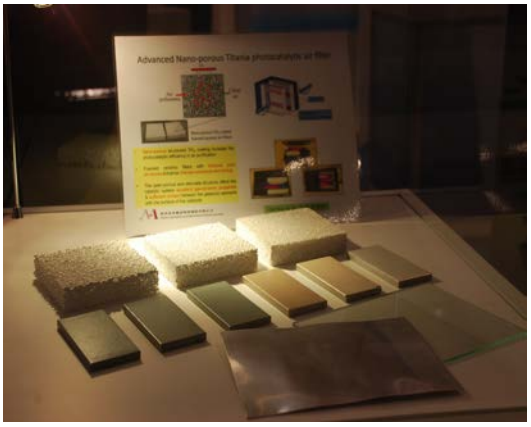
	2011-12	2012-13
Staffing	26.0	26.8
Accommodation	2.4	3.7
Equipment	0.5	2.9
Others	6.4	4.7
Total:	35.3	38.1

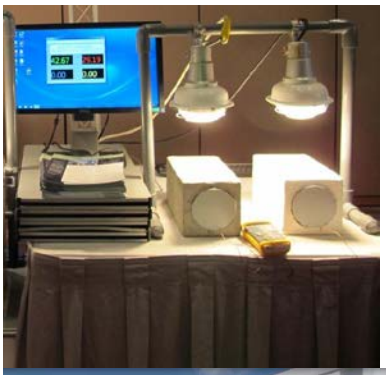
III. Industry Income Received (in $million)

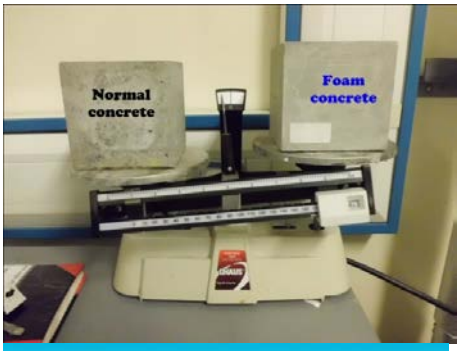
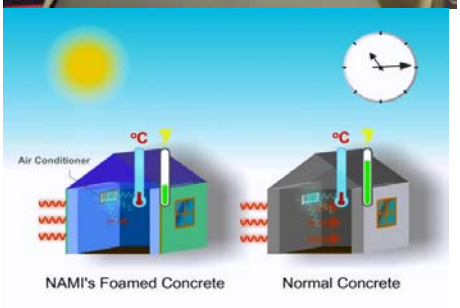
	2011-12	2012-13
Sponsorship for projects	7.57	21.30
Licensing/Royalty	-	0.35
Contract Services	0.11	1.43
Others	-	-
Total:	7.68	23.08

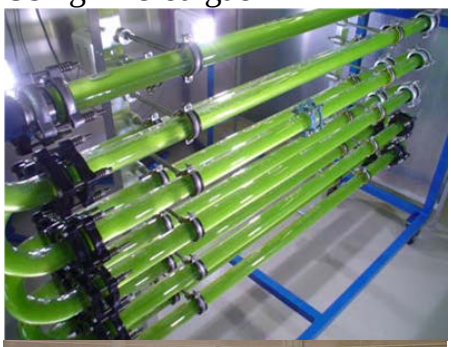
IV. Progress of Commercialisation and Use of R&D Deliverables in Public Sector

Project Name	Status / Progress
Development of Advanced Die Attach Adhesives with Nano-fillers/ Microcapsules for High Brightness LED 	A company has been granted a licence in April 2012 for using the technology. Another licensing agreement was signed in July 2012 with a sponsor using the project intellectual property rights (IPR) to develop thermal interface materials. The total upfront royalties received were $160,000. Apart from these, NAMI is also exploring further commercialisation with other companies that may apply this technology to their products.
Multifunctional Environmental Paint for Wooden Furniture Based on Organosilica Nanosol and Nanomaterial Additives   Combustion test proved its flame retardant property	NAMI developed a high performance environmental paint to replace existing solvent-based paints which may contain hazardous ingredients (e.g. volatile organic chemicals, heavy metals, etc.). The new generation paint with nanomaterial and functional additives offers technological superiority in water resistance, fire resistance, antibacterial capability, short drying time and functional tunability, as well as low cost manufacturing processes. One of the sponsors and some paint manufacturers have expressed interest in the product. Evaluation of the paint performance by them is underway. Negotiation is ongoing and commercialisation is planned for 2013.

