Development of innovation to lift Hong

Hit by the Asian financial crisis, many Hong Kong people begin to realize that a sound economy cannot solely rely on the finance and property market. There is an urgent need to diversify the economy more than ever.

The expenditure-based Gross Domestic Product (GDP) for the third quarter of 1998 released by the Government's Census and Statistics Department revealed a 7.1 per cent drop in real terms over the same period of the previous year. Unemployment rate reached 5.5 per cent in late 1998. Property prices have collapsed to about half of their heady heights of mid-1997. The territory is experiencing an unprecedented recession.

The road to recovery is full of challenges and chances. In an attempt to boost the future growth of the economy, the SAR Chief Executive Mr. Tung Chee-hwa announced his intention to make Hong Kong a "regional innovation centre" in his second policy address in 1998.

Under the chairmanship of Professor Tien Chang-lin, former Chancellor of the University of California at Berkeley, the government-appointed Commission on Innovation and Technology completed its interim report last September.

Concurrently, the Government announced its decision to inject $5 billion for the establishment of an Innovation and Technology Fund, and the setting up of an Applied Science and Technology Research Institute to boost the territory's mid-stream research capacity.

At the press conference announcing the Commission's First Report on October 9, 1998, Prof. Tien pointed out that it was crucial for Hong Kong to map out its position in the knowledge-based economy against increasing world competition.

He further commented that Hong Kong must create new and more effective niches through innovation and technology in order to ensure longer term economic stability and growth. Innovation and technology were important to all sectors of the economy, including traditional and low-tech manufacturing industries, as well as service industries. They might be applicable to every aspect of the value-adding chain.

"We envision Hong Kong to be an innovation-led, technology-intensive economy in the 21st century, serving the region as a centre for the development and commercialisation of innovative ideas and technology, in addition to Hong Kong's current role as a business and financial centre."

Prof. Tien introducing the First Report of the Commission on Innovation and Technology.

"While industry must make its own choices and investments, the Government should play the role of a promoter, facilitator and supporter," Prof. Tien said.

The Government's determination is clear. As Mr. Francis Ho Suen-wai, an ex-officio member of the Commission and the Government's Director-General of Industry, said: "The 21st century will be a knowledge-

and technology
Kong out of economic turnmoil

by Wilfred Lai

based world. In a knowledge-based global economy, innovation and technology are essential in adding value, increasing productivity and enhancing our overall competitiveness."

"In the world's largest economy, that of the United States, 80 per cent of productivity growth is attributed to technological and knowledge-based advances. To achieve success in this area, however, requires a dedicated effort and a commitment to investing in the necessary technological infrastructure. Although the rewards may not be immediately apparent, this is an essential investment in our future," said Mr. Ho.

Innovation comes in many forms, but the Government's current preoccupation is decidedly high technology of an applied nature.

"Some people associate high technology with state-of-the-art products, such as aerospace and supercomputers. However, technology is not remote from our everyday life at all. Technology with high or new scientific contents that creates or adds value to our products and service actually abounds. A very good example is the use of smart cards."

"Moreover, innovation and technology are not the prerogative of new industries. In the same way that banking and transportation may be revolutionized by innovation and technology, so may other so-called traditional industries, such as textiles, garment, plastics and metal." Mr. Ho added.

"To achieve this goal, the government effort alone is surely not enough. I am delighted to see that academia and the private sector are taking active initiatives in helping the process," he observed.

Initially, the Government's plan on innovation and technology has been met with skepticism, because Hong Kong has no technological infrastructure in respect of midstream research and development. In a single year, the total expenditure on research and development from all sources is usually less than 0.5 per cent of the territory's GDP. In comparison, other Asian economic powerhouses like Singapore and Taiwan are investing far more in research, with an annual expenditure between 1 and 1.5 per cent of their total national GDP.

Dr. Lily Chiang, Executive Director of the locally-listed Chen Hsong Group, agrees that the investment amount is insufficient: "Even a single factory in Taiwan can spend one billion (US dollar) on an expansion. The Government's investment is not very significant."

The Government is not fighting a lonely battle. There is a growing consensus on the development of innovation and

Mr. Ho Suen-wai

technology among the industrial sector and the community at large.

