For discussion
on 16 September 2025

Legislative Council
Panel on Commerce, Industry, Innovation and Technology

Progress Report on Research & Development Centres

PURPOSE

This paper briefs Members on the operation of the Research and Development ("R&D") Centres under the purview of the Innovation and Technology Commission ("ITC") in 2024-25.

BACKGROUND

2. Since 2006, the Government has set up the following five R&D Centres to drive and coordinate applied R&D in the selected focus areas –

(a) Automotive Platforms and Application Systems R&D Centre ("APAS")[1];
(b) Hong Kong Applied Science and Technology Research Institute ("ASTRI")[2];
(c) Hong Kong Research Institute of Textiles and Apparel ("HKRITA");
(d) Logistics and Supply Chain MultiTech R&D Centre ("LSCM"); and
(e) Nano and Advanced Materials Institute ("NAMI").

3. In July 2024, the Finance Committee ("FC") of the Legislative Council ("LegCo") approved an allocation of $1,304.5 million from the Innovation and Technology Fund ("ITF") to support the operation of four R&D Centres[3] up to 31 March 2028.

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[1] APAS was incorporated into the Hong Kong Productivity Council ("HKPC") since 1 April 2025 and renamed as "Centre of Advanced Power and Autonomous Systems".

[2] ASTRI was established in 2000 and designated as the R&D Centre for Information and Communications Technologies in 2006.

[3] As APAS was incorporated into HKPC and HKPC was made responsible for APAS's operating expenditure since April 2025, APAS will continue to use the remaining approved commitment until it has been expended without the need for additional commitment.

4. In addition, to promote local R&D and innovation and technology ("I&T") development and to dovetail with the national strategy for technological development, the FC of LegCo approved in May 2024 the creation of a new commitment of $2,838.4 million under the ITF for the establishment and operation of the Hong Kong Microelectronics Research and Development Institute ("MRDI")

5. The R&D Centres play an important role in creating a vibrant I&T ecosystem. They act as a focal point for technology collaboration among the Government, industry, academia and research sectors. Not only do the R&D Centres contribute to the applied research in key areas, but also work closely with universities and the industry, encourage investment in R&D from private enterprises in Hong Kong with a view to enhancing their technological know-how and facilitating technology transfer and commercialisation, thereby championing new industrialisation in Hong Kong. The R&D Centres also enhance communications and cooperation with the Mainland (in particular Mainland cities of the Guangdong-Hong Kong-Macao Greater Bay Area ("GBA")) with a view to developing Hong Kong into an international I&T centre.

6. In addition, the R&D Centres actively participate in the Public Sector Trial Scheme ("PSTS") to promote the adoption of local technology products and services by public sector organisations. Throughout the years, the R&D Centres have nurtured a lot of research talents and received numerous international awards for their innovations[4], making significant contributions in consolidating and enhancing the capabilities of local scientific research teams.

LATEST OPERATION OVERVIEW OF THE R&D CENTRES

7. The ensuing paragraphs provide an operation overview of the R&D Centres[5] in 2024-25 on the following areas –

(a) operating expenditure and manpower;
(b) industry income and commercialisation; and
(c) R&D expenditure and projects.

(I) Operating Expenditure and Manpower

8. The operating expenditure and manpower of the R&D Centres are as follows –

[4] APAS, NAMI and LSCM have won a total of four Gold Awards and three Silver Awards at Edison Awards 2025, a global authoritative I&T award.

[5] MRDI was established in September 2024. Figures under Table 2 to 5 will be provided in the next year's progress report.

Table 1: Operating Expenditure and Manpower

	Operating Expenditure (in $ million)						Number of staff as at 31 March 2025
	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a)/ (a)]	
APAS	19.7	23.8	26.8	29.4	32.7	+11%	52
ASTRI	174.0	181.8	186.5	202.1	212.5	+5%	684
HKRITA	42.2	41.2	47.3	54.2	58.3	+8%	101
LSCM	45.6	66.6	52.7	70.8	86.7	+22%	212
NAMI	79.8	96.0	108.6	115.9	122.5	+6%	265
MRDI	N/A				24.2	N/A	20
Total:	**361.3**	**409.4**	**421.9**	**472.4**	**536.9**	**+14%**	**1 334**

(II) Industry and Other Income and Commercialisation

9. As the R&D Centres are platforms for coordinating applied research and facilitating technology transfer to the industry, it is very important to gauge the level of support from the industry for their work. Nevertheless, it is worth noting that in addition to conducting applied research in the focus areas, the R&D Centres also play an ancillary and platform role. For example, some R&D projects conducted by the R&D Centres are relatively upstream (exploratory in nature) and midstream R&D, which may still be a long way before reaching the commercialisation phase and take time to achieve outcome.

10. The industry and other income, commercialisation and other income, as well as the level of industry and other income of the R&D Centres are as follows –

Table 2: Industry and Other Income, Commercialisation and Other Income, and Level of Industry and Other Income[6]

	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a) / (a)]
APAS						
Industry and Other Income (in $ million)	28.5	26.6	28.3	26.0	38.9	+50%
Commercialisation and Other Income (in $ million)	2.2	3.4	12.5	13.5	10.1	-25%
Level of Industry and Other Income	41%	41%	47%	54%	48%	-6 percentage points

[6] Industry and other income includes industry contribution pledged in relation to ITF-sponsored R&D projects, other sources of financial contribution pledged, and commercialisation and other income. Commercialisation income includes contract service income, licensing fees and royalties. The sum may not add up due to rounding.

	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a) / (a)]
ASTRI						
Industry and Other Income (in $ million)	65.5	121.9	112.6	154.0	173.3	+13%
Commercialisation and Other Income (in $ million)	10.0	43.3	48.3	95.1	100.1	+5%
Level of Industry and Other Income	34%	50%	63%	65%	59%	-6 percentage points
HKRITA						
Industry and Other Income (in $ million)	23.6	26.5	63.4	26.6	38.0	+43%
Commercialisation and Other Income (in $ million)	5.6	13.0	39.4	11.4	23.5	+106%
Level of Industry and Other Income	31%	47%	103%	47%	80%	+33 percentage points
LSCM						
Industry and Other Income (in $ million)	52.6	31.1	33.9	38.6	79.5	+106%
Commercialisation and Other Income (in $ million)	24.1	21.1	14.4	17.1	41.3	+142%
Level of Industry and Other Income	65%	105%	60%	54%	88%	+34 percentage points
NAMI						
Industry and Other Income (in $ million)	55.4	65.6	55.3	58.7	61.3	+4%
Commercialisation and Other Income (in $ million)	17.8	14.1	14.6	21.8	20.1	-8%
Level of Industry and Other Income	42%	43%	35%	46%	51%	+5 percentage points
Total						
Industry and Other Income (in $ million)	**225.6**	**271.6**	**293.5**	**303.9**	**391.0**	**+29%**
Commercialisation and Other Income (in $ million)	**59.7**	**94.9**	**129.2**	**158.9**	**195.1**	**+23%**

Note: The level of industry and other income is calculated as follows –

$$\frac{\textit{Industry Contribution Pledged + Other Sources of Financial Contribution Pledged + Commercialisation and Other Income Received}}{\textit{Approved R\&D Project Expenditure}} \times 100\%$$

11. In 2024-25, the R&D Centres received $391 million industry and other income and $195.1 million commercialisation and other income in total. It can be seen in the above table that the industry and other income and commercialisation and other income received by the R&D Centres have increased by about 29% and 23% respectively as compared with that in 2023-24,

demonstrating that the R&D Centres have made some remarkable achievements in transferring R&D results. Since 2017-18, ITC has set a target of 30% on the level of industry and other income for the R&D Centres, and raised the target to 35% and 40% in 2023-24 and 2024-25 respectively. All R&D Centres have exceeded the 40% target in 2024-25. In view of the prevailing challenging economic environment, ITC will keep in view before exploring the possibility of raising the target further to 50% in the long run.

(III) R&D Expenditure and Projects

12. The R&D expenditure of the approved ITF-sponsored R&D projects of the R&D Centres is as follows –

Table 3: R&D Expenditure

	R&D Expenditure (in $ million)					
	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a)/ (a)]
APAS	49.9	77.9	70.9	79.7	70.7	-11%
ASTRI	333.2	298.7	284.6	318.4	350.5	+10%
HKRITA	59.2	68.8	67.5	72.9	73.2	+<1%
LSCM	86.7	112.4	145.4	171.5	128.8	-25%
NAMI	128.9	146.3	146.9	156.2	164.0	+5%
Total:	**657.9**	**704.1**	**715.3**	**798.7**	**787.2**	**-1%**

13. The number of new projects commenced and the relevant project cost of the R&D Centres are as follows –

Table 4: Number of New Projects Commenced and the Relevant Project Cost

	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a) /(a)]
APAS						
Number of new projects commenced	19 (6)	21 (4)	22 (3)	23 (1)	26 (3)	+13% (+200%)
Relevant project cost (in $ million)	101.6 (46.1)	87.1 (33.9)	82.6 (19.0)	81.9 (15.0)	114.4 (47.0)	+40% (+213%)
ASTRI						
Number of new projects commenced	34 (2)	42 (3)	45 (8)	40 (1)	49 (3)	+23% (+200%)
Relevant project cost (in $ million)	281.9 (14.3)	338.8 (17.3)	313.2 (43.6)	332.3 (6.4)	376.5 (16.2)	+13% (+153%)
HKRITA						
Number of new projects commenced	22 (4)	20 (1)	21 (3)	20 (4)	13 (6)	-35% (+50%)
Relevant project cost (in $ million)	87.5 (10.5)	77.0 (2.3)	86.0 (41.8)	71.3 (14.0)	49.7 (16.0)	-30% (+14%)

	2020-21	2021-22	2022-23	2023-24 (a)	2024-25 (b)	% change [(b) – (a) /(a)]
LSCM						
Number of new projects commenced	25 (4)	25 (1)	26 (3)	27 (2)	27 (8)	±0% (+300%)
Relevant project cost (in $ million)	145.4 (15.3)	147.6 (2.2)	149.1 (6.4)	153.0 (2.5)	145.8 (36.2)	-5% (+1348%)
NAMI						
Number of new projects commenced	42 (14)	52 (23)	42 (15)	44 (9)	41 (11)	-7% (+22%)
Relevant project cost (in $ million)	172.1 (50.5)	201.5 (74.4)	192.9 (45.5)	200.0 (29.5)	184.6 (46.4)	-8% (+57%)
Total						
Number of new projects commenced	**142 (30)**	**160 (32)**	**156 (32)**	**154 (17)**	**156 (31)**	**+1% (+82%)**
Relevant project cost (in $ million)	**788.5 (136.7)**	**852.0 (130.1)**	**823.8 (156.3)**	**838.5 (67.4)**	**871.0 (161.8)**	**+4% (+140%)**

Note: Figures in brackets denote projects in collaboration with industry partner(s) where the industry partner(s) should contribute at least 30% of the project cost.

14. In 2024-25, the R&D Centres commenced a total of 156 new R&D projects (including 31 collaborative projects), the relevant total project cost was $871 million (including $161.8 million for collaborative projects). Overall speaking, the R&D Centres have continued to work closely with the industry to carry out applied R&D projects that suit the needs of the industry.

15. An overview of on-going projects of the R&D Centres is as follows –

Table 5: Number of On-going Projects, Number of On-going Projects Involving Industry Participation, and Number of Companies Participating in On-going Projects

	As at 31 March 2021	As at 31 March 2022	As at 31 March 2023	As at 31 March 2024 (a)	As at 31 March 2025 (b)	% change [(b) – (a) /(a)]
APAS						
Number of on-going projects	67	72	82	93	108	+16%
Number of on-going projects involving industry participation	29	37	45	51	63	+24%
Number of companies participating in on-going projects	43	56	74	81	99	+22%
ASTRI						
Number of on-going projects	69	76	79	72	76	+6%
Number of on-going projects involving industry participation	34	39	40	32	37	+16%
Number of companies participating in on-going projects	91	90	91	76	91	+20%

	As at 31 March 2021	As at 31 March 2022	As at 31 March 2023	As at 31 March 2024 (a)	As at 31 March 2025 (b)	% change [(b) – (a) /(a)]
HKRITA						
Number of on-going projects	58	58	65	69	58	-16%
Number of on-going projects involving industry participation	46	43	47	51	44	-14%
Number of companies participating in on-going projects	98	94	109	115	99	-14%
LSCM						
Number of on-going projects	62	59	68	71	74	+4%
Number of on-going projects involving industry participation	31	30	35	35	47	+34%
Number of companies participating in on-going projects	88	78	79	68	88	+29%
NAMI						
Number of on-going projects	80	95	111	109	117	+7%
Number of on-going projects involving industry participation	49	65	76	62	63	+2%
Number of companies participating in on-going projects	73	95	117	105	96	-9%
Total						
Number of on-going projects	**336**	**360**	**405**	**414**	**433**	**+5%**
Number of on-going projects involving industry participation	**189**	**214**	**243**	**231**	**254**	**+10%**
Number of companies participating in on-going projects	**393**	**413**	**470**	**445**	**473**	**+6%**

Note: R&D project is the basic unit in the calculation of the relevant performance indicator, which means that a company participating in various projects concurrently is counted in terms of the number of its projects.

