For discussion
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Legislative Council
Panel on Commerce and Industry

Measures to support re-industrialisation in Hong Kong

PURPOSE

This paper briefs Members on the measures to support the "re-industrialisation" in Hong Kong.

BACKGROUND

2. The Government has been actively promoting re-industrialisation in five areas, namely infrastructure, talent, capital, technology and scientific research; and developing advanced manufacturing, which is less land- or labour-intensive, based on new technologies and smart production in recent years in order to enhance the competitiveness of the manufacturing industry in Hong Kong through innovative technologies. High-end manufacturing will generate research and development ("R&D") needs, which is conducive to raising R&D investment by the industries, thus contributing to the robust and sustainable development of local R&D work and facilitating Hong Kong's development as an international innovation and technology ("I&T") hub. With Hong Kong's strong capabilities in R&D and advantages of internationalisation and marketisation, the promotion of "re-industrialisation" is conducive to identifying new growth points for the economy and creating quality employment opportunities.

3. The Government set up the Committee on Innovation, Technology and Re-industrialisation chaired by the Financial Secretary in April 2017, which advises the Government on matters related to the promotion of I&T development and re-industrialisation. In addition, we report the progress of work in various areas to the Panel on Commerce and Industry of the Legislative Council from time to time. The ensuing paragraphs will highlight the policy measures taken by the Innovation and Technology Bureau ("ITB") and Innovation and Technology Commission

("ITC") to promote "re-industrialisation" in respect of the aforementioned five areas and the latest development.

DEVELOPING R&D INFRASTRUCTURE

4. Quality infrastructure and facilities are indispensable for promoting re-industrialisation. The Hong Kong Science and Technology Parks Corporation ("HKSTPC") is responsible for managing the three Industrial Estates ("IEs") at Tai Po, Yuen Long and Tseung Kwan O, and the current overall occupancy rate of the IEs is around 93%. In order to dovetail the development on "re-industrialisation", HKSTPC develops specialised, highly efficient multi-storey industrial buildings for rental to multiple users, thereby encouraging manufacturers to set up their production bases in Hong Kong, promoting smart production and attracting high value-added technology industries and manufacturing processes suitable for Hong Kong, which include:

(i) Precision Manufacturing Centre ("PMC") - HKSTPC completed the refurbishment of a four-storey factory in the Tai Po IE into the PMC in 2017 to foster high technology smart production. Currently, the PMC has been fully occupied by enterprises engaging in precision engineering and assembly, new material manufacturing and environment-friendly yarn production, tooling and advanced indoor hydroponic industries, etc.;

(ii) Medical Accessory Resilience Supplies ("MARS") Manufacturing Centre - in order to strengthen the local capacity in supplying personal protective equipment in the future, HKSTPC is refurbishing and expanding an old factory in the Tai Po IE for the MARS Manufacturing Centre, which will provide a gross floor area ("GFA") of about 18 600 square metres ("sq. m.") for manufacturing medical products including masks and protective equipment. The works were being progressively completed from end of June 2021 onwards for manufacturers to move in;

(iii) Advanced Manufacturing Centre ("AMC") - HKSTPC is developing the AMC in the Tseung Kwan O IE, providing a GFA of about 108 600 sq. m. The project is expected to be completed in 2022. The AMC will provide companies

of different scales with scalable, efficient, and dedicated logistics serviced manufacturing space, and assist them in embarking on technological innovation, high value-added and low volume but highly customised production with the application of advanced manufacturing and testing processes. It will also provide comprehensive services for logistics, warehousing, prototyping, low-volume assembly and clean room enabled space. HKSTPC has started the leasing work for AMC; and

(iv) Microelectronics Centre ("MEC") - HKSTPC is developing the MEC in the Yuen Long IE, to attract manufacturers that produce microelectronic products and related industries (such as advanced materials). The MEC will provide a GFA of about 36 180 sq. m. with dedicated facilities for the microelectronics manufacturers, such as clean rooms, dangerous goods storage and waste treatment, etc. The MEC is expected to be completed by 2023.