Mr. Henry Tang Ying-yen, a leading industrialist on the panel of the Commission on Innovation and Technology, said: "The Asian financial crisis has prompted the government and the community to realize the stabilizing function of industry in the economy structure.

Mr. Henry Tang is optimistic about the development of innovation and technology.

This is surely a golden opportunity for the long term development of industry."

"The future growth of industry hinges on three principal factors: investment, human resources and government policy. None of these can be missing."

"The government can provide a conducive business environment like lowering tax for companies with major focus in research and development. Besides, the setting up of a second stock exchange can help technology-based companies to gather more resources."

Besides, Mr. Tang also called for a closer partnership between the industry and the academia.

"University researchers must understand that what the industry needs is not distant and unreachable. What we need most are midstream researches that are readily applicable in our daily life. At the same time, industrialists should be aware of the latest research results, and make use of their business acumen to identify suitable products for commercialization."

The partnership between academia and industry has indeed come a long way.

Traditionally, university researchers do not want to confine themselves to applied research. To increase the chances of success in midstream research, many universities realize that a closer involvement with industry is almost an irrevocable trend. The Massachusetts Institute of Technology's *Made by Hong Kong* study in 1997 further re-affirmed the need to increase allocation of resources to research and development in order to assist local industry move to higher value-added activities.

Nevertheless, providing support to industry is by no means an easy task, as pointed out by Mr. Alwin Wong, Head of Industrial Development (Technology Resources) of The Hong Kong Polytechnic University. "To expedite the use of advanced technologies, availability of the requisite human resources is essential."

"The PolyU is fully committed to meeting the needs for professional manpower. Besides, the University also encourages its staff to support the industry by conducting applied researches and providing consultancy services," Mr. Wong continues.

The two major objectives of the University are not mutually exclusive. Since 1990, the Institution has been operating a Teaching Company Scheme under which graduate research students are placed full-time in participating companies for two years to undertake research of specific concern to the company. The student receives a full salary contributed equally by the University and the company concerned, and is guided by an academic supervisor from the University as well as by supervisors from the company.

Through this operation model, participating companies will benefit from the research deliverables, and students will benefit from their practical research experience in a genuine business environment. So far a total of 38 projects has been successfully completed for the industry.

The Scheme has won high acclaim not only from the industry but also from the Commission on Innovation and Technology. The Commission noted in its interim report: "We consider the Scheme a good model for fostering university-industry partnership and recommend that it should be promoted to other universities."

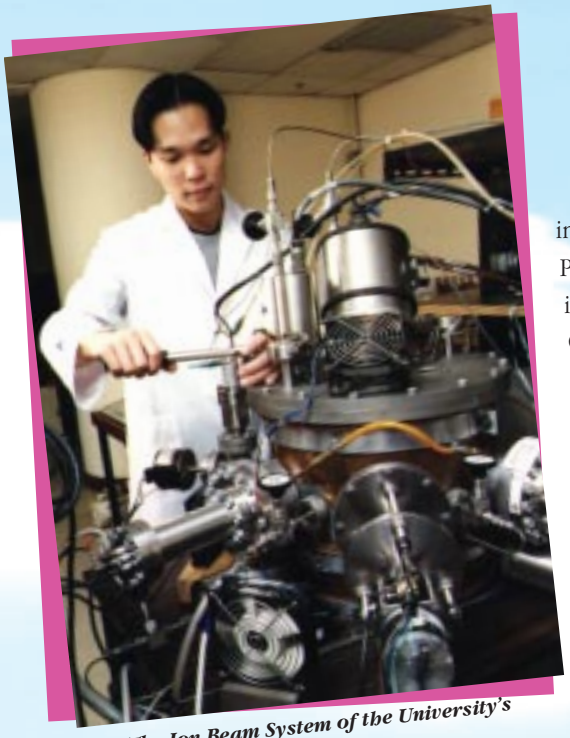
In 1996, the PolyU earmarked the Industry-Guided Research and Development (IGARD) Fund from its internal reserve to stimulate applied research with well-identified industrial application. Part of the industry-guided nature is reflected by the requirement that endorsements must be obtained from at least two reputable establishments in the relevant industry ascertaining the value of the projects.

A laboratory of the University's Department of Rehabilitation Sciences.

More recently, the PolyU is actively working on the establishment of the Rapid Product Development Syndicate (RAPRODS) under the aegis of its non-profit-making services arm, the PolyU Technology and Consultancy Company Ltd.