16. As at end-March 2025, there were 433 on-going projects (including 254 projects involving industry participation) under the R&D Centres and there were 473 companies participating in on-going projects. Overall speaking, many on-going projects involve industry contribution (either in cash or in kind) and participation, demonstrating that these projects could meet the needs of the industry.

REPORT ON INDIVIDUAL R&D CENTRES

17. The ensuing paragraphs elaborate the key activities and highlights of each R&D Centre in 2024-25.

APAS

18. Over the past several years, APAS has conducted numerous significant R&D projects, making substantial contributions to the advancement of automotive technology and smart city development in Hong Kong. APAS focuses its R&D efforts on four key areas: "Green Transportation", "Smart Mobility", "Intelligent Systems" and "Emerging Applications". Examples of major projects are summarised as follows –

(a) *Autonomous Air-ground Cooperative Tunnel Inspector* – This system integrates an unmanned aerial vehicle with an unmanned ground vehicle to autonomously navigate and capture images in tunnels without signals from the Global Positioning System. Leveraging artificial intelligence, the system detects defects from the captured images of tunnel internal structures and accurately localises them using the Hong Kong 1980 Grid System coordinates to facilitate maintenance operations. By eliminating the potential safety risks associated with traditional manual high-elevation inspections, the system significantly reduces inspection costs and time. The technology has been successfully implemented in the Trunk Road T2 project, whereas industry assessments confirm that the system achieves a 23-fold increase in operational speed compared to conventional inspection methods, while cutting inspection costs by half. The technology was awarded a Gold Award at Edison Awards 2025.

(b) *19-Seater Low-Entry Full Electric Light Bus* – This electric light bus is equipped with modular battery packs and intelligent driving systems, supporting both pantograph and plug-in charging methods. They are designed to replace existing liquefied petroleum gas-powered minibuses and comply with Euro VI emission standards, providing the industry with a cleaner, smarter, and more sustainable public transport solution.

(c) *In-Vehicle Life Presence Detection System* – This system employs millimeter-wave radar technology integrated with advanced artificial intelligence ("AI") algorithms, combining dynamic and micro-motion detection capabilities to identify vital signs of life—including limb movement, respiration, and heartbeat. The radar's penetration capability enables detection through clothing to identify children and pets, while real-time alerts are transmitted via Internet of Things ("IoT") connectivity, significantly enhancing passenger safety.

(d) *New Methanol Fuel Cell Intelligent Autonomous Delivery Platform* – This vehicle incorporates lithium battery hybrid power, four-wheel independent drive, and AI-driven autonomous driving technology, and features a 400 km range, an 800 kg payload capacity, and Level 4 autonomous driving capability. It is suitable for unmanned delivery and urban logistics, supporting Hong Kong's goal of achieving zero carbon emissions for vehicles.

(e) *Mobile 3-in-1 Hydrogen Refueling System* – Housing hydrogen production, storage, and refueling functions within a 20-foot standard container, this system enables on-demand production and rapid deployment. It offers significant space and cost savings compared to conventional fixed hydrogen refueling stations, with high mobility particularly suitable for temporary and remote locations.

19. On promoting commercialisation of R&D outcomes and technology transfer, APAS developed an intelligent taxi meter system for local taxi fleets and provides consultancy services on converting left-hand drive vehicles to right-hand drive. APAS also collaborated with a local delivery platform to develop an AI-driven driving behavior prediction system, which monitors via mobile app real-time high-risk behaviours such as sudden acceleration, harsh braking, illegal lane changes, and mobile phone usage, thereby enhancing road safety in Hong Kong. Additionally, APAS offers consultancy services to a Mainland high-end electric vehicle manufacturer on left-to-right-hand drive conversions and conducts comprehensive research on the differences between Mainland national standards for battery-swappable electric vehicle models and Hong Kong's current standards, aiming to reduce testing costs while meeting safety requirements.

20. On applying R&D outcomes for the benefit of the community, APAS, supported by the Hong Kong Auto Parts Industry Association, has launched industrial trials focused on stamping technologies for sandwich hybrid metal-plastic/fibre sheets and developed pre-heating mechanism for warming of sandwich sheets. Furthermore, APAS collaborates with the Hong Kong University of Science and Technology ("HKUST") on experimental projects jointly developing thermoplastic composite prepreg samples for racing car components.

21. On strengthening I&T collaboration, at the "New Energy Summit 2024" hosted by APAS, memorandums of understanding ("MoUs") were signed with the Hong Kong and China Gas Company Limited, the Hong Kong Polytechnic University, and other research partners, enhancing exchanges and cooperation in new energy and electric vehicle technologies. Moreover, APAS is jointly advancing electric vertical take-off and landing aircraft technologies with a Mainland automotive manufacturer and has formalised an MoU with the

Shandong Science and Technology Market, a Mainland technology service platform, to establish a regularised interface and collaboration framework providing professional support for Mainland enterprises in Hong Kong and international markets.

22. APAS's highlights and key activities in 2024-25 are set out in **Annex A**.

ASTRI

23. ASTRI drives Hong Kong's technological advancement through applied research, strengthening the competitiveness of its technology-based industries. ASTRI focuses its R&D efforts on six technology areas: "New Industrialisation and Intelligent Manufacturing", "Financial Technologies", "Digital Health", "Smart City", "Application-Specific Integrated Circuits" and "Metaverse". Examples of major projects include –

(a) *Intelligent Optical Precision Positioning System* – ASTRI has developed an edge AI system leveraging neural-like sensing and multispectral imaging technologies to identify hazardous areas, issue warnings, and prevent collisions by detecting fast-moving objects in complex environments. The system is currently being piloted in Hong Kong for applications in confined spaces access control and safe operation of heavy machinery. This technology, integrated with Optical Integrated Sensing and Communication, has led to the development of a millimeter-level accurate positioning system for MiC construction, enabling real-time positioning, alignment, path monitoring, and alert notifications for on-site workers and tower crane operators.

(b) *SoC Chip for Capsule Endoscopy* – It offers an image transmission rate over five times faster than existing market solutions. This advancement delivers clearer, more coherent images, and enables a smaller capsule size, significantly improving patient experience during gastrointestinal examinations. The SoC chip utilises a high-performance asymmetric radio frequency ("RF") transceiver system and advanced Low-density Parity Check ("LDPC") error correction code to ensure high-speed transmission of high-definition images with extremely low power consumption. ASTRI's partner is currently seeking National Medical Products Administration certification in China for the capsule product utilising this SoC design, with plans to launch it in the market.

(c) *Sn-Bi Alloy Solder Co-plating Technology for Low-Temperature 3D-IC Bonding* – ASTRI has developed an innovative bismuth alloy (Sn-Bi alloy) solder co-plating technology that enables 3D-IC bonding at temperatures below 200°C. This breakthrough technology uses an environmentally friendly electroplating additive, and is well-suited for high-volume industrial production of Sn-Bi alloy microbumps. ASTRI has partnered with a Mainland semiconductor company to provide Sn-Bi alloy microbump electroplating services. Several wafer samples have been completed and delivered for internal evaluation, with plans to explore further collaboration.

(d) *Efficient Data Storage Methods for Artificial Intelligence Computing* – Addressing the issues of high power consumption and high storage demands generated by computing, ASTRI has developed this technology that enhances AI computing performance through tailored compression and memory management solutions. The essence of this technology is the employment of a two-pronged approach: intelligent data compression to minimise energy consumption during memory reads and writes, and efficient memory reuse and allocation to optimise hardware resource utilisation. In large data centres, it significantly reduces energy consumption, while in IoT devices, it lowers storage requirements and extends battery life.

(e) *Mid-End Semiconductor Wafer Inspection System* – ASTRI's R&D team has developed a coaxial line-scanning spectral confocal technology with a resolution of 0.5 micrometre, capable of inspecting structures with aspect ratios of up to 18:1 or higher. Featuring innovative line-scanning software with an industry-leading processing speed of 10 000 frames per second, this technology integrates advanced optical principles, intelligent algorithms, and automated design. It meets most of the precision requirements in the mid-end semiconductor packaging process, enhancing quality control and production efficiency.

24. On promoting commercialisation of R&D outcomes and technology transfer, ASTRI has developed an Artificial Intelligence of Things ("AIoT") learning system for a local educational institution. This system analyses multimodal IoT data collected from classrooms to enable a one-to-many teaching model. It helps students with special educational needs and therapists improve learning and teaching efficiency and is currently being piloted in local schools and non-governmental organisations. In addition, ASTRI has developed a digital health technology solution to enhance the efficiency of patient care through monitoring the health of hospitalised patients. Wearable chest patch

sensors can collect and transmit patients' electrocardiogram ("ECG") data, movement data, and indoor location data to an AI analytical platform for real-time monitoring. When abnormalities in heart rate, falls, or ward departures are detected, the system immediately notifies the ward nurses for follow-up. The platform has already been piloted at Tin Shui Wai Hospital, where data is being collected to further enhance its performance. ASTRI has also transferred the relevant technologies to a local medical system provider to prepare for scaled-up adoption.

25. On applying R&D outcomes for the benefit of the community, ASTRI has signed an MoU with the Immigration Department to explore innovative technological solutions in four areas: innovative border control models, biometric authentication, artificial intelligence, and robotics technology. This aims to provide the public with more efficient and high-quality public services. Furthermore, ASTRI has signed an MoU with the Board of Directors of Pok Oi Hospital to collaborate on exploring innovative technologies development for the Pok Oi Hospital Tuen Mun Lam Tei Nursing and Residential Care Home for the Elderly Project. Scheduled for completion in 2027, the project is envisioned to become Hong Kong's largest smart care home, delivering enhanced efficiency and quality of elderly care services.

26. On strengthening I&T collaboration, the Shenzhen ASTRI office located in the Hetao Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone was officially opened in October 2024. The facility integrates research capabilities from both regions and enhances enterprise collaboration across the Greater Bay Area to deliver more cross-border R&D projects. Additionally, ASTRI has signed an MoU with the Federation of Malaysian Manufacturers to support Malaysia's digital transformation and business process enhancements across various industries in Malaysia leveraging ASTRI's smart manufacturing technologies. ASTRI also hosted the Tech Applied Summit, which convened over 40 global leaders from government, industry, academia, research, and investment sectors to explore generative AI, low-altitude economy, and smart cities. The Summit drew over 1 500 participants from multiple sectors.

27. ASTRI's highlights and key activities in 2024-25 are set out in **Annex B**.

HKRITA

28. HKRITA is dedicated to becoming a leading centre of excellence in research, development and technology transfer for the fashion and textile industry, driving continuous progress across the sector. HKRITA conducts R&D in four research areas - "New Materials, Textiles and Apparel Products",

"Advanced Textiles and Clothing Production Technologies", "Innovative Design and Evaluation Technologies", and "Enhanced Industrial Systems and Infrastructure". Examples of major projects are as follows –

(a) *Selective Separation and Recovery of Nylon from Textile Waste* – This technology operates under ambient conditions, resulting in low energy consumption. It enables a solvent reuse rate of up to 99.8%, thereby reducing both costs and environmental impact. The molecular chains of the recovered nylon fibre remain intact and the recycled nylon fibres retain a tensile strength exceeding 400 MPa, allowing the material to be reused in textile production without the need to add virgin nylon. Besides, the technology preserves the integrity of other fibres during the nylon separation process, allowing them to be individually recycled and enabling full recovery of blended textiles.

(b) *Mass Customisation of Breathable Lightweight Hip Protectors for the Elderly* – Developed using 3D printing technology, the hip protector features a lattice structure tailored to the body shape and pelvic contours of Asian individuals. Its thickness, surface area and hardness have been optimised to offer greater protection than conventional products. Designed to be both breathable and lightweight, it ensures enhanced comfort for the wearer.

(c) *Scalable Process Technology for PET Passive Cooling Fibre* – Passive radiative cooling is achieved using selected metal oxide particles and their particle-void structure, which are integrated into PET fibres. These fibres can reflect solar ultraviolet and visible light, enabling the cooling effect. This technology can significantly reduce heat stress for individuals working outdoors or engaging in high-intensity sports.

(d) *Smart Vest for Improving Behavioural Performance of School-aged Children with Attention-deficit/Hyperactivity Disorder* – The vest utilises machine learning and information fusion technologies to detect and analyse children's behaviour. When hyperactive movements are identified, it uses gentle vibrations to prompt children to self-regulate.

(e) *Soft Robotic Clothing: Automatic Thermal Adaptation* – The innovation automatically adapts to changes in ambient temperatures and activity levels, increasing insulation in cold conditions and reducing thermal resistance in warm environments, while maintaining exceptional breathability.

