

Public Consultation on
Digital 21 Strategy

Continuing to build on our strengths
through technology across the community

October 2006

Commerce, Industry and Technology Bureau
The Government of the Hong Kong Special Administrative Region

2007 Digital 21 Strategy

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Foreword

This document sets out the draft 2007 Digital 21 Strategy, an updated blueprint for the development of information and communications technology for Hong Kong. We aim to promulgate the finalised 2007 Digital 21 Strategy within the first half of 2007 after consulting the public.

We welcome public comments on the draft 2007 Digital 21 Strategy, which can be sent to the Office of the Government Chief Information Officer of the Commerce, Industry and Technology Bureau by 18 December 2006 by any of the following means:

Post Office of the Government Chief Information Officer
Commerce, Industry and Technology Bureau
2/F, Murray Building
Garden Road
Hong Kong

Fax (852) 2511 1458

E-mail digital21@ogcio.gov.hk

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For enquiries on this public consultation, please contact Mr Louis Leung, Administrative Officer of this Office, at 2189 2309.

**Office of the Government Chief Information Officer
Commerce, Industry and Technology Bureau
October 2006**

Executive Summary

I Background

- The Digital 21 Strategy was first published in 1998 by the Government of the Hong Kong Special Administrative Region to set out our vision of developing Hong Kong into a leading digital city. As a living document, updated in 2001 and 2004, it has taken into account the evolving needs of the community and technological advancements.
- In the 2007 edition, we note that Hong Kong offers the world's most affordable Internet connection and mobile phone services with penetration rates among the highest in the world. Cyberport and the Hong Kong Science Park have been developed as strategic hubs bringing together clusters of high-tech information and communications technology (ICT)¹ companies and professional talent from all over the world. The Government is pursuing a vigorous e-government programme that has achieved good progress over the years.

II The Challenge

- There are opportunities and challenges ahead to ensure Hong Kong continues as a leading digital city. Technology and innovation will continue to play a key role in helping Hong Kong to compete by enabling businesses to transform and provide goods and services of increasing value. Harnessing our role as the two-way platform assisting Mainland enterprises to bring in foreign investment and

¹ This document generally adopts "ICT" as the term to refer to all technologies and applications that involve information processing and/or exchange over communication network(s), including the Internet. Nevertheless, we have kept the term "IT" (information technology), which is generally used interchangeably with ICT by the industry, in the naming of specific programmes or projects.

participate in the global economy is a critical opportunity and challenge that underlines Hong Kong's positioning as a source of competitive advantage.

- Moving towards the vision of an inclusive, knowledge-based society, we need to ensure that the benefits of ICT adoption are widely available to different segments of the community. Issues relating to data standards, information management and intellectual property rights protection become areas of increasing focus.

III Moving Ahead

- The Government has a significant role as an ICT investor, the sponsor of the e-government programme, a supporter of research and development (R&D) and innovation, the regulator, a champion of digital inclusion and a facilitator of cross-boundary technological cooperation.
- **The vision underpinning the 2007 Digital 21 Strategy is “advancing our achievements and seizing new opportunities: building on Hong Kong’s position as a world digital city”.** To lay the foundation for ICT-enabled development in Hong Kong in the next decade, the Government has identified the following key action areas in 2007 Digital 21 Strategy for implementation between 2007-2010.

(i) Promoting advanced technology and innovation

- We will strengthen Cyberport and the Science Park, with their technological talent and excellent infrastructure, as hubs for innovation and technology.

- We will facilitate intellectual property transfer and commercialisation of innovation through the newly established R&D Centres.
- The Government through the ICT industry will provide focus and support (where appropriate) to important technology domains including: (i) communications technologies; (ii) development of digital content; (iii) sensor and identification technologies; (iv) software development and packaging; and (v) next-generation Internet.

(ii) Developing Hong Kong as a hub for technological cooperation and trade

The Government

- has established channels to cooperate with Mainland authorities and Guangdong Province on innovation, information management, and technological development.
- is facilitating the continued upgrading of the ICT workforce through developing competency standards to strengthen training and is paving the way for professional recognition and a vibrant ICT industry.
- will ensure the continued presence of a conducive business environment for technological business to flourish.
 - Information security: we will publish a risk assessment and electronic authentication framework in 2008 for public reference.