"To realize the vision of establishing Hong Kong as a regional innovation centre, Hong Kong companies must be prepared to move from original equipment manufacturing to original design manufacturing, " Mr. Wong said.

Two of the key figures behind the operation of RAPRODS: Mr. Alwin Wong (right) and Mr. Yanta Lam, Associate Professor of the PolyU's School of Design.



The Ion Beam System of the University's Materials Research Centre.

"The latter involves investing in new products and new brands – a research and development process which most Hong Kong firms have been reluctant to embrace. Therefore, the PolyU is trying to fill in this niche by making use of its expertise in engineering, product development and industrial design."

What is more, RAPRODS is well poised to tape on the vast research potential of the Mainland through its connection with the International Strategic Technology Alliance (ISTA), an expertise network initiated by the PolyU. Apart from the PolyU, ISTA's current membership includes 14 leading universities in the Chinese Mainland, the University of Warwick in the UK and Purdue University in the US.

According to PolyU's experience, collaboration with institutions on the Mainland proves to be a huge success. The University has successfully completed 14 products for commercialization despite the relatively short history of ISTA.

The new products have gained strong support from the industry. Pro-Health Technology Limited, a member of the Chen Hsong Group, has commercialized eight medical-related products out of the 14 breakthroughs. Dr. Lily Chiang said: "Our project with the PolyU fully exemplifies the tremendous potential for collaboration between industry and academia."

In a broader perspective, the Government has also taken many other steps to provide a congenial environment for Hong Kong's inventors. The newly set up Patent Application Grant has supported 31 patent-seekers by covering the various costs involved in the registration process, and the construction of the territory's first Science Park is in full swing. Situated in a site of 22 hectares in Tai Po, the Science Park will provide office premises for rent to technology-based companies and land plots for lease to firms that plan to purpose-build their own premises for intensive research and development.

Is any place too late for innovation and technology? At least this is not the case for Israel. In seven years' time, the country came from nowhere to become in the forefront in the world's information technology industry.

In the next phase of its work, the Commission on Innovation and Technology will examine issues not fully covered in the first report. These include measures to attract technological talents to Hong Kong, fostering a culture of innovation and technology in industry, improving the business environment and reviewing institutional arrangements.

Coupled with the entrepreneurial drive and resilience of Hong Kong people, it is highly likely that innovation and technology will become the future drives of the economy.

發展創新科技刻不容緩

受到亞洲金融風暴的衝擊，很多香港人覺察到一個健全的經濟體系不能單靠金融業和地產業，而需要多元化發展。政府持續多月的統計數據顯示經濟呈負增長，失業率不斷飆升，樓價從九七年的高位下滑近乎一半之多；這一切顯示，香港正處於嚴峻的經濟衰退期。

為了促進香港未來的經濟發展，特區行政長官董建華先生在一九九八年發表的第二份施政報告中訂下明確的目標，要將香港發展成為華南以至整個亞太區域的「創新科技中心」。與此同時，政府委任的創新科技委員會在田長霖教授的領導下亦完成了首份報告書。政府隨即宣佈耗資五十億港元設立創新科技基金，並籌組成立應用科技研究院大力促進中游研究的發展。

田長霖教授公布第一份報告時表示，香港需要在以知識為本的全球經濟中定位，以應付來自世界各地及日益增加的競爭。

田教授重申，為了確保長期經濟穩定和增長，香港必須通過創新及科技去發展新的、效用更高的優勢。他認為創新及科技對經濟體系的所有行業，包括傳統或低科技的製造業和服務業，均十分重要；創新及科技亦可適用於增值鏈的各個環節。

田教授說：「我們憧憬香港在二十一世紀會成為以創新為主導和技術密集的經濟體系，不僅是區內的商業和金融中心，亦是將創新意念和科技發展及商業化的中心。產業本身固然必須作出選擇和投資，政府也要擔當推動、協助和支援的角色。」

特區政府發展創新科技決心堅定，據創科會官方成員之一工業署署長何宣威先生表示：「廿一世紀的全球一體化經濟體系將會以知識和資訊為基礎，香港必須發展創新的動力和發展科技的能力，才可以增強本身的競爭力。雖然現時政府的投資未可以立即取得回報，然而這項投資對香港的將來發展非常重要。」