29. On promoting commercialisation of R&D outcomes and technology transfer, HKRITA signed a technology licensing agreement with a local uniform manufacturer for the "Development of Functional Chitosan Fibre Blended Knitted Fabrics". Products developed using this technology exhibit strong antibacterial and anti-pilling properties. HKRITA also signed another licensing agreement with a local functional outdoor apparel manufacturer for the "Decentralised Intelligent Platform for Made-to-Measure Mass Customisation", aimed at developing a direct-to-consumer intelligent service platform.

30. To scale up the adoption of technologies, "Open Lab", officially launched in September 2024, focuses on showcasing technological solutions, providing a collaborative platform, striving to solve problems and optimising resources, ultimately driving industry-wide transformation in response to climate change. To date, the "Open Lab" has received nearly 1 500 government and industry representatives, and has won the 2024 International Textile Manufacturers Federation Award in the International Collaboration category, as well as the Innovation and Creativity Award at the 2023-24 Hong Kong Awards for Industries. The "Open Lab" has also initiated cross-sector collaborations with ISS Facility Services Limited and Redress, recycling used garments and upcycling them into sustainable textile materials.

31. On strengthening I&T collaboration, HKRITA has signed MoUs with several leading research institutions in the Mainland, including the China Textile Academy and Donghua University, as well as Mainland industry leaders. In addition, HKRITA has jointly established the "Green Innotextile Base" with the Pudong New Force Incubator and Pudong-Hong Kong Institute for Technology Transfer and Innovation, promoting the development of new textile and apparel materials, circular economy initiatives and AI applications in the Yangtze River Delta region. HKRITA has also signed a tripartite framework agreement with HKUST and a global apparel manufacturer, to advance smart design, production optimisation, supply chain management, quality inspection, smart wearables, etc.

32. HKRITA's highlights and key activities in 2024-25 are set out in **Annex C**.

LSCM

33. LSCM focuses on the development and application of diverse technologies for flows of personnel, materials, capital and data, with a view to addressing the applied R&D requirements of small and medium-sized enterprises across various industries in Hong Kong and the Mainland. Additionally, it facilitates Government bureaux/ departments and public organisations in the adoption of innovative technologies. The main R&D areas of the centre include "Infrastructure Information Technology System", "IoT and Radio Frequency Identification Technology", "Location-based Service Technology", "Logistics

and Supply Chain Analytics and Applications", "Supply Chain Security" and "Financial Services and e-Commerce Technology". Examples of major projects are as follows –

(a) *Port Community System* – Serves as a data intelligence infrastructure and cross-enterprise software platform that offers a one-stop, all-weather solution for real-time tracking of transportation information. It connects maritime, land, and air transport data, and provides value-added electronic services such as alert functions and the "Single Submission for Dual Declaration" feature. This system promotes data interoperability and sharing, thereby enhancing Hong Kong's competitiveness in the shipping industry (for details, please see LegCo Paper CB(3)257/2025(05)).

(b) *Smart Robotics Coordination System for Hospital Logistics* – Includes autonomous mobile robots and robot management system. The robot can be applied in various sizes and types of cargo carts, while the robot management system can coordinate different types of robots to move in complex environments, assisting hospital staff in transporting heavy items. The pilot trial is conducted at Tseung Kwan O Hospital to assist Hospital Authority ("HA") in developing smart hospitals in Hong Kong.

(c) *Robo-9: with Multi-Sensor Fusion Technologies for Visually Impaired* – LSCM developed a robot with vision and sensing solution for obstacles avoidance and navigation similar to guide dogs. Besides, Robo-9 utilised simultaneous locationing and mapping technology to gather surrounding environment information by using sensors, thereby planning the best route for the users. Robo-9 has been in trial at local schools for the blind and elderly care centers, with plans to expand to other large indoor venues such as exhibition centers and shopping malls in the future. This helps enhance the mobility independence of visually impaired individuals. This application was awarded a Gold Award at Edison Awards 2025.

(d) *Multiple Input Energy Harvesting Integrated Circuit using Silicon-On-Insulator Technology* – LSCM developed a micro energy harvesting integrated circuit using silicon on insulator technology. This energy harvesting chip supports various energy collection methods, including radio frequency energy, optical energy, and kinetic energy. Leveraging its high transition frequency, low current leakage, and versatility in energy collection, this chip is suitable for a range of small battery or battery-free devices available in the market. It addresses the industry's demand for low-cost, single-chip solutions that can accommodate multiple input harvesting methods.

(e) *Development of satellites and integrated remote sensing technologies for near real-time landslide monitoring* – LSCM collaborated with The Chinese University of Hong Kong to develop a small optical satellite and integrated remote sensing technologies with deep learning analysis for near real-time landslide monitoring to improve the slope safety of Hong Kong and major infrastructures in Southwest China. In addition to landslide monitoring, preliminary research is conducted in the fields of smart traffic monitoring and land management based on satellite data to assess their broad application potential. The results of this project provided professional remote sensing processing and service systems for government, education, research, and industry sectors.

34. On promoting commercialisation of R&D outcomes and technology transfer, LSCM assisted HA and a local property services company with electronic power assist trolley system to enhance employee safety and productivity. Additionally, LSCM licensed a virtual reality content creator suite runtime to a local company in this field for developing training content and scenarios.

35. On applying R&D outcomes for the benefit of the community, LSCM continued to assist the Hong Kong Council of Social Service in optimising the Tele-practice System. LSCM also collaborated with a local property management company to provide smart service robots for residents of light public housing, fostering the adoption of gerontechnology. Furthermore, LSCM collaborated with the Department of Health and HA to advance the "eMed" (Care Home) scheme under the "eHealth+" initiative. This effort is designed to improve drug management systems and procedures in residential care facilities, ensuring the safety and convenience of medication intake for residents.

36. On strengthening I&T collaboration, LSCM organised the annual "LSCM Logistics Summit", during which it signed MoUs with several institutions, including the Guangzhou Institute of Software Application Technology and the China Electronics Joint Innovation Research Institute. Additionally, LSCM hosted the "LSCM Maritime Summit" at the "Asian Logistics, Maritime and Aviation Conference", where it also entered into MoUs with multiple logistics companies.

37. LSCM's highlights and key activities in 2024-25 are set out in **Annex D**.

NAMI

38. NAMI focuses on market-driven R&D of nanotechnology and advanced materials, dedicated to promoting technological advancement, commercialisation, and new industrialisation in related industries in Hong Kong and the Mainland, benefitting the industry and society, and cultivating world-class scientific research talents in nanotechnology and advanced materials, thereby driving economic growth and sustainable development in Hong Kong. NAMI conducts R&D in areas including "Battery and Electronic Materials", "Sustainable Building and Low-Carbon Materials", "Functional Polymers and Biomaterials" and "Advanced Coatings and New Materials for Air and Water Treatment". Examples of major projects are as follows –

(a) *"MiSmartLink" Wall Connection System* – Simplified how the concrete walls are connected, making the construction process faster and more efficient, reducing construction complexity, and increasing usable indoor space (for details, please see LegCo Paper CB(1)730/2025(02)). NAMI has signed an MoU with the Housing Bureau, and it is expected the technology be applied earliest in the public housing project in Kwu Tung North New Development Area.

(b) *Nanocurtain: Energy-Saving Transparent Window Coating* – Blocks 50% harmful solar radiation while allowing 60% natural light to pass through, with a reflectance of less than 6%, reducing glare, maintaining sufficient indoor light, and effectively lowering indoor temperatures, thereby saving energy for air conditioning and lighting. The coating can be applied on windows of various shapes. The technology won a Gold Award at Edison Awards 2025.

(c) *Biodegradable Reusable Cutlery* – With ≥90% bio-based content, low carbon, biodegradable, can withstand 125 wash cycles in dishwater safety test, more durable and sturdy than currently available degradable plastic cutlery. The cutlery sets were trialed at the AsiaWorld-Expo, local coffee chains, and schools. This technology won a Gold Wward at Edison Awards 2025.

(d) *PAPEL+™: Water-Resistant, Oil-Resistant, Germ-Repellent Coating for Paper Packaging* – An advanced plastic-free varnish for food paper packaging with excellent water- and oil-resistance along with germ repellency. This varnish prevents bacterial contamination and is certified for 100% repulpable, providing a safe and environmentally friendly alternative to traditional plastic-lined paper packaging. This technology won a Silver Award at Edison Awards 2025.

(e) *Safe and Non-Flammable Electric Vehicle Battery* – Use non-flammable, in-situ formed quasi-solid electrolytes, providing 10 times extended cycle life under 45°C and 4.5 V high temperature high voltage cycling, and more than 30°C thermal stability improvement over liquid counterpart. This technology won a Silver Award at Edison Awards 2025.

39. On promoting commercialisation of R&D outcomes and technology transfer, 510 air purifiers equipped with plasma-driven catalysts developed by NAMI were installed in Kai Tak Sports Park, saving 90% of energy and over 70% of space, reducing by-products such as wastewater and chemical residues, and are more effective in converting toxic compounds into carbon dioxide and water, significantly improving air quality and providing a healthier environment for performers and visitors. In addition, NAMI's industry partner had completed an initial trial production of nano-curcumin supplement in Hong Kong. The supplement was developed with NAMI's innovative hydrophobic substance solubilisation technology, overcoming the traditional curcumin absorption bottleneck, allowing the curcumin to more effectively exert its antioxidant, anti-inflammatory, and other health benefits, fully supporting joint, cardiovascular, immune, and cognitive health.

40. On applying R&D outcomes for the benefit of the community, NAMI collaborated with the Yau Tsim Mong District Office and District Council to jointly implement the "Yau Tsim Mong Scientific and Technological Repair Plan for Exposed Reinforcement", using NAMI's repair mortar materials to address issues of ceiling concrete spalling and exposed reinforcement in units of households in need. In addition, NAMI has signed an MoU with the MTR Corporation to jointly develop sustainable building materials for maintaining civil structures of tunnels; and advanced materials related to public health, enhancing passenger health and safety.

41. On strengthening I&T collaboration, NAMI has proactively visited the Mainland and Southeast Asia, including visits to Suzhou Industrial Park, a series of enterprises in Shanghai, the Suzhou Institute of Nano-Tech and Nano-Bionics of the Chinese Academy of Sciences, the Ministry of Science, Technology and Innovation of Malaysia, NanoMalaysia, etc. In addition, NAMI co-hosted a luncheon with the Federation of Hong Kong Industries to introduce its innovative materials technology. Moreover, NAMI organised the "NAMI Innovation and Award-Winning Technology Recognition Conference" to showcase how its several award-winning technologies have transitioned from the laboratory to the market.

42. NAMI's highlights and key activities in 2024-25 are set out in **Annex E**.

MRDI

43. MRDI was established in September 2024, and has set up its Head Office, formed a core technical team, and progressively awarded contracts for pilot lines equipment. MRDI's R&D Division is expected to gradually move into the Microelectronics Centre at Yuen Long InnoPark from October 2025, with the aim to commission the pilot lines in 2026 after installation and tuning. MRDI's key priorities in 2025-26 include proper setup of the pilot lines, recruitment and nurturing of talent (particularly R&D staff) to build a high-performing team, establishment of partnerships with local universities and renowned semiconductor companies in Mainland and overseas; launching semiconductor-related R&D projects, which include baseline process integration based on advanced equipment and new process development; AI-assisted process design and device architecture innovation; devices incorporating new materials and process innovation; and exploration of cutting-edge technology such as heterogeneous integrated packaging. The aim is to establish MRDI's comprehensive R&D capabilities across devices, processes, packaging, testing and modules. MRDI will also collaborate closely with partnering suppliers to assist them in optimising materials and equipment to meet the technical demands of next-generation chips.

WAY FORWARD

44. Further to the announcement at the meeting of Panel on Commerce, Industry, Innovation and Technology in June 2024 that APAS would be incorporated into HKPC, the Government has also announced in November in the same year that ASTRI and NAMI would merge. ITC has commissioned an independent consultant to make preliminary suggestions on the transitional arrangements and implementation plan on the merger, and established a transition taskforce, comprising the chairpersons and some directors of the Boards of the two centres as well as the Commissioner for Innovation and Technology, to provide steer on all sorts of matter in relation to the merger, with view to implementing the merger in April 2026.

45. Furthermore, the Government expects HKRTIA and LSCM to gradually transform into R&D Centres that are primarily supported by the industry. From 1 April 2028 onwards, while the Government will continue to support the two centres in commencing R&D projects in accordance with existing arrangement, their operating expenditure will no longer be supported by the Government. The Government has been in close liaison with the Board of directors and management of the two centres to assist them in devising plans to achieve financial independence.

MONITORING MECHANISM

46. We will closely monitor the operation and performance of the R&D Centres, and will continue to submit the R&D Centres' progress report to the Panel on Commerce, Industry, Innovation and Technology regularly. As a standard practice, the R&D Centres are required to submit the following documents for approval by their respective Board of Directors and ITC every year –

(a) an annual plan of the R&D Centre (including the annual R&D plan, expenditure budget and performance indicators);

(b) quarterly/ annual reports on their operation (including the major activities, manpower and expenditure position); and

(c) annual audited accounts of the R&D Centre's operation and its R&D projects.