POOLING TECHNOLOGY TALENT

5. Development of I&T needs excellent technology talent. The Government has been resorting to all possible means and channels to expand the local I&T talent pool. ITC launched the Re-industrialisation and Technology Training Programme ("RTTP") in 2018, which funds local enterprises on a 2 (Government) : 1 (Enterprise) matching basis for their staff to receive training in advanced technologies, especially those related to "Industry 4.0" ("i4.0"). As at the end of July this year, the RTTP has approved over 1 680 applications for registering public courses and provided over 5 470 training sessions in advanced technologies with total funding exceeding $46.9 million. Enterprises which applied for training grants are from different industries, e.g. hotel, catering and tourism, retail, insurance, real estate and automobile-related industry, etc., some of which are small and medium enterprises. The training sessions in advanced technologies provided to enterprise staff involve various technological aspects, including information technology, electronics systems, biotechnology and mechanical systems, etc. Many of them are related to i4.0, e.g. trainings on i4.0 workflows, automated retail and production lines and building information modelling, etc.

6. The Hong Kong Productivity Council ("HKPC") has partnered with the Vocational Training Council and Fraunhofer Institute for

Production Technology ("IPT") of Germany, an international pioneer of i4.0, to launch the first professional diploma programme in i4.0 in Hong Kong to enhance training for industry practitioners in respect of i4.0. In addition, we encourage universities to nurture talents by organising courses. For example, the City University of Hong Kong has recently launched the Global Research Enrichment and Technopreneurship Programme in collaboration with the Federation of Hong Kong Industries ("FHKI"), which allows students to choose to intern at local or overseas tech ventures established by FHKI members in their second year of study, putting theory into practice. Besides, HKPC has received support from ITB to launch training courses on topics related to "re-industrialisation" through the "Matching Grant Scheme for Skills Upgrading", including digital manufacturing skills upgrade and transformation in production processes, food and beverage production, Chinese medicine, and manufacturing of personal care and protection products, etc.

PROVIDING CAPITAL

7. In respect of providing capital, ITC launched the Re-industrialisation Funding Scheme ("RFS") in 2020, which subsidises manufacturers, on a 1 (Government) : 2 (Company) matching basis, to set up new smart production lines in Hong Kong. The funding for each project is capped at $15 million. RFS provides material assistance to local manufacturers, assisting them to move towards high value-added production and gradually upgrade to i4.0. Not only can it provide direct employment opportunities, it can also prompt the relevant enterprises to set up other businesses in Hong Kong (e.g. marketing and promotion, sales and accounting, supply chain management, wholesale and distribution, etc.) and create demand for services provided by other industries (e.g. advertising, testing and certification, etc.), bringing wider benefits to different industries in Hong Kong. As at end of July 2021, ITC has received 21 applications. The Vetting Committee has agreed in principle to support 16 applications, covering industries such as biotechnology, food processing, construction, printing, medical device and nanofiber materials, etc. The total funding amount is about $108 million and the total estimated matching fund of the enterprises is about $241 million. Two applications did not pass the assessment and three other applications are being processed. Supported highlight projects include:

(i) a local food processing enterprise will set up a food processing smart production line for a central kitchen. Using traditional cooking processes with smart

technologies such as Industrial Internet of Things ("IIoT") and data analysis, the smart production line could enhance production efficiency to tackle the problem of limited production capacity and enhance quality control and food safety, so as to explore new market opportunity and enhance its competitiveness in the market;

(ii) a local technology company will set up two smart electrospinning production lines for nanofiber filter material. Traditional needle-type electrospinning production line faces a number of problems, e.g. easy needle clogging which requires manual replacement of needles, no real-time monitoring system and limited collectable data, etc. The smart production line to be set up could enhance production efficiency and quality, as well as create smart production related jobs to nurture local talent with knowledge on the area; and

(iii) a local biotechnology company will set up four smart production lines to produce biochips for diagnostic rapid testing. Through smart technologies like real-time data and robotic systems, the whole production process will be completed in the clean room environment, thereby increasing the production capacity and at the same time reducing product contamination risk and preventing work injury of staff due to prolonged working hours. The planned smart production line can enhance production efficiency and quality, and hence can raise production capability of the biochips to meet market demand.