- Privacy safeguards: vigorous efforts will continue to be made to safeguard personal data privacy.
- Protection of intellectual property rights: building on safeguards for intellectual property rights through legislation, we will put in place necessary digital rights management infrastructure to cultivate a legal software download culture in the community.
- Development of data standards: we will collaborate with different sectors to develop industry-specific data standards to facilitate the provision of joined-up, value-added services.
- Regulatory framework: we will establish the Communications Authority as the single regulator for the communications sector.

(iii) Enabling the next generation of public services

- The Government is committed to leading by example in the use of e-business, for both internal and public services.
- The focus of e-government programme is a citizen-centric mode of service delivery emphasising on customer engagement and information management. Increased efforts will be made to integrate services across Government bureaus, departments and agencies.
- The new Government portal, GovHK, introduced in September 2006 as the single entry point to online Government information and services provides the necessary platform for transformation to a citizen-centric mode of service delivery. We are committed to exploring private sector participation to provide value-added services on GovHK.

- As e-channels grow, we need to examine the possibility of rationalising different delivery channels according to what customers need and value. A Channel Management Strategy will be developed in 2007 for this purpose.
- Subject to funding approval by the Finance Committee, we will pursue pilot electronic procurement projects and formulate plans for further roll-out in the Government so that we can encourage private sector suppliers to adopt electronic commerce, thereby improving their competitiveness.
- We envisage that the existing e-government investment is a basis for the development of a next-generation government where the programme becomes fully engrained in policy-making and the daily business of all government bureaus and departments. Healthcare and transportation are potential areas for the provision of highly integrated and personalised services to citizens across both public and private sectors.

(iv) Building an inclusive, knowledge-based society

- We will lead discussions across the community toward the following five goals to move Hong Kong towards an inclusive, knowledge-based society: (i) broadband connectivity for every citizen; (ii) allowing every student access to ICT facilities to support learning; (iii) more affordable access to industry software solutions; (iv) information management; and (v) digital rights management infrastructure and culture.

- The Government will publish the third IT in Education Strategy in 2007 to propose specific measures to empower the education sector to better exploit the potential of ICT in enriching learning and knowledge.
- We propose to set up a task force to formulate a strategy and initiatives for digital inclusion.

IV Conclusion

- The Digital 21 Strategy sets out our vision of building on Hong Kong's position as a world digital city through advancing our achievements and seizing new opportunities. The realisation of the vision requires the participation of the entire community including the ICT industry, business sectors, academia and the general public.
- The Office of the Government Chief Information Officer is the focal point in the Government for dialogue with the public on the proposed Strategy and for coordinating with all parties within the Government on the implementation of the Strategy after its promulgation.

Chapter One: Where We Are

- 1.1 The Digital 21 Strategy was first published in 1998 by the Government of the Hong Kong Special Administrative Region to set out our vision of developing Hong Kong as a leading digital city in a globally connected world. The aim of the strategy is to outline how Government, business, industry, academia and the public can work together to achieve this goal. It is a living document that requires constant review to take account of advances in technology and the changing needs of the community. Updates to the Strategy were made in 2001 and 2004.

- 1.2 Progress and achievements in ICT development in Hong Kong have received international recognition. The Economist Intelligence Unit ranked Hong Kong second in the Asia Pacific region in 2006 in terms of e-readiness. With market liberalisation, which generates healthy competition, Hong Kong offers the world's most affordable Internet connection and mobile phone service according to a survey conducted by the International Telecommunication Union (ITU) in 2005. Hong Kong ranked fifth in the world in digital inclusiveness, according to the Digital Opportunity Index 2005 developed by the ITU, which measures opportunity, maturity of infrastructure and ICT utilisation among businesses and the general public. The Government's leadership in developing electronic applications in the delivery of public services has also received international recognition (see Box 1).

International recognition of Government ICT projects

- The “Policing Disease” project gained the Stockholm Challenge Award in 2004 for its innovative application in turning the Hong Kong Police Force’s IT system into a smart tracking system to identify the chain of human transmission of severe acute respiratory syndrome (SARS).
- The Hong Kong Smart Identity Card was awarded the Card Technology Breakthrough Award in the implementation category by Card Technology Magazine in 2004. In 2005, the Entry/Exit Processing and Records System implemented at immigration control points won the Pioneer Award of the 7th Annual Government Solutions Center Award conferred by the e-Government Institute of the United States.
- In the Asia Pacific ICT Awards 2005, the Hospital Authority’s Electronic Patient Record with Radiological Image Distribution won the top prize in the healthcare category, while the Immigration Department’s Face Recognition System was the winner of the e-Government and Services category.