ADVICE SOUGHT

47. Members are invited to note the latest progress of the R&D Centres.

Innovation, Technology and Industry Bureau
Innovation and Technology Commission
September 2025

Annex A

Automotive Platforms and Application Systems Research and Development Centre ("APAS")
Operation Overview in 2024-25

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

	2023-24			2024-25		
	Number of new projects	Project cost	Industry contribution	Number of new projects	Project cost	Industry contribution
Platform[1]	9	33.5	5.0	11	33.6	5.0
Collaborative[2]	1	15.0	7.5	3	47.0	23.7
Seed[3]	12	31.6	N/A	9	24.1	0.1
Public Sector Trial Scheme ("PSTS")[4]	1	1.8	N/A	3	9.7	N/A
Total:	23	81.9	12.5	26	114.4	28.8

II. Operating Expenditure (in $ million)

	2023-24	2024-25
Manpower	18.3	19.7
Accommodation	4.0	4.1
Equipment	1.5	1.2
Others	6.5	8.5
Less: Project administrative overheads	(0.9)	(0.7)
Total:	29.4	32.7[5]

[1] Platform projects require industry contribution of at least 10% of the total project cost.

[2] Collaborative projects require industry contribution of at least 30% of the total project cost.

[3] Seed projects are more forward-looking and exploratory in nature. No industry contribution is required.

[4] PSTS projects do not require industry contribution.

[5] The sum may not add up due to rounding.

III. Industry and Other Income (in $ million)

	2023-24	2024-25
Industry Contribution	12.5	28.8
Licensing/Royalty	0.4	0.4
Contract Services	0.1	0.5
Others	13.0	9.2
Total:	26.0	38.9
Approved R&D Project Expenditure:	48.5	80.6
Level of Industry and Other Income:	54%	48%

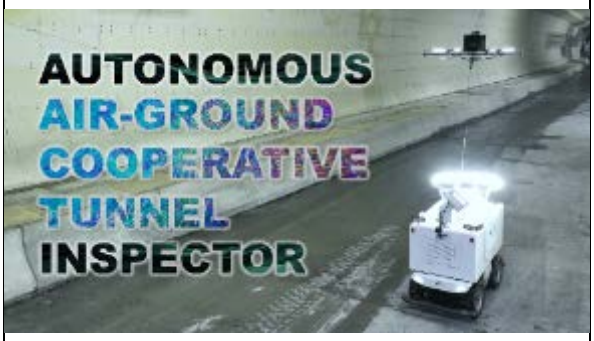
IV. Other Performance Indicators

	2023-24	2024-25
Number of Organisations Benefitting from PSTS[6]	15	17
Number of Researchers Engaged under Research Talent Hub	115	116
Number of Patents Filed	10	26
Number of Patents Granted[7]	16	20

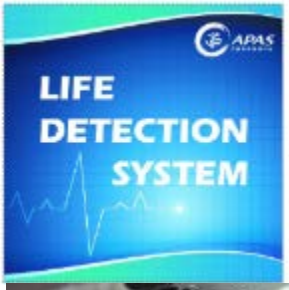
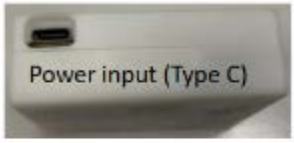
[6] R&D project is the basic unit in the calculation of the relevant performance indicator, which means that an organisation benefitting from various projects concurrently is counted in terms of the number of projects from which it benefitted.

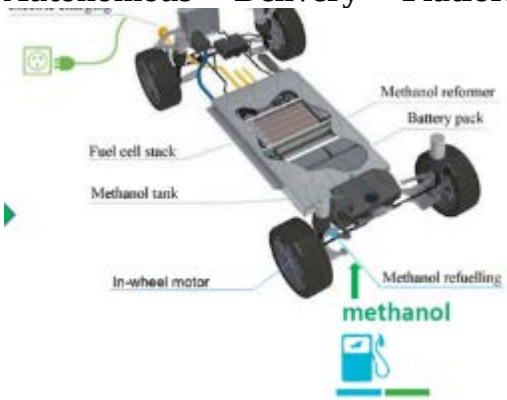
[7] As the patent approval process takes time, the patent applications filed may not be granted within the same year.

V. Highlights and Key Activities in 2024-25

Highlights/Key Activities	Status/Progress
1. Autonomous Air-ground Cooperative Tunnel Inspector  	APAS has developed an advanced air-ground cooperative tunnel automated inspection system that integrates unmanned ground vehicle and unmanned aerial vehicle technologies. Utilising simultaneous localisation and mapping algorithms, the system enables centimetre-level accurate positioning in tunnels without signals from the Global Positioning System ("GPS"). Through edge computing and artificial intelligence ("AI"), the system automatically analyses structural images of tunnels and detects defects, precisely georeferencing them within the Hong Kong 1980 Grid Coordinate System, thereby significantly improving maintenance efficiency. As the world's first air-ground cooperative tunnel automated inspection system, it has been successfully implemented in the Trunk Road T2 project. Industry assessments confirm that the system achieves a 23-fold increase in operational speed compared to conventional inspection methods, while cutting inspection costs by half. The innovation has earned prestigious recognition, including a Gold Award at the prestigious global Edison Awards 2025, and a HKMA/HKT Silver Award in 2025. This system breaks new ground by overcoming the challenge of high-precision localisation in GPS-denied environments, effectively eliminating the safety hazards inherent to traditional manual high-elevation inspections. Supported by a multi-robot cooperative framework, it facilitates fully automated, all-weather inspection operations. Furthermore, its AI-driven analytical platform delivers real-time identification of structural defects, establishing a new benchmark for infrastructure maintenance in Hong Kong.

Highlights/Key Activities	Status/Progress
2. 19-Seater Low-Entry Full Electric Light Bus 	APAS developed a 19-seater low-entry full electric light bus solution designed to provide Hong Kong with a cleaner, smarter, and more sustainable public transport alternative. This solution aims to replace the existing liquefied petroleum gas minibuses, which do not comply with the forthcoming Euro VI emission standards. The system supports both pantograph fast-charging and plug-in charging interfaces, modular battery configurations and an intelligent driving system to optimise operational efficiency while minimising environmental impact. The project was honoured with the Outstanding Award in the Green Transportation Innovation and Technology category at the 2025 Hong Kong Sustainable Development Innovation Technology Awards.

Highlights/Key Activities	Status/Progress
3. In-Vehicle Life Presence Detection System    	APAS developed an advanced in-vehicle life presence detection system leveraging AI-enhanced algorithms. This system is equipped with highly sensitive millimeter-wave radar sensors and integrates state-of-the-art sensing technologies. It integrates both dynamic motion detection and micro-movement sensing capabilities, effectively capturing large-scale movements of the torso and limbs, as well as subtle chest movements associated with respiration and heartbeat during stationary conditions. Through AI-enhanced algorithms, the system can accurately detect the presence of children and pets even when concealed beneath thin clothing or blankets. Moreover, it can classify detected occupants by analysing biometric parameters, vital signs of life, and other distinguishing parameters. Enabled by Internet of Things ("IoT") connectivity, the detection data is wirelessly transmitted via a mobile application to promptly alert concerned personnel, thereby markedly improving child passenger safety. This project was recognised with the 2024 World Internet of Things Exposition New Technology, New Product, New Application Selection – Innovation Award.

Highlights/Key Activities	Status/Progress
4. New Methanol Fuel Cell Intelligent Autonomous Delivery Platform  	APAS has pioneered the development of an autonomous delivery platform powered by methanol fuel cell technology, achieved through the integration of advanced systems including a lithium-ion battery hybrid powertrain, four-wheel independent motor drive control, and a multi-sensor fusion AI-based autonomous driving platform. This innovative platform delivers a driving range of 400 kilometres, a payload capacity of 800 kilograms, rapid fuel refilling capability, and Level 4 autonomous driving functionality. The technology is applicable to last-mile delivery services, continuous 24-hour unmanned delivery operations, and urban logistics transportation. By deploying this technology, carbon-neutral mobility and zero-emission transportation can be realised, alongside reductions in labour costs, alleviation of traffic congestion, and enhancements to public health and urban environment. This advancement effectively supports Hong Kong's commitment to achieving zero vehicle carbon emissions by 2050.

Highlights/Key Activities	Status/Progress
5. Mobile 3-in-1 Hydrogen Refueling System 	APAS's innovative mobile hydrogen energy system seamlessly integrates hydrogen production, storage, and refueling functionalities within a standardised 20-foot mobile container. This design enables immediate on-site, on-demand hydrogen generation and utilisation, facilitating rapid deployment. Compared to conventional fixed hydrogen refueling stations, the integrated system effectively eliminates spatial inefficiencies and reduces high construction costs associated with dispersed equipment, thereby significantly optimising space utilisation. Its high level of mobility and transportability renders it particularly suitable for temporary installations and locations lacking established hydrogen refueling infrastructure. In 2024-25, the project was selected for inclusion in the national-level "中國好技術" 項目庫（B類）and awarded the prestigious title of "中國好技術". It also won the "Green Energy Innovation & Technology–Outstanding Award" under the "2025 Hong Kong Sustainable Development Innovation and Technology Awards".

Highlights/Key Activities	Status/Progress
6. AI-Driven Driving Behaviour Prediction System 	APAS has partnered with a local delivery platform to jointly develop an AI-Driven Driving Behaviour Prediction System that integrates machine learning, sensor technology, and cloud computing. This system monitors high-risk driving behaviours in real time via mobile devices, including harsh acceleration, harsh braking, illegal lane changes, and mobile phone usage while driving. Equipped with a cloud-based real-time analytics and risk alert function, the system also features a comprehensive driver scoring mechanism to encourage safer driving habits, while embedding privacy protection measures by design. This project not only enhances road safety standards in Hong Kong but also serves as a demonstration model, providing a replicable operational framework for the delivery platform's expansion into 14 markets across Asia, Latin America, and Europe.

Highlights/Key Activities	Status/Progress
7. New Energy Summit 2024  	APAS convened its annual flagship event, the "New Energy Summit 2024 – Powering Tomorrow: Exploring the Frontiers of New Energy", which brought together industry elites from both local and overseas sectors to collectively explore future trends in new energy. The forum facilitated the sharing of the latest technological advancements and commercial prospects, and featured in-depth discussions on sustainability and a range of clean energy technologies, aimed at advancing the development of the new energy industry. During the event, APAS unveiled the New Energy Hall and formalised collaboration through the signing of Memorandums of Understanding ("MoUs") with The Hong Kong and China Gas Company Limited, The Hong Kong Polytechnic University, and research partners. These agreements served to further enhance technical exchange and cooperation in the fields of new energy and electric vehicles. A series of keynote speeches were delivered by invited industry experts from the Mainland and abroad, covering the application and future development of alternative energies, including hydrogen. Two panel discussions, featuring "Exploring the Potential of Hydrogen as a Clean Energy Solution" and "Accelerating the Transition to Clean Energy: Opportunities, Challenges, and Strategies", provided in-depth analyses of current energy transition prospects and practical implementation strategies. The event was attended by over 300 industry professionals, who collectively shared insights on the latest developments and commercial prospects in new energy, Hong Kong's carbon reduction policies, as well as the development of new energy vehicle markets in Mainland China and the world. Participants also explored the various challenges and opportunities encountered in promoting these emerging technologies.

Highlights/Key Activities	Status/Progress
8. Collaboration with Mainland Technology Service Platform Shandong Science and Technology Market 	An MoU has been formalised with the Mainland technology service platform, Shandong Science and Technology Market, to establish a regularised interface and collaboration framework. This aims to provide Mainland enterprises with professional support in their development in Hong Kong and international markets, including consultative services on technology transfer, technology commercialisation, and business expansion strategies, thereby facilitating the internationalisation and global scaling of Mainland science and technology innovation enterprises.
9. Promoting the Development of Electric Vertical Take-off and Landing (eVTOL) Aircraft Technology in Collaboration with Mainland Automotive Manufacturers 	APAS successfully completed the handover of a demonstration eVTOL aircraft in partnership with mainland automotive manufacturers. The collaboration will further accelerate the development of related technologies, including the joint development of a low-altitude airspace simulation platform, active participation in regulatory sandbox pilot programmes, advocacy for low-altitude airspace regulatory standardisation, ecosystem co-development, and the promotion of multi-scenario operational deployment. These efforts aim to expedite technological breakthroughs in urban air mobility, adaptive regulatory frameworks, standardisation processes, and commercialisation pathways for the related technology.

Highlights/Key Activities	Status/Progress
10. Provision of Technical Support to Local Taxi Fleets 	APAS developed a smart taxi meter system specifically engineered for local taxi fleets and delivered consultancy services for the conversion of left-hand drive vehicles to right-hand drive configuration. This vehicle model obtained type approval from the Transport Department in May 2025. As of July 2025, the smart metre system has been successfully installed in 100 taxis.