TECHNOLOGY SUPPORT

8. In terms of technology, HKPC is determined to assist enterprises to move towards high value-added production and gradually upgrade to i4.0. With the set up of the INC Invention Centre ("the Hatch") in collaboration with the Fraunhofer IPT Germany to introduce i4.0 related technologies, it supports Hong Kong enterprises in adopting innovative industrial technologies and promoting the development of smart industries. Meanwhile, HKPC also implements the "i4.0 Upgrade and Recognition Programme". Its professional consultant team is qualified as "Certified i4.0 Trainer & Expert" and "Implementation Consultant" by Fraunhofer IPT Germany. Through the integration of artificial intelligence, robotics,

Internet of Things, human-machine interface, big data and other technologies, the team facilitates enterprises to build intelligent production lines. More than 20 industries and 50 enterprises have applied intelligent manufacturing technology for production. In addition, HKPC also operates "Inno Space" and "Digital@HKPC (Digital Transformation)"[1] to promote "re-industrialisation" and assist the industry in moving towards smart production.

9. In addition, HKPC actively assists local companies in setting up new i4.0 smart production lines in Hong Kong. As a technical consultant, HKPC supports companies in the design and establishment of smart production lines to attain the 1i maturity level of i4.0 (meaning "vertical integration and data visualisation"), ranging from factory plant layout, production and logistics, digitalisation, smart technology, to IIoT and training, etc. Through the established foundation of i4.0, companies can perform diagnostic, predictive, and even indicative analysis, as well as enhance production parameters, processes and sales strategies in real time, which further advance production efficiency, product quality and sales return. HKPC also organises different kinds of training courses and seminars to introduce new technologies and the latest scientific research results, and encourage the industry to seize the opportunities brought by I&T.

ENCOURAGING AND SUPPORTING R&D

10. R&D is the foundation of I&T. To encourage more enterprises to conduct R&D locally and foster the development of I&T and the economy, the Government amended the Inland Revenue Ordinance in 2018 to provide a two-tiered enhanced tax deduction regime for expenditure on "qualifying R&D activities" incurred by enterprises. As at June 2021, the claims for tax deduction on R&D expenditure for the year of assessment 2019-20 amounted to about $3.21 billion, representing close to a double increase as compared to $1.67 billion for the year of assessment 2017-18 (i.e. prior to the implementation of the measure). About 70% of the claims were eligible for enhanced tax deduction, which indicates that the relevant tax measure could attract and encourage enterprises to devote more resources in local R&D activities.

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[1] "Digital@HKPC (Digital Transformation)" is one of the themed exhibition areas in the HKPC building installed with different smart production lines to demonstrate the application of "Industry 4.0" technology.

11. On financial support, ITC currently administers 17 funding schemes under the Innovation and Technology Fund ("ITF"), each having its own objectives, including various funding schemes[2]which support R&D. These schemes provide funding support for R&D projects of eligible organisations and enterprises, or provide cash rebate for eligible R&D expenditure of enterprises. In the past four years (financial year 2017-18 to 2020-21), ITF funded about 13 000 projects with a total commitment of about $11.066 billion, amounting to 3.9 times and 2.2 times of those of the previous four years respectively. They include about 1 560 R&D projects (with a total commitment of around $4.654 billion).

12. Furthermore, Hong Kong possesses excellent scientific research talent in various local universities and institutions. The five R&D centres established by the Government[3] will also continue to work on applied R&D related to re-industrialisation in close collaboration with the industry, thereby fostering the commercialisation of R&D outcomes. To fully unleash our strengths in scientific research and foster technology transfer as well as realisation of R&D results, we have increased the funding amount for the 16 State Key Laboratories in Hong Kong, six Hong Kong Branches of the Chinese National Engineering Research Centres, Technology Transfer Offices of seven designated universities[4] and the Universities and the Technology Start-up Support Scheme for Universities starting from 2019-20 and made the funding recurrent.

EXAMPLES OF IMPLEMENTING RE-INDUSTRIALISATION

13. The Government has achieved good results in helping traditional industries enhance their technologies through "re-industrialisation" in recent years. Supported by the Research and Development Cash Rebate Scheme ("CRS") of ITC, an enterprise commissioned HKPC to tailor-made the "Owl" intelligent production line, including the R&D of the technology, design, planning, and even machine assembly and testing for the entire production line and system. It demonstrates Hong Kong's success in

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[2] Namely the Innovation and Technology Support Programme, Mainland-Hong Kong Joint Funding Scheme, Guangdong-Hong Kong Technology Cooperation Funding Scheme, Partnership Research Programme, Enterprise Support Scheme and Research and Development Cash Rebate Scheme.