Project Name	Status / Progress
LED Arrays on Silicon Substrates by Flip-chip Technology 	A non-exclusive licensing agreement was signed in August 2012. Commercial products would be launched in 2014. The technology is being further developed for display applications in addition to pico-projector. The associated development such as drivers, improved resolution, etc. will be considered.
Development for High Efficient Anti-Bacteria Porous Filters for Use in Air Purifiers 	Ownership of the project IPR has been transferred to a new industrial partner. The collaborative agreement was signed in October 2012 and the upfront royalties was received. The industrial partner is now working on the patent application. The product is expected to be launched to the commercial market in 2013.

Project Name	Status / Progress
Advanced Thermal Insulation Coating Material  	A VOC-free inorganic-based thermal insulation coating has been developed. Besides significant thermal insulation property, it also demonstrates an advantage in anti-bacterial, fire-resistant and wear-resistant properties. A non-exclusive licensing agreement was signed in August 2012 and upfront royalties of $150,000 was received. Commercialisation is expected in 2013.
Field Trial of Anti-bacteria Coating for Disinfection Applications 	A field trial of a NAMI developed anti-bacterial coating was conducted at a hospital in Hong Kong to evaluate its disinfection capability in a hospital environment. The trial, which will last for around 15 months, was commenced in early 2012 and will be completed within 2013. Evaluation is in progress.

Project Name	Status / Progress
Environment-friendly Mirror-like Coating on Steel and Zinc Alloy 	NAMI has developed a mirror-like coating on steel and zinc alloy. The coating is environment-friendly and has high potential to replace traditional electroplating. The coating's aesthetic and functional performance is comparable with traditional electroplating, without generating hazardous wastes during the coating process. A six-month public trial of the coating at Hong Kong Science Park is being planned, with the reliability tests to be conducted in parallel. The product is planned to be launched to the commercial market in 2014.
High Performance Cementitious Materials for the Construction of External Wall with Enhanced Thermal Insulation   	A light-weight cementitious material (foamed concrete) with proven thermal insulation property and strength has been developed. The durability of the foamed concrete can be further improved with the wrapping of a thin layer of light weight fiber reinforced cementitious composite. Building of a prototype by using the foamed concrete has been planned. The prototype will be in form of two demonstration rooms, one using the foamed concrete, and the other one using normal concrete. Difference in energy consumption between the two rooms will be monitored. The project is supported by the Hong Kong Housing Authority.

Project Name	Status / Progress
A Nano Preparation for the Topical Treatment of Limb Injuries 	A transdermal patch made by nanomization of Chinese herbal extracts has been developed. The patch demonstrated both in vitro and in vivo effects on bone fracture and soft tissue healing. An eighteen-month pilot clinical trial is being planned and a quality assurance system will be developed for maintenance of the products' standard.
A Photobioreactor for Air Treatment Using Microalgae  	With the coordination of the Highways Department, NAMI will install a trial demonstration at the Project Information Center of the Hong Kong-Zhuhai-Macao Bridge during the third quarter of 2013. The target of the proposal is to build a scheme of specifications and technology knowhow for large-scale photobioreactor tailor-made for the environment of Hong Kong, e.g. the Hong Kong section of Hong Kong-Zhuhai-Macao Bridge.

Project Name	Status / Progress
Development of Key Technologies for CIGS Solar Cells: H2Se-free Selenization and Precise Chemical Bath Deposition  	CIGS cell with target conversion efficiency has been developed. NAMI will continue to make improvements to the product. An 18-month public trial for the production and installation of CIGS solar systems at 3 to 5 public organisation sites is being planned.

Project Name	Status / Progress
Research on Multi-Junction Silicon-Based Thin Film Solar Cells for Conversion Efficiency Improvement   	This is the second NAMI-Du Pont Apollo collaborative project. Amorphous Silicon (a-Si) single-junction thin film solar cell with target conversion efficiency has been developed in the last collaborative project. Building on the technology and experience derived from the last project, the performance of a-Si thin film solar cell would be further enhanced by taking advantage of multi-junction solar cell architecture.

Details of the R&D projects undertaken by NAMI are available at *http://www.nami.org.hk/clb_rnd_e.html*.

Nano and Advanced Materials Institute
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