Annex B

Hong Kong Applied Science and Technology Research Institute ("ASTRI")
Operation Overview in 2024-25

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

	2023-24			2024-25		
	Number of new projects	Project cost	Industry contribution	Number of new projects	Project cost	Industry contribution
Platform[1]	18	254.3	55.9	22	285.4	65.6
Collaborative[2]	1	6.4	3.2	3	16.2	8.1
Seed[3]	18	50.3	N/A	21	57.5	N/A
Public Sector Trial Scheme ("PSTS")[4]	3	21.3	N/A	3	17.4	N/A
Total:	40	332.3	59.1	49	376.5	73.7

II. Operating Expenditure (in $ million)

	2023-24	2024-25
Manpower	116.7	124.3
Accommodation	32.5	36.4
Equipment	4.2	5.5
Others	48.7	46.3
Total:	202.1	212.5

[1] Platform projects require industry contribution of at least 10% of the total project cost.

[2] Collaborative projects require industry contribution of at least 30% of the total project cost.

[3] Seed projects are more forward-looking and exploratory in nature. No industry contribution is required.

[4] PSTS projects do not require industry contribution.

III. Industry and Other Income (in $ million)

	2023-24	2024-25
Industry Contribution	59.1	73.7
Licensing/Royalty	3.5	2.4
Contract Services	64.0	63.9
Others	27.5	33.3
Total:	154.0[5]	173.3
Approved R&D Project Expenditure:	237.8	292.7
Level of Industry and Other Income:	65%	59%

IV. Other Performance Indicators

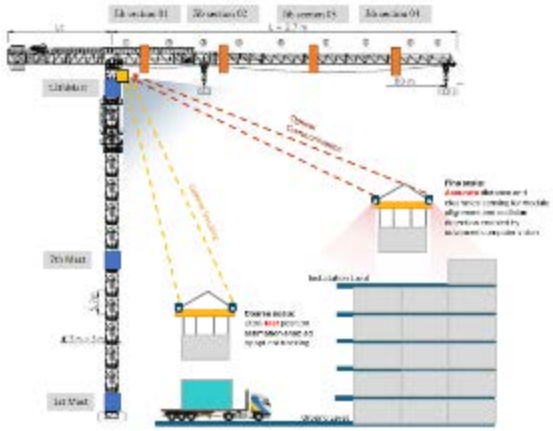
	2023-24	2024-25
Number of Organisations Benefitting from PSTS[6]	9	11
Number of Researchers Engaged under Research Talent Hub	157	152
Number of Patents Filed	60	66
Number of Patents Granted[7]	69	47

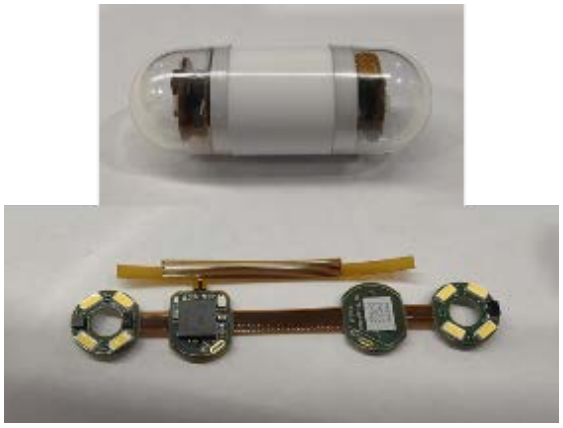
[5] The sum may not add up due to rounding.

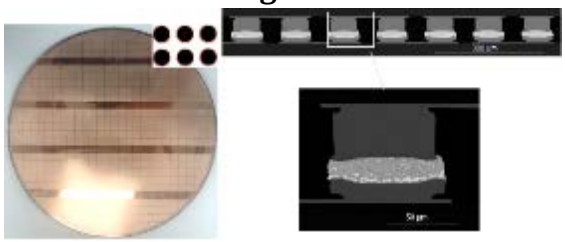
[6] R&D project is the basic unit in the calculation of the relevant performance indicator, which means that an organisation benefitting from various projects concurrently is counted in terms of the number of projects from which it benefitted.

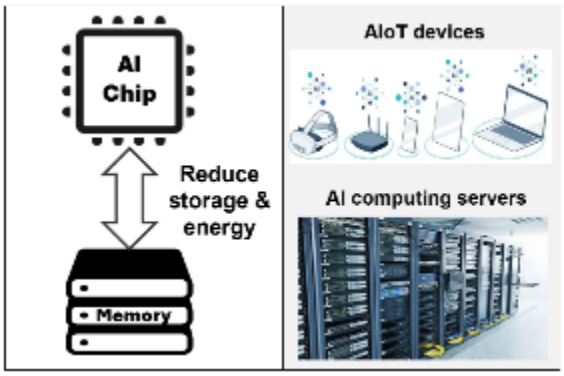
[7] As the patent approval process takes time, the patent applications filed may not be granted within the same year.

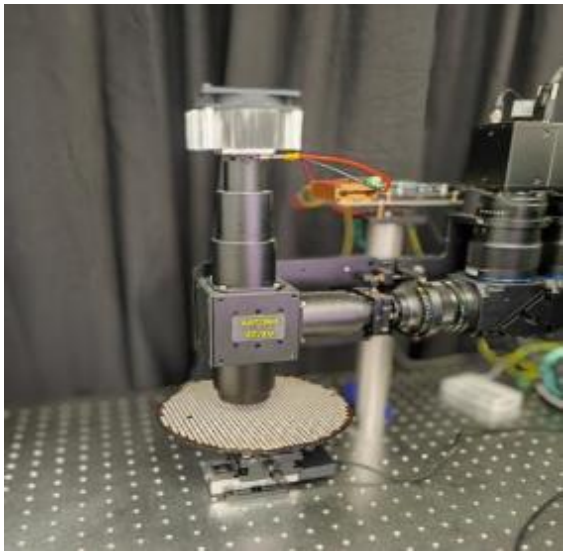
V. Highlights and Key Activities in 2024-25

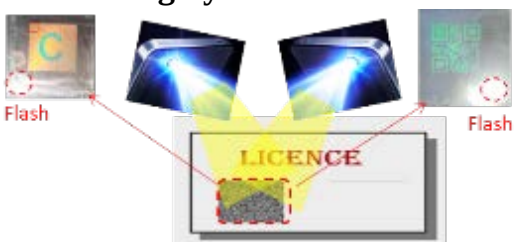
Highlights/Key Activities	Status/Progress
1. Intelligent Optical Precision Positioning System 	ASTRI has developed an edge artificial intelligence ("AI") system leveraging neural-like sensing and multispectral imaging technologies to identify hazardous areas, issue warnings, and prevent collisions. Designed to complement existing solutions, the system excels in detecting fast-moving objects in complex environments. The system is currently being piloted in Hong Kong for applications in confined spaces access control and safe operation of heavy machinery. This technology, integrated with Optical Integrated Sensing and Communication, has led to the development of a millimeter-level accurate positioning system for Modular Integrated Construction ("MiC") construction, enabling real-time positioning, alignment, path monitoring, and alert notifications for on-site workers and tower crane operators.

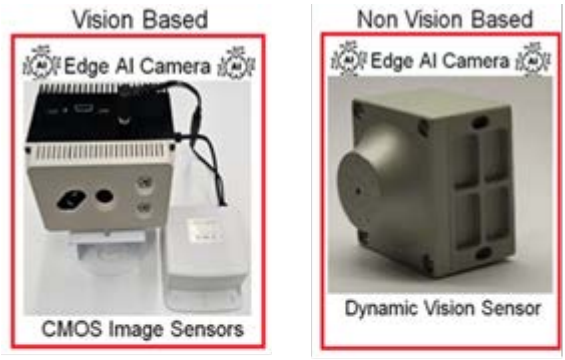
Highlights/Key Activities	Status/Progress
2. SoC Chip for Capsule Endoscopy 	ASTRI is partnering with a medical device company to develop a system-on-chip ("SoC") designed for high-speed data transmission within the human body. This SoC will be utilised in capsule endoscopes, offering a safer and more comfortable solution for gastrointestinal examinations. This highly integrated chip features a high-performance asymmetric radio frequency ("RF") transceiver system and advanced low-density parity-check ("LDPC") error correction code, enabling high-definition images transmission at high speeds with extremely low power consumption. This technology received a Bronze Award at the 2024 Hong Kong ICT Awards; while its associated AI-powered automated detection technology earned a Silver Medal at the 50th International Exhibition of Inventions Geneva in 2025. The partner is currently seeking National Medical Products Administration certification in China for the capsule product incorporating this SoC design. Plans are underway for mass production, paving the way for a new generation of capsule endoscopy products.

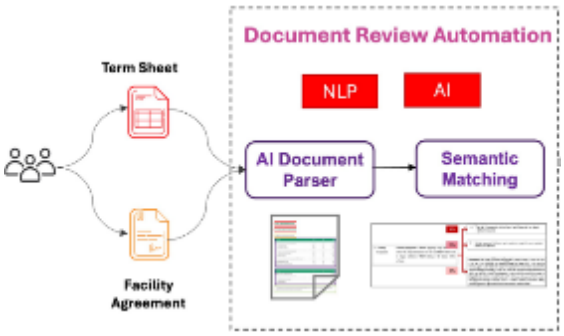
Highlights/Key Activities	Status/Progress
3. Sn-Bi Alloy Solder Co-Plating Technology for Low-Temperature 3D-IC Bonding 	The progression of Moore's Law is increasingly hindered by physical limitations, making wafer manufacturers to shift focus from advanced nanofabrication processes to innovative 3D-IC packaging technologies. While tin-lead alloy solder, with a melting point of 183°C, has been widely used, its environmental toxicity has led to a ban. Alternative tin alloy solders typically have melting points exceeding 200°C, presenting challenges for low-temperature bonding. To address this, ASTRI has developed an environmentally-friendly electroplating method that utilises a novel additive to produce tin-bismuth ("Sn-Bi") alloy microbumps. This enables 3D-IC bonding at a temperature below 200°C, optimised for high-volume industrial production. This breakthrough technology was awarded a Gold Medal at the 2024 Asia Exhibition of Innovations and Inventions. ASTRI has also engaged with a Mainland semiconductor company to provide Sn-Bi alloy microbump electroplating services. Several wafer samples have been delivered for internal evaluation. Discussions will continue regarding further collaboration opportunities.

Highlights/Key Activities	Status/Progress
4. Efficient Data Storage Methods for Artificial Intelligence Computing 	AI computing faces critical challenges, including high power consumption and substantial storage requirements. Data centre power consumption has become a significant global issue, while the massive data storage demands of AI computing continue to grow. Similarly, the high-power consumption and storage needs of smart IoT applications hinder the widespread adoption of AI in smart devices. ASTRI has developed an innovative data storage technology that significantly enhances AI computing performance through tailored compression and memory management solutions. The essence of this technology is the employment of a two-pronged approach: intelligent data compression, which reduces energy consumption during memory reads and writes, and efficient memory reuse and allocation, which maximises hardware resource utilisation. This solution is well-suited to modern AI applications. In large data centres, it reduces energy consumption, while in IoT devices, it lowers storage requirements and extends battery life. The technology was awarded a Silver Medal at the 50th International Exhibition of Inventions Geneva in 2025.

Highlights/Key Activities	Status/Progress
5. Mid-End Semiconductor Wafer Inspection System 	ASTRI's R&D team has developed a coaxial line-scanning spectral confocal technology with a resolution of 0.5 micrometre, capable of inspecting structures with aspect ratios of up to 18:1 or higher. Featuring innovative line-scanning software with an industry-leading processing speed of 10 000 frames per second, this technology integrates advanced optical principles, intelligent algorithms, and automated design. It meets most of the precision requirements in the mid-end semiconductor packaging process, enhancing quality control and production efficiency. The technology received a Silver Medal at the 48th International Exhibition of Inventions Geneva in 2023 and the Equipment and Machinery Design Award at the 2023-2024 Hong Kong Awards for Industries. The technology was successfully transferred to several semiconductor inspection equipment manufacturers in 2024.
6. Optimised Computational Micro Machine Learning Platform 	ASTRI has developed a platform leveraging AI technology for voice recognition, specifically designed for mobile edge devices. With its compact, lightweight, low-power, and low-latency architecture, the platform incorporates an optimised convolutional neural network and algorithms, enabling deployment on extremely compact devices. Using block floating-point arithmetic, the platform ensures simpler, faster and energy-efficient computations, functioning without requiring an internet connection. This technology is ideal for applications in smart cars and smart homes, enabling voice-activated commands such as turning lights on and off or opening and closing windows. Additionally, the team is also exploring its use in indoor anti-theft systems, where the platform can detect unusual sounds and automatically trigger an alarm. This innovation won a Gold Medal at the 50th International Exhibition of Inventions Geneva in 2025.