[3] Namely the Hong Kong Applied Science and Technology Research Institute, Nano and Advanced Materials Institute, Logistics and Supply Chain Multitech R&D Centre, Hong Kong Research Institute of Textiles and Apparel, and Automotive Platforms and Application Systems R&D Centre.

[4] The University of Hong Kong, the Chinese University of Hong Kong, City University of Hong Kong, the Hong Kong University of Science and Technology, Hong Kong Baptist University, the Education University of Hong Kong and the Hong Kong Polytechnic University.

achieving "re-industrialisation" by building intelligent manufacturing production line[5]. The production area occupies only 10 000 square feet, which is significantly reduced by half compared with the traditional industrial production line, yet the overall production capacity has increased by 1.5 times. Compared with the traditional production line, the "Owl" smart production line can reduce the manpower by 60%, and it is estimated that the production cost can also be reduced by 15% to 20%.

14. Moreover, with the funding support of CRS, a local company, with producing plastic products in the Mainland being its core business, commissioned HKPC to develop and establish an intelligent production line for manufacturing optical adaptive lenses in Hong Kong, successfully developed its high value-added product lines and supply chains. Leveraging this, the company is able to open the Mainland and European markets with its "Made in Hong Kong" products. The intelligent production line, consisting of six machines and about 30 metres long, occupies only about 3 000 square feet and requires only two people to operate with a maximum production capacity of 100 lenses per hour.

15. Furthermore, examples of applied R&D developed by the R&D centres established by the Government include:

(i) The Hong Kong Applied Science and Technology Research Institute has developed a high-resolution optical inspection hardware system and deep learning-based defect classification software for quality control in production lines to replace the traditional manual inspection methods. Such software can reduce production costs such as manpower and operating space and enhance production quality and efficiency.

(ii) The Logistics and Supply Chain MultiTech R&D Centre has developed the "Follow-me" robot and platooning technology especially for local warehouses and factories to help improve efficiency of warehouse and production lines. The "Follow-me" robot can help operators move large and heavy items, thus ensuring occupational safety and reducing labour costs.

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[5] From R&D to delivery, HKPC spent two years to complete the "Owl" intelligent production line which adopts a U-shape compact layout design equipped with 12 robotic arms with high precision assembly capability to effectively reduced the production defect rate from 1.5% to 1.2%.

(iii) In terms of application of materials, the Nano and Advanced Materials Institute has licensed its patented germicide-free and durable antibacterial coating for hospital facilities to an enterprise to develop an anti-bacterial and durable handrub formulation as well as antibacterial and antiviral surface coating. The enterprise has set up a production line in Hong Kong since 2020 for the related products.

(iv) The Hong Kong Research Institute of Textiles and Apparel has developed a clean and enclosed industrial system for recycling old clothes to fibres. Through sanitisation and mechanical means, the system up-cycles old clothes to fibres so that the good physical properties of the fibres can be kept for producing yarn and fabric. The up-cycling process makes use of a high degree of automation through the use of automated guided vehicles and intelligent control of conveyors. Colour-sorted fibres can be used directly for spinning without the need for dyeing and finishing. The whole production process is waterless. A local company has adopted this new technology and set up an environment-friendly yarn production line in Tai Po IE in September 2018.

(v) The Automotive Platforms and Application Systems R&D Center has developed a technology for the secondary use of retired electric vehicle batteries to support the development of Hong Kong battery recycling industry. It promotes the development of new generation of local battery industry, and addresses the current environmental issue of disposing Hong Kong's retired electric vehicle batteries to the Mainland or other places.

WAY FORWARD

16. We noted that many entrepreneurs have expressed interests in investing in smart production in Hong Kong, and the industry has been proactively upgrading their existing production lines towards i4.0. We will strive to work in accordance with the National 14th Five Year Plan, assessing the changes in internal and external circumstances, and enhancing our work in promoting "re-industrialisation" in close collaboration with the industry, the academia and research institutes.

ADVICE SOUGHT

17. Members are invited to note and provide views on our work in promoting "re-industrialisation" in Hong Kong.

Innovation and Technology Bureau
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