1.3 Key indicators on where Hong Kong stands in digital connection are shown in Box 2 below.

Where do we stand?

- Broadband can be reached by all commercial and residential buildings
- Equipped external telecommunications capacity: 1,152 Gbps (March 2006)
- Mobile phone penetration rate: 125% in 2006 (104% in 2003)
- Household PC penetration: 70% in 2005 (68% in 2003)
- Broadband household Internet penetration 66% in 2006 (50% in 2003)
- PC penetration in business: 60% in 2005 (55% in 2003)
- Internet penetration in business: 55% in 2005 (48% in 2003)
- Over 50% of businesses adopted some form of e-business in 2005

1.4 The 2004 Strategy set out eight action areas, namely government leadership, sustainable e-government programme, infrastructure and business environment, institutional review, technological development, vibrant IT industry, human resources in a knowledge economy and bridging the digital divide. Most of the initiatives set out in the Strategy have been successfully completed. The remaining items are ongoing and proceeding on schedule. A summary of the implementation of the 2004

Strategy is shown in Box 3 below.

Box 3

Progress of implementation of 2004 Strategy

- The Digital Media Centre opened in Cyberport in March 2004 to provide hardware, software, technical and marketing support to the digital entertainment industry.
- All four phases of Cyberport were completed by June 2004, creating an environment for a cluster of ICT companies dedicated to developing new technologies, applications, services and content.
- The implementation framework for digital terrestrial television was announced in July 2004.
- The second IT in Education Strategy, entitled “Empowering Learning and Teaching with Information Technology”, was published in July 2004.
- Since December 2004, Hong Kong permanent residents holding the smart Identity Card can perform self-service immigration clearance at control points installed with e-channels.
- The Digital Solidarity Fund was set up in 2004 to sponsor worthwhile digital inclusion projects.
- Since 2004, six different industry sectors have benefited under the Sector-Specific Programmes to promote e-commerce adoption.
- Special arrangements for Hong Kong IT service suppliers in respect of Computer Information System Integration Qualification Certification under the Mainland and Hong Kong Closer Economic Partnership Arrangement started in January 2005.
- A collection of guidelines on the selection and adoption of open source software and management issues relating to its usage were issued for reference by Government bureaux and departments in July 2005.
- An Industry Training Advisory Committee was established in July 2005 to oversee the development of a Qualifications Framework for the ICT industry.
- The “Three Smart Tips to Clean PC” campaign was launched in 2005 to enhance public awareness of information security.
- Anti-spam measures were launched in 2005.
- In 2005-06, about 93% in value of our new IT projects were outsourced. The hosting services for departmental information systems of the Central Computer Centre were also outsourced in 2006.
- Five research and development centres were set up in April 2006 with strategic focus in five areas, automotive parts and accessory systems, logistics and supply chain management enabling technologies, nanotechnology and advanced materials, ICT, and textiles and clothing.
- The Unsolicited Electronic Messages Bill was introduced into the Legislative Council in July 2006.
- The GovHK one-stop portal, the main Internet gateway to government information and services, was soft launched in September 2006 to provide user-friendly e-government services.
- A three-year pilot scheme to open up intellectual property ownership in Government IT systems was implemented in 2006.
- The “3G Cyberport” Project to support the development of innovative 3G applications was completed in 2006.

Chapter Two: The Challenge

- 2.1 The Information Age presents challenges as well as opportunities for economies all over the world. Competition in the global market is moving from purely cost considerations to selection based on quality and usability. Technology offers huge potential, not only in terms of lowering cost through productivity and efficiency gains, but more importantly in the value it can offer consumers through business transformation leading to better quality goods and services.

- 2.2 Developing economies that are relatively unencumbered by legacy systems are making significant progress in adopting state-of-the-art technology, which enables them to upgrade their production along the value chain. Falling under this category is the Mainland economy, which has undergone remarkable economic advancement over the past few decades. This generates new dynamics in its economic relationship with Hong Kong. The challenge is to sustain Hong Kong's edge amid growing competition from other economies. We believe technology and innovation play key roles in helping Hong Kong meet the challenge.

- 2.3 First, Hong Kong is currently the 11th largest trading economy in the world and trading will continue to be our lifeblood. Economic advancement on the Mainland makes it both a supplier and consumer of technology and related products. Hong Kong has the essential physical infrastructure and a strategic cluster of companies and professional talent from all over the world engaging in different technology businesses and innovative activities. Coupled with a conducive business environment and vigorous protection of intellectual property rights, Hong Kong can serve as a hub for technological cooperation and trade among local, Mainland and overseas enterprises.