Highlights/Key Activities	Status/Progress
7. Optical Digital Encoding-Decoding System 	In collaboration with a government department, ASTRI has developed an innovative anti-counterfeiting technology that integrates optical and digital encoding-decoding techniques, revolutionising the security measures for printed materials. This system employs resonant waveguide gratings to encode information within images, enabling angular multiplexing of displayed visuals. Additionally, aperiodic diffraction gratings are used to expand the users' field of view. This cutting-edge technology was awarded a Silver Medal at the 50th International Exhibition of Inventions Geneva in 2025.

Highlights/Key Activities	Status/Progress
8. Event-based Sensor Fusion Monitoring System  	ASTRI has developed an intelligent edge AI sensor fusion system designed to monitor human behaviour and environmental conditions, aiming to improve operational efficiency and address manpower demands of special needs and elderly care centres. This system automates repetitive manual tasks such as attendance tracking, temperature monitoring, abnormality alerts, and closed-circuit television ("CCTV") footage review. The system is designed for easy integration with existing CCTV infrastructure, enabling traditional surveillance systems to be upgraded into intelligent sensing systems with a simple plug-in. It prioritises privacy protection by utilising visual perception and thermal sensor fusion in public spaces such as classrooms and training rooms, while employing non-visual, privacy-preserving sensing technology in private spaces like restrooms and bedrooms. The core functionality of the system lies in its ability to continuously observe and analyse human activities, automatically detecting unusual behaviours such as falls or fights, and sending instant alerts to management with event videos. Furthermore, the system automatically tracks events across camera feeds and generates heat maps, allowing management to quickly assess situations and ensure timely emergency responses, such as calling an ambulance or the police. This system has already garnered interest from a large elderly care home and other similar institutions to adopt it in their care facilities.

Highlights/Key Activities	Status/Progress
9. Semantic Matching for Loan Document Review 	ASTRI, in collaboration with a Hong Kong bank, has developed an AI-powered automated loan document review system that leverages advanced natural language processing and deep learning technologies. This system is designed to automatically extract and compare relevant content between the term sheet and the loan agreement to ensure semantic consistency. The system has been successfully deployed by the bank across various loan types, achieving an accuracy rate exceeding 90%. By significantly improving the speed of document review, it reduces operational risks, minimises human errors, and alleviates the workload of frontline staff.
10. Tech Applied Summit and Technovation Week 	ASTRI organised the Tech Applied Summit, Hong Kong's first premier innovation and technology event this year, at the Hong Kong Convention and Exhibition Centre in February 2025. With the theme "Leading Tech Forward", the Summit has drawn more than 1 500 attendees, including technologists, industry leaders, and start-ups. Over 40 local, Mainland and overseas leaders from the Government, industry, academia, research, and investment sectors engaged in discussions on cutting-edge topics such as new quality productive forces, smart cities, low-altitude economy, and generative AI. ASTRI signed multiple MoUs at the Summit, forging new partnerships to advance the commercialisation of R&D outcomes and foster cross-sector collaboration. The Technovation Zone showcased 20 innovative technological solutions from local enterprises, universities and research institutions, highlighting the vibrancy and potential of Hong Kong's innovation and technology sector. Following the Summit, ASTRI hosted a five-day Technovation Week at the Hong Kong Science Park.

Annex C

Hong Kong Research Institute of Textiles and Apparel ("HKRITA")
Operation Overview in 2024-25

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

	2023-24			2024-25		
	Number of new projects	Project cost	Industry contribution	Number of new projects	Project cost	Industry contribution
Platform[1]	10	43.2	8.1	6	31.4	6.3
Collaborative[2]	4	14.0	7.1	6	16.0	8.2
Seed[3]	3	8.4	<0.1	1	2.4	N/A
Public Sector Trial Scheme ("PSTS")[4]	3	5.7	N/A	-	-	N/A
Total:	20	71.3	15.3[5]	13	49.7[5]	14.5

II. Operating Expenditure (in $ million)

	2023-24	2024-25
Manpower	33.1	35.3
Accommodation	10.2	11.2
Equipment	0.3	0.4
Others	10.6	11.8
Less: Project administrative overheads	-	(0.3)
Total:	54.2	58.3[5]

[1] Platform projects require industry contribution of at least 10% of the total project cost.

[2] Collaborative projects require industry contribution of at least 30% of the total project cost.

[3] Seed projects are more forward-looking and exploratory in nature. No industry contribution is required.

[4] PSTS projects do not require industry contribution.

[5] The sum may not add up due to rounding.

III. Industry and Other Income (in $ million)

	2023-24	2024-25
Industry Contribution	15.2	14.5
Licensing/Royalty	1.7	0.4
Contract Services	8.8	15.0
Others	0.9	8.1
Total:	26.6	38.0
Approved R&D Project Expenditure:	57.2	47.4
Level of Industry and Other Income:	47%	80%

IV. Other Performance Indicators

	2023-24	2024-25
Number of Organisations Benefitting from PSTS[6]	21	16
Number of Researchers Engaged under Research Talent Hub	100	89
Number of Patents Filed	29	36
Number of Patents Granted[7]	14	14

[6] R&D project is the basic unit in the calculation of the relevant performance indicator, which means that an organisation benefitting from various projects concurrently is counted in terms of the number of projects from which it benefitted.

[7] As the patent approval process takes time, the patent applications filed may not be granted within the same year.

V. Highlights and Key Activities in 2024-25

Highlights/Key Activities	Status/Progress
1. Selective Separation and Recovery of Nylon from Textile Waste 	This eco-friendly solution extracts and recovers nylon from textile waste using green solvent under ambient conditions. The molecular chains of the recovered nylon fibre remain intact, preserving its quality and value, and making it suitable for reuse in garment production while enabling 99.8% solvent reuse. This recycling process significantly minimises environmental and human impact. Furthermore, it can be adapted into a scalable system with high potential for industrial textile applications at a low cost, facilitating the transition to a circular textile economy. This project won a Gold medal at the 50th International Exhibition of Inventions of Geneva.
2. Mass Customisation of Breathable Lightweight Hip Protectors for the Elderly 	This project was developed by HKRITA in partnership with the Chinese University of Hong Kong. The hip protectors are designed for the elderly using 3D-scan-based inverse design and AI automated lattice generation. This approach enables 3D printing of hip protectors with an optimised lightweight structure, minimising both weight and cost while maximising user comfort. These protectors can be easily attached to pants, reducing the risk of hip fractures caused by falls. Their breathable and lightweight design is suitable for the elderly living in hot and humid regions. This project won a Gold medal at the 50th International Exhibition of Inventions of Geneva.

Highlights/Key Activities	Status/Progress
3. Scalable Process Technology for PET Passive Cooling Fibre 	Passive radiative cooling is achieved using selected metal oxide particles and their particle-void structure, which are integrated into PET fibres. These fibres reflect solar ultraviolet and visible light. This enhances the cooling effect, achieving a 2°C temperature reduction under sunlight compared to conventional PET fabrics. This technology can significantly reduce heat stress for individuals working outdoors or engaging in high-intensity sports. Additionally, this technology can be directly integrated into the conventional manufacturing process, making it an ideal solution for low-cost mass production. This project won a Bronze medal at the 50th International Exhibition of Inventions of Geneva.

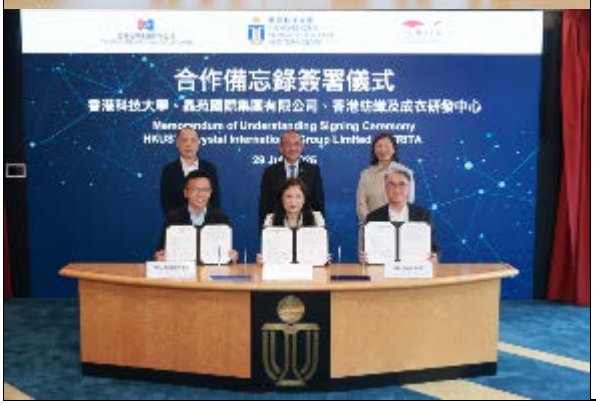
Highlights/Key Activities	Status/Progress
4. Smart Vest for Improving Behavioural Performance of School-aged Children with Attention-deficit/Hyperactivity Disorder ("ADHD") 	This project was developed by HKRITA in partnership with the Education University of Hong Kong. This innovative smart vest is a non-invasive real-time feedback system designed to help children with ADHD integrate into classrooms and society. It features two small sensors that monitor movement. When hyperactive movements are detected, the vest uses gentle vibrations to prompt children to self-regulate, enabling them to refocus in class. This allows teachers to concentrate fully on teaching without distractions. The electronic components are housed in the back of the vest and can be easily removed for charging or washing. Two versions of the vest are available: a cotton vest suitable for school uniforms and a breathable fabric vest designed for sportswear. This project won a Bronze medal at the 50th International Exhibition of Inventions of Geneva.

Highlights/Key Activities	Status/Progress
5. Soft Robotic Clothing: Automatic Thermal Adaptation 	This project was developed by HKRITA in partnership with the Hong Kong Polytechnic University. The innovation automatically adapts to changes in ambient temperatures and activity levels, increasing insulation in cold conditions and reducing thermal resistance in warm environments, while maintaining exceptional breathability. This intelligent clothing system, integrated with a user-friendly app, has transformed personal thermal management. It is beneficial for a wide range of users, including the general public, outdoor workers, firefighters, winter athletes and professionals operating in extreme environments. This project won a Bronze medal at the 50th International Exhibition of Inventions of Geneva.

Highlights/Key Activities	Status/Progress
6. Development of Functional Uniform and Occupational Safety and Health Shoes for Food and Environmental Hygiene Department ("FEHD") 	In partnership with the FEHD, HKRITA designed comfortable and durable raincoats and work shoes for cleaning staff. The FEHD is gradually introducing new contract terms in the tender contracts for public cleaning services, requiring contractors to provide these new uniforms for frontline staff. This requirement will be implemented across all FEHD's new public cleaning service contracts within 3 to 5 years, with an aim to enhance occupational safety and health in rainy and slippery conditions. HKRITA has transferred the relevant technologies to successful contractors through a non-exclusive licensing agreement. Given that this production initiative is intended to benefit frontline cleaning workers who serve the community, HKRITA has offered the technology at an affordable and non-exclusive licensing fee, allowing all awarded contractors to adopt it.
7. Eco-friendly Yarn and Fabric for Sporty Fashion 	This project designed eco-friendly yarns and fabrics for the production of sporty fashion with multi-functions, including one-way moisture transport, UV blocking, antimicrobial properties, durability and easy care. The production methods developed are free of harmful chemicals and can be integrated into existing industry production processes, providing sustainable alternative material options for sportswear and casual clothing. This project won a Silver medal at the 48th International Exhibition of Inventions of Geneva. HKRITA will license the technology to an international fibre manufacturer.

Highlights/Key Activities	Status/Progress
8. Open Lab  	"Open Lab" officially launched in September 2024, successfully established an industrial-scale circular production line for textiles and garments in an urban setting. After undergoing the AI garment sorting system, suitable items are resold, while materials identified as PET-cotton blends go through the Green Machine 2.0's Hydrothermal Separation process and PET fibres are transformed into high-quality recycled yarn and textiles. Another key component of the "Open Lab" is the "Fashion Future Lab", a modular research space for early-stage solutions. Its first initiative, "Farm-to-Garment", features a location-independent production line from hydroponic cotton cultivation to spinning and garment manufacturing. The project has already yielded its first harvest of cotton fibres from long-staple and coloured cotton plants. These achievements demonstrate Open Lab's success in transforming research on textile recycling and carbon emission reduction in the supply chain into practical industry operations.

Highlights/Key Activities	Status/Progress
 	To date, the "Open Lab" has received nearly 1,500 official and industry representatives, including Legislators from various sectors, Singapore's Ministry of Sustainability and the Environment, the Federation of Hong Kong Industries, Hong Kong Manufacturing Industry Employees General Union, as well as major trade associations, brands, environmental organisations, the Education Bureau and universities. Through these exchanges, the "Open Lab" has built a diverse network of stakeholders to promote cross-sector collaboration toward a sustainable future. "Open Lab" won the 2024 International Textile Manufacturers Federation ("ITMF") Award in the International Collaboration category and the Innovation and Creativity Award at the 2023–24 Hong Kong Awards for Industries. It has also launched cross-industry partnerships with ISS Facility Services Limited and Redress, recycling used garments and upcycling them into sustainable textile materials.

Highlights/Key Activities	Status/Progress
9. HKRITA Innovation & Technology Symposium  	HKRITA organised its flagship event, the Innovation and Technology Symposium, in 2024 and 2025 respectively. The themes were "Scaling from Innovation to Impact" and "Navigating Change: United for a Sustainable Future." The symposiums invited distinguished guests, including the Secretary for Innovation, Technology and Industry, renowned researchers, leaders in international trade and branding and representatives from environmental organisations to explore the direction of industry development. The two symposiums attracted over 430 industry professionals.
10. Stronger Collaboration with Mainland Research Institutes and Enterprises  	HKRITA established the Green Innotextile Base with technology incubators in Shanghai, promoting the development of new textile and apparel materials, circular economy initiatives and AI applications in the Yangtze River Delta region. In addition, HKRITA signed a framework agreement with the Hong Kong University of Science and Technology and global apparel manufacturers to advance areas such as smart design, production optimisation and wearable technology. Furthermore, HKRITA signed memoranda of understanding with the China Textile Academy, Donghua University and an industry leader in the Mainland to strengthen collaboration on innovation.