「要達到這目標，政府單方面的努力是不足夠的。我很高興見到學界與私營產業正積極採取行動，推動這項發展。」

對於政府勾劃的創新科技藍圖，也有社會人士感到疑慮。其中一個主要原因，是政府投資在科研的資源太少，每年不足國民生產總值的百分之零點五。正如震雄集團行政總裁蔣麗莉女士說：「在台灣，單是一所科技工廠擴充的資金已達十億美元，香港政府的投資算得上是甚麼？」

然而，政府並不是孤軍作戰；因為有愈來愈多社會人士支持創新科技的發展理念。

創科會成員之一，資深工業家唐英年先生稱：「亞洲金融風暴的發生正好給予香港工業一個好機遇，讓政府及社會上更多人認同工業對穩定經濟的重要作用。」

唐先生表示，工業的長遠發展必須具備三項條件：資金、人才、政府政策。這三項條件必須互相配合，缺一不可。他呼籲政府透過稅務優惠鼓勵企業發展科研項目，並成立第二板市場協助以科技為主的中小型企業籌集資金。

此外，唐先生認為工業界必須與學術界緊密溝通和合作，讓科研人員了解工業所需的並非尖端科技，而是可應用於日常生活的科技；同時，工業家也知道最新的科研進展，憑著他們豐富的市場經驗，找出合適的科研成果，予以應用及進行商品化。

要促進學術界與工業界合作發展殊不容易。傳統上，大學科研人員不想局限於應用研究。為了爭取開發中游研究的成功機會，各大專院校必須認同要與工業界加強連繫的重要性。

據香港理工大學工業發展（科技資源）處總幹事黃亮先生表示，理大一向以培育社會專業人才為主，發展的研究項目也著重實用性。

黃先生並舉出該校的廠校合作研究計劃，說明學術界與工業界合作的可行性。自一九九零年以來，理大一直推行廠校合作研究計劃。根據這項計劃，修讀研究生課程的大學生會獲得安排在參加計劃的私人公司擔任全職工作，為期兩年，負責研究該公司所關注的特定課題。參加計劃的學生所收取的薪金，由大學和有關公司各支付一半。大學的學術導師和該公司的督導人員，都會為學生提供指導和意見。

這項計劃可謂一舉數得，因為參加的公司可以得到切實可行的研究成果，而學生則可在現實商業環境中，汲取實際的研究經驗。此外，有關學院亦可藉此與產業保持更密切的聯繫，以及加深對產業問題的認識。

廠校合作研究計劃不但取得業內人士一致好評，更獲得創新科技委員會在首份報告書中稱許：「我們認為這項計劃是促進大學與產業締結夥伴關係的典範，因此建議應推廣至其他大學。」

此外，理大更在一九九六年成立工業主導的應用科技研究及發展基金，推動學術界與工業界合作發展用途清晰明確的應用研究。研究人員必須取得兩所企業保薦，才可獲得資助。

近期，理大更積極籌組成立創新產品快速開發體，藉以加強理大科技及顧問有限公司的服務。

黃亮先生稱：「若香港要成為亞太區內的創新科技中心，企業必須著重產品設計、建立自己的品牌。」

「由於大部份的香港公司都不願意投資科研及產品設計，理大正嘗試綜合校內的工程、產品發展及工業設計人才，填補這個缺口。」

據黃先生表示，新部門更可以透過理大成立的「國際應用科技開發協作網」，善用內地豐富的科研人才與資源。協作網自九五年成立以來，已成功將十四項科研成果商品化。協作網成員包括內地十四所重點大學，近期更獲英國華威大學和美國普渡大學加盟。

從宏觀角度剖析，特區政府正採取多項措施為本地的發明家締造有利的環境，例如新成立的專利申請資助計劃正協助三十一個單位申請產品專利權。此外，預期在大埔的科學園建成後，可為以科技產品為主的公司提供租值相宜的選址地方。

在下一階段，創科會會進一步研究多項題目；包括培育能勝任科技發展的人才，吸引科技人才來港工作，培養創新科技的風氣，及維持有利工商業發展的環境。憑著香港人的企業精神和不屈不撓的心志，創新科技極有可能成為香港經濟的未來新動力。