- 2.4 Second, as a trading and services economy with an international clientele, effective communication and responsiveness to changing market conditions is of paramount importance in a competitive environment. This is particularly relevant to Hong Kong given the molecular nature of our economic structure with most companies being small and medium-sized enterprises (SMEs).² Connectivity can be significantly improved through the development of an ICT-enabled common platform and a virtual marketplace to support our financial and trading infrastructure.
- 2.5 Third, the vision of a ubiquitous society with total connectivity in everyday life is no longer fictional as we are moving towards media convergence and development of next-generation networks. This will give further impetus to the creation and exchange of digital content and information, which is expected to grow in exponential scale and speed. Apart from generating a new horizon of business opportunities for products and services that may revolutionalise our way of living, important issues such as data standards, information/content sharing and management, security and privacy considerations need to be properly addressed.
- 2.6 Fourth, continuing efforts are being made to deepen and broaden the e-government programme, in terms of introducing seamless services and revamping back-end business processes to tie in with front-end electronic services. The challenge is to entrench ICT in the business of bureaus and departments to provide efficient and user-friendly services to citizens, so much so that e-government will no longer be viewed as a distinct programme. A new form of ICT-enabled governance will emerge.

² In Hong Kong, 98% of our business establishments are SMEs, which together employ around 60% of our workforce in the private sector.

2.7 Fifth, in tackling concerns over the digital divide, we must recognise that ICT is in fact a powerful tool to increase social cohesion by connecting people and businesses, promoting the sharing of knowledge and enabling disabled people to gain better access to information and services. The Government will endeavour to promote the opportunities of ICT to all segments of the community so as to transform Hong Kong into an inclusive, knowledge-based society.

2.8 The ability to adopt innovative applications of technology in the business process and services are vital to enhance the competitiveness of Hong Kong as a service economy. We have identified five action areas to achieve our vision of strengthening Hong Kong's role as a world digital city:

- Facilitating a digital economy;
- Promoting advanced technology and innovation;
- Developing Hong Kong as a hub for technological cooperation and trade;
- Enabling the next generation of public services; and
- Building an inclusive, knowledge-based society.

2.9 The Government, the ICT industry, businesses, academia and the public must work together to realise this vision.

Chapter Three: Facilitating a Digital Economy

3.1 Continuing Government leadership and commitment is crucial in realising our vision of building on Hong Kong's position as a world digital city. The Digital 21 Strategy Advisory Committee provides the Government with expert advice, and the Government has a unique role to play in bringing businesses, the ICT industry, academia and the general public together through a consultative process to work out a blueprint for the city's future ICT development. This we have been doing in regular updates of the Digital 21 Strategy.

3.2 Apart from forging community consensus, the Government continues to play a significant role as a user, supporter and facilitator of ICT and its applications:

- The Government will continue to invest in IT to support and improve our operations. Over \$5.2 billion was earmarked for IT spending³ in the 2006/07 financial year. The outsourcing policy applies not only to new Government IT projects⁴, but also application maintenance and system management and operations.⁵
- Reviewing the experience gained in the implementation of existing electronic services, the Government will set the agenda for a deepened e-government programme with increasing interface with citizens and business, thereby encouraging migration to the electronic channel.

³ This is the amount of IT expenditure of the entire Government machinery, including the Housing Authority, Hospital Authority and subvented schools.

⁴ About 93% in value of our new IT projects in 2005-06 were outsourced.

⁵ The hosting services for departmental information systems of the Central Computer Centre, for example, have been outsourced since June 2006.

- In order to spearhead the development and application of advanced technology in the knowledge-based era, the Government will continue to demonstrate its support of advanced technology by providing financial assistance for R&D and innovative work and facilitate their wider application and commercialisation.
- The Government will ensure that the regulatory framework in relevant industries keeps abreast of advancement in technology and the changing needs of the community. The increasing convergence of telecommunications, broadcasting and information technology industries is an emerging reality.
- While penetration rates of mobile phones, computers and broadband connection in Hong Kong are high by world standards, the Government will sharpen its focus in implementing digital inclusion programmes among SMEs and citizens with special needs.
- Since ICT is very often embedded in merchandise as well as the business process, increasing trade and economic integration between Hong Kong and the Mainland also calls for closer cooperation in the ICT field. While business and technological collaboration between Hong Kong and Mainland enterprises are prevalent, the Government has a significant role to play in forging partnerships with the relevant Mainland authorities, such as the Ministry of Information Industry, Ministry of Science and Technology and our immediate neighbour, Guangdong Province, which has the Mainland's largest high-tech production share. Such strategic partnerships will provide the platform for cooperation between business enterprises of both sides. CEPA (Mainland and Hong Kong Closer Economic Partnership Arrangement) framework

and the Hong Kong Guangdong Cooperation Joint Conference are essential for such strategic partnerships.