Annex D

Logistics and Supply Chain MultiTech Research and Development Centre ("LSCM")
Operation Overview in 2024-25

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

	2023-24			2024-25		
	Number of new projects	Project cost	Industry contribution	Number of new projects	Project cost	Industry contribution
Platform[1]	7	84.8	20.5	10	81.0	19.9
Collaborative[2]	2	2.5	1.3	8	36.2	18.3
Seed[3]	11	34.7	4.0	5	15.0	1.5
Public Sector Trial Scheme ("PSTS")[4]	7	31.0	N/A	4	13.7	N/A
Total:	27	153.0	25.8	27	145.8[5]	39.7

II. Operating Expenditure (in $ million)

	2023-24	2024-25
Manpower	46.0	54.5
Accommodation	21.4	22.1
Equipment	2.5	3.8
Others	16.8	18.2
Less: Project administrative overheads	(15.9)	(11.9)
Total:	70.8	86.7

[1] Platform projects require industry contribution of at least 10% of the total project cost.

[2] Collaborative projects require industry contribution of at least 30% of the total project cost.

[3] Seed projects are more forward-looking and exploratory in nature. No industry contribution is required.

[4] PSTS projects do not require industry contribution.

[5] The sum may not add up due to rounding.

III. Industry and Other Income (in $ million)

	2023-24	2024-25
Industry Contribution	21.8	38.2
Licensing/Royalty	2.1	0.2
Contract Services	14.7	39.4
Others	<0.1	1.7
Total:	38.6[5]	79.5
Approved R&D Project Expenditure:	71.4	90.2
Level of Industry and Other Income:	54%	88%

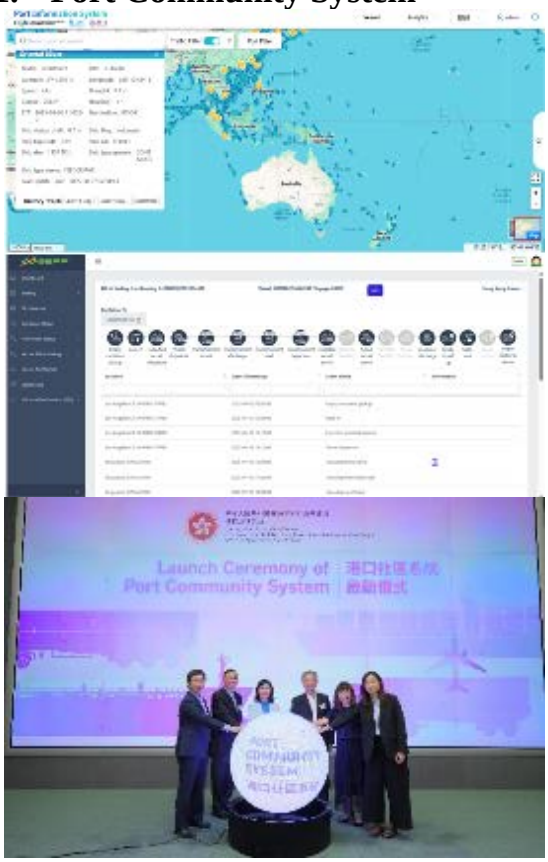
IV. Other Performance Indicators

	2023-24	2024-25
Number of Organisations Benefitting from PSTS[6]	39	39
Number of Researchers Engaged under Research Talent Hub	31	42
Number of Patents Filed	48	51
Number of Patents Granted[7]	19	41

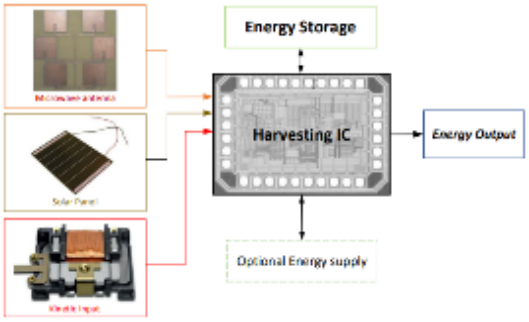
[6] R&D project is the basic unit in the calculation of the relevant performance indicator, which means that an organisation benefitting from various projects concurrently is counted in terms of the number of projects from which it benefitted.

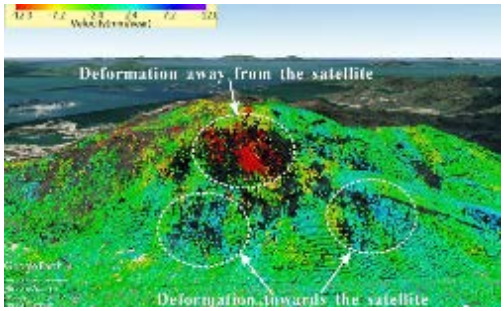
[7] As the patent approval process takes time, the patent applications filed may not be granted within the same year.

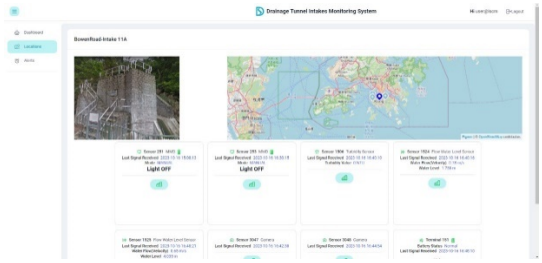
V. Highlights and Key Activities in 2024-25

Highlights/Key Activities	Status/Progress
1. Port Community System 	With the support of the Innovation and Technology Fund, LSCM has partnered with the Transport and Logistics Bureau to jointly develop the "Port Community System" smart shipping logistics platform technology, starting in 2023. This collaboration aims to establish a service platform that will be available for industry use beginning in the first quarter of 2026. The new platform is expected to facilitate the digitalisation of the port and enhance collaboration among local and regional stakeholders. This includes achieving comprehensive transparency in the cargo delivery process, providing timely trade information, and improving logistics efficiency. Currently, Hong Kong port lacks a unified information technology system or platform for shipping logistics. The new platform will enable various stakeholders in the port's trade logistics sector (such as importers and exporters, warehousing companies, trucking firms, freight forwarders, shipping agents, shipping companies, port terminal operators, and waterborne freight services) to share information and interact on a single platform.

Highlights/Key Activities	Status/Progress
	The platform is designed to facilitate integration with other service platforms and data exchange, promoting third-party provision of value-added services. The first confirmed value-added service is "Single Submission for Dual Declaration", which will streamline cross-border logistics in the Guangdong–Hong Kong–Macao Greater Bay Area ("GBA"). Under this service, importers and exporters will only need to submit a single set of data related to their trade transport arrangements, enabling the automatic generation of various customs and business declaration forms to meet the requirements of customs authorities in Hong Kong and Mainland cities in the GBA.
2. Smart Robotics Coordination System for Hospital Logistics 	Smart hospital is the main strategy for the Hospital Authority's ("HA") sustainable development. One of the strategic initiatives is to deploy robots with advanced technologies to reduce manual labour for repetitive tasks. This project aims to develop a smart robotic coordination system to provide delivery service in hospitals including an autonomous mobile robot system that supports vertical logistics and fleet planning and management system with open application programming interface. The pilot trial is conducted at Tseung Kwan O Hospital to assist HA in developing smart hospitals in Hong Kong.

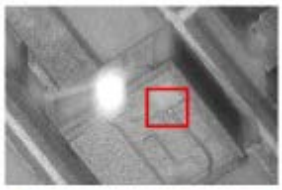
Highlights/Key Activities	Status/Progress
3. Robo-9 with Multi-Sensor Fusion Technologies for Visually Impaired 	Independent travelling is difficult and sometimes impossible for the visually impaired. Therefore, LSCM developed a cost-effective robot with vision and sensing solutions for mobility assistance, able to avoid obstacles and navigate similar to guide dogs. It will enhance the quality of life for individuals with visual impairments. The robot vision and sensing technology developed in this project included navigation and locationing, which can provide walking guidance for the visually impaired. Besides, it utilised simultaneous locationing and mapping technology to gather surrounding environment information by using sensors, assisting users to free walk and reach their destinations. This application was awarded a Silver Medal at the 3rd Asia Exhibition of Inventions Hong Kong in 2023 and a Gold Medal at Edison Awards 2025.
4. Multiple Input Energy Harvesting Integrated Circuit using Silicon-On-Insulator Technology 	LSCM developed a micro energy harvesting integrated circuit using silicon on insulator technology. This energy harvesting chip supports various energy collection methods, including radio frequency energy, optical energy, and kinetic energy. Leveraging its high transition frequency, low current leakage, and versatility in energy collection, this chip is suitable for a range of small battery or battery-free devices available in the market. It addresses the industry's demand for low-cost, single-chip solutions that can accommodate multiple input harvesting methods.

Highlights/Key Activities	Status/Progress
5. Development of satellites and integrated remote sensing technologies for near-real-time landslide monitoring  	LSCM collaborated with the Chinese University of Hong Kong to develop a small optical satellite and integrated remote sensing technologies with deep learning analysis for near-real-time landslide monitoring to improve the slope safety of Hong Kong and major infrastructures in Southwest China. The objectives of this project include: (i) design and develop a small optical satellite based on Hong Kong's environments to improve the monitoring frequency; (ii) develop an innovative Tomo-PSInSAR method with deep learning analysis for landslide deformation monitoring; (iii) automatically detect fast-moving slides using optical remote sensing images and deep learning; (iv) develop a data-driven dynamic landslide risk assessment platform using multi-source big data analytics. In addition to landslide monitoring, preliminary research is conducted in the fields of smart traffic monitoring and land management based on satellite data to assess their broad application potential. The results of this project provided professional remote sensing processing and service systems for government, education, research, and industry sectors.

Highlights/Key Activities	Status/Progress
6. A Wireless Sensor Network System for Monitoring Drainage Tunnel Inlets   Turbidity and water float sensor	LSCM addressed several challenges related to drainage tunnel inlets, including the lack of remote monitoring for detecting blockages, the high risks associated with manual inspections during adverse weather conditions, and the labour-intensive clean-up required due to debris accumulation. To tackle these issues, a dedicated monitoring system is developed to continuously track water flow velocity, water levels, sediment accumulation, and to capture images of large foreign objects falling into the tunnels. The system is designed with low power consumption to overcome field power supply limitations and enhance data transmission coverage in heavy rain environments through customised low-frequency LoRa data packets. This system interfaces with an online platform and mobile application to provide the public with real-time regional risk alerts while also assisting the Drainage Services Department in optimising maintenance and operational decision-making. Currently, the system is being implemented on Pokfulam Road, Bowen Road, and Mount Butler Road.

Highlights/Key Activities	Status/Progress
7. Assistant robots for Siu Lam Rehabilitation Services Complex and Hong Kong Police Force  	To enforce occupational safety, provide a healthy working environment and reduce the work burden, LSCM collaborated with Siu Lam Rehabilitation Services Complex and Hong Kong Police Force to develop the follow-me robot and the delivery robot. Follow-me robots can carry different types of heavy payload and follow the worker when needed. Delivery robots can auto navigate and deliver/collect small items such as documents, equipment and dangerous goods up to 30kg. LSCM planned to promote this technology to other sectors such as hospitals and caring centres with similar working environments.

Highlights/Key Activities	Status/Progress
8. Automated Hill Fire Surveillance System 	To enhance the accuracy of the wildfire detection system in country parks, LSCM collaborated with the Agriculture, Fisheries and Conservation Department to establish an automated wildfire detection system that combined video analytics and artificial intelligence technologies. The system employed image analysis and AI algorithms to identify different heat sources, thereby improving the accuracy of wildfire location identification. This technology did not only enhance the precision of existing monitoring techniques but also helped to reduce false alarms (such as those caused by heat from sunlight reflection and heating mechanisms), thereby saving human resources needed for verifying alarm accuracy. Currently, this technology has been implemented in eight wildfire lookout facilities in Hong Kong, including Ba Yung, Tin Fu Tsai, Shek Pik, Kam Shan, Tai Po Kau, Hoi Ha, Hok Tsui, and Wong Chuk Yeung.

Highlights/Key Activities	Status/Progress
9. Air-conditioning Water Dripping Inspection System   	Regarding the issue of air conditioner water dripping in Hong Kong, LSCM collaborated with the Food and Environmental Hygiene Department to develop an Air-conditioning Water Dripping Inspection System. This portable hardware solution is designed to assist operation staff in locating the source of water dripping from air-conditioning units. Capable of viewing distances up to approximately 120 meters, reaching as high as the 40th floor. This system features a night vision camera with auto-focus and tablet-controlled zoom, allowing staff to inspect areas discreetly without disturbing residents. Its tripod handle and electric tilt platform enable precise and effortless control of the camera's movement, enhancing the accuracy and efficiency of inspections.