3.3 The remaining chapters will detail the specific work of the Government in providing leadership in the above areas.

Chapter Four: Promoting Advanced Technology and Innovation

Leveraging on our technology infrastructure

- 4.1 The ability to harness technology and the business opportunities it generates is vital in enabling our economy to move up the value chain and stay competitive in the global market.
- 4.2 Cyberport and the Hong Kong Science Park are our technology flagships providing the infrastructure for the development of applied R&D, technological innovation and technology-related applications and businesses. They serve as hubs bringing together a strategic cluster of high-tech companies and professional talent from all over the world, thereby facilitating synergy and partnership among different segments of the ICT industry as well as research personnel in local universities. Phase Two of the Science Park will be completed in stages from 2007 to 2008 to cater for rising demand for technological infrastructure.

Continued investment in R&D

- 4.3 We will adopt a highly focused approach to support applied R&D to promote technology upgrading in different industries. Over \$2 billion has been earmarked under the Innovation and Technology Fund to set up five R&D Centres, all of which exploit applications of ICT. These Centres will be dynamic hubs that forge partnerships among multiple players including the ICT industry, different industrial sectors, academia and overseas/Mainland enterprises in the development, application and commercialisation of new technology.

4.4 The R&D Centre for Logistics and Supply Chain Management Enabling Technologies⁶ (R&D Centre for LSCM) was established in April 2006 to foster the development of core competencies in logistics and supply-chain-related technologies with Radio-Frequency Identification (RFID) as a key focus. The initial technology roadmap of the LSCM Centre focuses on three major areas, namely RFID tag and reader technologies, networking and infrastructure technologies, and applications and decision support technologies. Efforts will also be directed at the development of unified industry standards, which will facilitate adoption not only in Hong Kong but also in the wider Pearl River Delta Region. In this connection, the LSCM Centre will work closely with the RFID Support Centre of Guangdong Province in areas of mutual interest, such as applications relating to the tracking of cross-boundary movement of products. Research outcomes of the Centre are expected to enhance competitiveness of Hong Kong's global logistics operations by integrating information flow, legacy systems and business processes for better interoperability. Fierce competition from ports in the Pearl River Delta with much lower operating costs makes it critical for Hong Kong to harness technology to further drive efficiency and quality services in order to maintain its status as a major regional port.

4.5 In anticipation of rising interest and applications in RFID technology, the Science Park is planning to set up an RFID Laboratory under its Phase Two development for testing and demonstration of RFID in logistical applications.

⁶ The Centre is hosted by the University of Hong Kong, the Chinese University of Hong Kong and Hong Kong University of Science and Technology.

4.6 The R&D Centre for Information & Communications Technologies⁷. (R&D Centre for ICT) was established in April 2006 with the objective of promoting applied R&D and facilitating technology transfer and commercialisation under four closely interrelated domains – communications technologies, consumer electronics, integrated circuit design and opto-electronics. The work of the Centre will be complemented by the Wireless Communications Laboratory, which is scheduled to open at the Science Park in late 2006 to provide support services such as pre-compliance tests and measurement for 3G, broadband wireless access and ultra-wideband technologies. Separately, Government sponsorship was given to the Hong Kong Wireless Development Centre to set up a TD-SCDMA⁸ test-bed at Cyberport, the first trial site outside the Mainland, for the industry to develop innovative 3G applications and services.

4.7 The work of R&D Centres in other technology areas is also closely related to the development of ICT. For example, ICT is the enabling technology underpinning the research on automatic navigation systems being undertaken in the R&D Centre for Automotive Parts and Accessory Systems. In respect of the R&D Centre for Textile and Clothing, ICT is being adopted to enhance the dissemination of information on textile materials and clothing products. The R&D Centre for Nanotechnology and Advanced Materials is conducting industry-oriented research, the outcome of which will bring significant business opportunities to the ICT industry. The Centre will shape the next generation of consumer electronics products and devices by improving product performance and functionality, making them smaller, cheaper and more reliable.

⁷ The Centre is hosted by Hong Kong Applied Science and Technology Research Institute Company Limited (ASTRI).

⁸ The 3G standard adopted on the Mainland.

4.8 With excellent infrastructure and the presence of a strategic cluster of technological firms and talent, Cyberport and the Science Park are ideal incubators for start-up firms. There are ongoing incubation programmes to provide business and technical support to qualified organisations in their formative stages.

Key technologies

4.9 Building on Hong Kong's strengths in innovative applications, particularly in communications products and services, we expect to see further progress in the application of a number of key technologies in the coming years. Such applications will lead to the development of new services that would in turn drive new demand from business and citizens. Apart from supporting R&D and putting in place the necessary infrastructure, the Government will keep in close touch with the ICT industry on the latest developments and matters of business interest and, where appropriate, support pilot projects with a significant ripple effect. We will also establish a business-friendly policy framework and regulatory environment to encourage innovative applications to flourish.

4.9.1 Communications technologies

- The traditional boundaries between telecommunications, broadcasting and information technology are becoming increasingly blurred by media convergence with the advent of digitalisation. Such technological integration will stimulate developments in different sectors of the communications value chain, including innovation in distribution technologies, investment in upgrading delivery networks, creation of new content and services, investment in digital rights management technologies and manufacturing of new consumer products. The

trend of media convergence is exemplified by increasing interest in major economies in mobile television services.

- The Government will facilitate the introduction of commercial mobile television services in Hong Kong by addressing the related regulatory and spectrum assignment issues. Since this is a new area with significant business opportunities as well as considerable market uncertainty, the Government will solicit views from industry players and the public on the policy framework for introducing mobile television services. A public consultation exercise will be launched before the end of this year.
- On a more imminent front, the expected launch of digital terrestrial television (DTT) by the two local terrestrial television broadcasters in 2007 will provide another digital platform for media convergence. DTT will bring free-to-air high-definition television services to Hong Kong. It is also expected to spur the growth of interactive services such as datacasting (e.g., financial quotes and flight information) and online games. ICT manufacturers will benefit from the demand for consumer electronic products capable of receiving digital television services.
- The Government will continue to provide an enabling environment for the introduction of new communications technologies, such as broadband wireless access for fixed-mobile convergence and ultra-wideband for home networking. Policy frameworks and regulatory arrangements, such as those relating to the radio frequency spectrum, will be reviewed as and when necessary to take account of prevailing market situations.

4.9.2 Digital content

- “Content is king” is the often quoted slogan of the media industry. Emergence of new distribution platforms, such as DTT and mobile television services, will boost the demand for new content in different formats (e.g., tailor-made clips and short programmes for mobile television) as well as enhanced content (e.g., high definition content and interactive advertising).
- The roll-out of DTT, possible future introduction of mobile television services, convergence in electronic delivery networks (fixed and mobile, Internet Protocol and telephone networks) and user devices (personal computers and mobile devices) are expected to further stimulate the demand for new digital content, research and application of interactive technologies and investment in digital rights management solutions. At the same time, business opportunities will be created for the traditional audiovisual industry and the new digital multimedia industry as well as the ICT industry.
- With our solid industrial base and a ready pool of creative talent in film production, broadcasting and advertising, Hong Kong has the means to develop into a digital content and services hub in the Asia-Pacific region. To spearhead development in this area, the Government has sponsored the establishment of various industry support centres at Cyberport, including the Digital Entertainment Incubation-cum-Training Centre and the Digital Media Centre, to provide state-of-the-art facilities as well as technical and marketing support to companies involved in computer graphics, animation, and the production of films and games.

- This will create an environment that is conducive to the development and adoption of advanced technology related to digital content. Embryonic enterprises at Cyberport and the Science Park provide molecular groups of talent that fuel the development of digital content and related services.