Highlights/Key Activities	Status/Progress
10. LSCM Logistics Summit 2024  	LSCM held its flagship annual event, LSCM Logistics Summit 2024, with the theme of "From Smart City to Digital Economy". The Summit highlighted the importance of innovative technologies in fostering the development of the Smart City and Digital Economy and facilitating the industry to capitalise on the new opportunities brought about by technology development in the GBA. At the Summit, LSCM signed Memorandums of Understanding with leading institutes in the Mainland to further advance collaborations in the research and development of various key technologies for smart city development and cross-border logistics. In addition, LSCM showcased a series of its cutting-edge technologies developed for the logistics and other sectors at the event. The event attracted more than 1 000 guests to share and exchange their ideas and views on the development of smart city technology and digital economy.

Annex E

Nano and Advanced Material Institute ("NAMI")
Operation Overview in 2024-25

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

	2023-24			2024-25		
	Number of new projects	Project cost	Industry contribution	Number of new projects	Project cost	Industry contribution
Platform[1]	16	109.6	22.0	13	91.6	18.2
Collaborative[2]	9	29.5	15.1	11	46.4	23.7
Seed[3]	13	36.3	N/A	13	36.4	N/A
Public Sector Trial Scheme ("PSTS")[4]	6	24.6	N/A	4	10.3	N/A
Total:	44	200.0	37.0[5]	41	184.6[5]	41.8[5]

II. Operating Expenditure (in $ million)

	2023-24	2024-25
Manpower	49.3	54.6
Accommodation	28.2	28.8
Equipment	15.1	18.3
Others	35.7	35.2
Less: Project administrative overheads	(12.3)	(14.4)
Total:	115.9[5]	122.5

[1] Platform projects require industry contribution of at least 10% of the total project cost.

[2] Collaborative projects require industry contribution of at least 30% of the total project cost.

[3] Seed projects are more forward-looking and exploratory in nature. No industry contribution is required.

[4] PSTS projects do not require industry contribution.

[5] The sum may not add up due to rounding.

III. Industry and Other Income (in $ million)

	2023-24	2024-25
Industry Contribution	37.0	41.8
Licensing/Royalty	3.3	3.8
Contract Services	9.3	5.3
Others	9.0	10.4
Total:	58.7[5]	61.3
Approved R&D Project Expenditure:	128.6	119.8
Level of Industry and Other Income:	46%	51%

IV. Other Performance Indicators

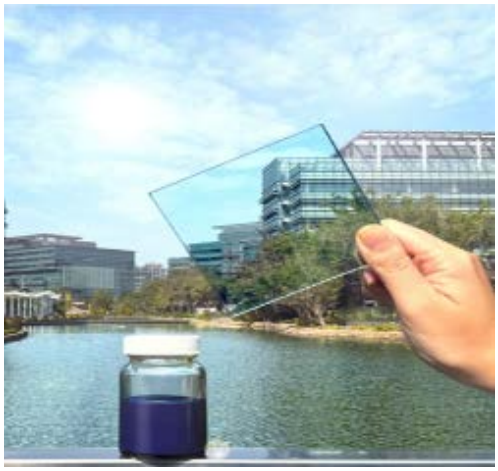
	2023-24	2024-25
Number of Organisations Benefitting from PSTS[6]	46	48
Number of Researchers Engaged under Research Talent Hub	22	21
Number of Patents Filed	87	111
Number of Patents Granted[7]	37	22

[6] R&D project is the basic unit in the calculation of the relevant performance indicator, which means that an organisation benefitting from various projects concurrently is counted in terms of the number of projects from which it benefitted.

[7] As the patent approval process take time, the patent applications filed may not be granted within the same year.

V. Highlights and Key Activities in 2024-25

Highlights/Key Activities	Status/Progress
1. "MiSmartLink" Wall Connection System  	With support from the Innovation and Technology Fund, NAMI, together with the Hong Kong Housing Authority and the Housing Bureau, developed the innovative "MiSmartLink" connection technology in 2024. This technology is applied in the Housing Authority's second-generation Modular Integrated Construction ("MiC") system, streamlining the connection of prefabricated concrete internal wall panels, simplifying on-site installation procedures, and improving construction efficiency. Compared with the first-generation MiC system, the new technology allows for thinner walls that are stronger, safer, and faster to assemble. This technology supports the target as announced in the 2022 Policy Address, aiming for at least half of public housing projects completed in the second five-year period to adopt the MiC method. The Housing Authority will also sign further cooperation agreements with NAMI to launch more cross-disciplinary collaborations related to public housing development.

Highlights/Key Activities	Status/Progress
2. Nanocurtain : Energy-Saving Transparent Window Coating 	NAMI's breakthrough transparent window coating technology has the outstanding advantages such as long-lasting durability, low cost, and easy application, providing excellent energy-saving performance for windows of various shapes. Its core performance indicators include: • Effectively blocks 50% of solar radiation • Maintains over 60% visible light transmittance • Keeps reflectance below 6% • Service life exceeding 12 years • Simple application process with room temperature curing Through PSTS, the coating was successfully applied for the first time at the Christian Family Service Centre, and the industry partner is planning to expand this technology to international markets. During the promotion of the technology in the Malaysia market, it received widespread recognition, with high commendations on the technical performance by local enterprises.

Highlights/Key Activities	Status/Progress
3. Biodegradable Reusable Cutlery 	NAMI successfully developed low-carbon reusable cutlery and food trays using plant stem materials. Through the Public Sector Trial Scheme and with the support of the AsiaWorld-Expo, NAMI redesigned this low-carbon reusable cutlery to promote sustainability, distinguishing between disposable and non-disposable items, and enhancing public awareness of environmental protection. Multiple non-governmental organisations, including Tung Wah Group of Hospitals, Pok Oi Hospital, Yan Oi Tong, and Po Leung Kuk, also actively participated in the trial project, promoting the concept of "reuse." A total of 365,000 sets of cutlery were distributed across 12 units, which expressed satisfaction with the results. The industry partner is now proactively reaching out to potential clients in the catering, hotel supplies, and household goods sectors to drive commercialisation of the product.

Highlights/Key Activities	Status/Progress
4. PAPEL+™：Water-Resistant, Oil-Resistant, Germ-Repellent Coating for Paper Packaging 	NAMI's innovative plastic-free coating, suitable for food paper packaging, has excellent water resistance, oil resistance, and germ-repellent properties. The coating complies with food contact safety standards stipulated by the U.S. Food and Drug Administration, prevents bacterial contamination, and has passed 100% repulpability certification. PAPEL+™ offers a safe and eco-friendly alternative to traditional plastic-lined paper packaging. The industry partner has already established a production line at their Dongguan factory and is actively expanding into the food packaging markets in Hong Kong and the Mainland.
5. 3D-Printed Food Recipes 	NAMI has leveraged advanced 3D printing technology, combined with nanostructured bigel system, to create a novel plant-based salmon. This vegan sashimi offers a texture, appearance, and nutritional value comparable to raw fish, providing a high-quality alternative for vegetarian consumers. The industry partner is preparing for commercialisation, in preliminary discussions with several five-star hotels in Hong Kong, aiming to first introduce the product to upscale Japanese restaurants, with the long-term goal of expanding into high-end restaurants across major provinces and cities in Mainland China.

Highlights/Key Activities	Status/Progress
6. Nano-curcumin Supplement 	NAMI's nano-curcumin supplement adopts an innovative hydrophobic substance solubilisation technology, overcoming the traditional curcumin absorption bottleneck. The patented nano-formula precisely controls curcumin particle size at the nano level, greatly enhancing its bioavailability while ensuring stable absorption and sustained release. This innovative technology allows curcumin to more effectively deliver its antioxidant and anti-inflammatory health benefits, comprehensively supporting joint, cardiovascular, immune, and cognitive health. The industry partner has completed initial trial production in Hong Kong and is currently working on product packaging design and promotion.
7. Air Purifiers equipped with Plasma-driven Catalysts in Kai Tak Sports Park  	Air purifiers equipped with NAMI's plasma-driven catalyst technology have been fully deployed at Kai Tak Sports Park. A total of 510 units have been installed throughout the Park, including in garbage collection rooms, restrooms, changing rooms, and all air handling units within the Park, effectively improving air quality and providing a healthier environment for performers and visitors. Compared with conventional methods, the plasma-driven catalytic technology developed by NAMI offers key advantages; including over 90% saving in energy and more than 70% in space, reducing by-products such as wastewater and chemical residues, and more efficiently converting toxic compounds into carbon dioxide and water, highlighting the critical role of advanced technology in public health.

Highlights/Key Activities	Status/Progress
8. NAMI Innovation Gala  	NAMI held an 'Innovation Gala' at the Hong Kong Science Park, bringing together more than a hundred representatives from government, industry, academia, and research sectors. Over 20 commercialised advanced material technologies were showcased at the event, spanning the four major areas of clothing, food, housing, and transportation. Highlights included 3D-printed plant-based salmon, biodegradable composite materials, hip protectors, long-lasting extreme temperature batteries, "MiSmartLink" connection system for MiC, and self-compacting backfill materials, demonstrating how scientific innovation is moving beyond the laboratory to address real-world needs. NAMI will continue to promote technology transfer through collaboration among government, industry, academia, and research, accelerating pilot projects, mass production, and international expansion, in order to support low-carbon transformation and enhance industry competitiveness.

Highlights/Key Activities	Status/Progress
9. Yau Tsim Mong Scientific and Technological Repair Plan for Exposed Reinforcement 	NAMI, in collaboration with the Yau Tsim Mong West Area Committee and the Yau Tsim Mong Care Team, launched the 'Yau Tsim Mong Scientific and Technological Repair Plan for Exposed Reinforcement', aiming to, by using advanced materials, address residential safety problems caused by the aging of old buildings in Hong Kong. NAMI, in collaboration with the Yau Tsim Mong West Area Committee and the Yau Tsim Mong Care Team, launched the 'Yau Tsim Mong Scientific and Technological Repair Plan for Exposed Reinforcement', aiming to, by using advanced materials, address residential safety problems caused by the aging of old buildings in Hong Kong. The team visited beneficiary families and used NAMI's specially developed repair mortar on-site to treat ceiling concrete spalling and exposed steel reinforcement. Over the past year, repair works have been completed at eight pilot sites in Yau Tsim Mong, and the next step is to expand the initiative to other areas in need, further enhancing its impact.

Highlights/Key Activities	Status/Progress
	The aging of buildings in Hong Kong's older districts, coupled with a humid climate, has led to both interior and exterior concrete spalling and exposed reinforcement, compromising structural safety and residents' quality of life, especially for families living in subdivided flats. If left unaddressed, the rebar will continue to rust and expand, accelerating structural deterioration. NAMI's repair mortar is specifically designed for Hong Kong's humid environment and offers three key advantages: - The material is densely structured, with tensile strength 30% higher than regulatory standards, preventing rainwater penetration and effectively guarding against rebar corrosion. - Infused with mineral fibers to enhance concrete strength, it reduces the risk of repeated spalling, effectively resists chemical corrosion, and has a lifespan of up to 50 years—the typical service life of a building. - Compared with traditional repair materials, it is more durable and significantly reduces the frequency of maintenance. The material's processing cost is 50% lower than market products, hence savings on project expenses. NAMI demonstrates a 'from R&D to community' implementation pathway, focusing on user needs and enabling innovative materials to solve real problems in practical scenarios.

Highlights/Key Activities	Status/Progress
10. Visits to Government Departments, Research Institutions and Enterprises in Mainland China and Southeast Asia    	NAMI participated in the University Technology Transfer Conference and the 2nd Suzhou International Science and Innovation Conference, as well as the 17th International Elite Entrepreneurship Week, engaging in exchanges with over a thousand enterprises, academicians, and experts. Leaders such as the Deputy Secretary of the Jiangsu Provincial Committee and the Secretary of the Suzhou Municipal Committee visited the NAMI's booth. The Vice Mayor of Suzhou, the Deputy Secretary of the Party Working Committee of Suzhou Industrial Park, and the Deputy Director of the Administrative Committee held discussions with NAMI regarding a tripartite cooperation memorandum, injecting new momentum into Suzhou-Hong Kong research collaboration. NAMI held discussions with both government and private organisations in Malaysia, including the Ministry of Science, Technology and Innovation of Malaysia, NanoMalaysia, IJM Construction, Sunway Malls, the Malaysia Shopping Malls Association, and the Hong Kong Trade Development Council's Malaysia office. NAMI signed a Memorandum of Cooperation with NanoMalaysia to jointly promote the certification of nanomaterial products. NAMI also co-hosted an online seminar in Indonesia with a technology company, where NAMI's innovative technologies were introduced to numerous Indonesian industry leaders, with participants from sectors such as data centers, smart cities, banking, tourism, construction, and energy.