4.9.3 Sensor and identification technologies

- Besides upstream research efforts being undertaken at the R&D Centre for LSCM and the Science Park, the Government has initiated pilot projects to test and promote the use of sensor and identification technologies in supply-chain operations and management of imported food.
- The study on an On-board Trucker Information System (OBTIS) has commenced in April 2006 with a view to launching a pilot in 2007. The new system will utilise Global Positioning System (GPS)⁹ and RFID technologies. It will enable better job dispatch and fleet management among cross-boundary trucks covered under the pilot scheme and improve interconnectivity among different stakeholders along the logistics supply chain. There will eventually be open access to the OBTIS so as to encourage more truckers to make use of the new platform, thereby driving down service costs through economies of scale.
- Financial support was given to GS1 Hong Kong under the Guangdong/Hong Kong Technology Cooperation Funding Scheme to embark on a project to establish an Electronic Product Code (EPC) Network infrastructure riding on RFID technology to

⁹ GPS is a satellite navigation system that can accurately determine the location of an object anywhere on earth.

enhance end-to-end supply-chain visibility. The objective of the project is to develop a global reference model for EPC/ RFID adoption. The project commenced in April 2005 and is expected to be completed by March 2007.

- Food safety is another area where RFID technology can make a significant contribution. The Government will cooperate with the Guangdong Government through the Expert Group on Co-operation in Informatisation to implement a pilot project under which RFID will be used to track the movement of certain food products along the production chain for better control at source.
- Other potential applications of sensor and identification technologies closely related to our daily lives include distribution and security services, detection of counterfeit goods, management of waste and transportation. Chapter Six will discuss in more detail the adoption of these technologies in respect of transportation.

4.9.4 Software development and packaging

- The Government encourages continuous improvement in the capabilities of the software industry so as to enhance its competitiveness in Mainland, regional and overseas markets. The Government will support its e-government contractors in developing a local centre of excellence through setting high standards of professional, managerial and technical practices. Through a pilot scheme of opening up the intellectual property in Government IT systems, IT suppliers will be able to exploit the intellectual property commercially to demonstrate their expertise

and excellence in new markets. The ongoing efforts of the Government in promoting the adoption of open and interoperable standards create cross-technology platforms and cross-market development opportunities. Various government funding schemes are available to support industry initiatives in this area.

- In consultation with the ICT industry, the Science Park will explore the setting up of an IT Outsourcing Centre under its Phase Two development in response to market needs. The Centre is expected to support commercialisation and export of software products developed by local and Mainland software developers and offshore outsourcing.

4.9.5 Next-generation Internet

- The Internet Protocol version 4 (IPv4) currently used on the Internet was developed at the time when computers were far less common. With increasing computer and broadband penetration, the growing popularity of mobile devices with network connectivity and the trend of media convergence, it is envisaged that the address capacity of IPv4 will soon be exhausted posing a limit on further development and growth of the Internet. Internet Protocol version 6 (IPv6) is the protocol chosen by the Internet Engineering Task Force¹⁰ as the next-generation Internet Protocol. IPv6 will generate a new horizon of business opportunities for the ICT and other sectors. It has the potential to trigger revolutionary changes to our way of living, for example by enabling the development of “home networking” under which electronic devices and home appliances can be network-connected and

¹⁰ The Internet Engineering Task Force is an international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet.

remotely operated. The new Internet protocol is also expected to stimulate the production of extremely portable or “wearable” personal computers with information processing and networking power that can integrate sensors and human interface technologies (“the next-generation personal computer”).

- The Government will take the lead in migrating to IPv6. The Internet backbone of the local universities has already been upgraded to a high-speed network of 10 giga-bit-per-second in support of IPv6. The new protocol will be adopted in the Government’s internal network by 2008. Internet service providers are encouraged to plan for the ultimate migration.

Promoting excellence

4.10 To recognise outstanding achievement and to showcase Hong Kong’s ICT success locally and abroad, we have consolidated the existing ICT awards into a mega event – the Hong Kong ICT Awards.¹¹ Nominations for the Awards were invited in April 2006 and the presentation ceremony is scheduled for the end of this year.

¹¹ There are seven award categories – digital entertainment, digital inclusion, eBusiness, eGovernment, eLearning, eYouth and wireless technology.

Chapter Five: Hong Kong as a Hub for Technological Cooperation and Trade

5.1 Being an international trading and financial centre with the unique advantage of having the Mainland as our hinterland, Hong Kong is well placed to serve as a hub for technological cooperation and trade in high-tech products and services. The presence of a technology cluster of companies from different origins allows Hong Kong to contribute to cross-border technological cooperation worldwide. Rapid economic development on the Mainland makes it both a significant source of demand for technology and a growing supplier of certain technology items such as computers, consumer electronics and telecommunications products. The emphasis placed on technological advancement in China's 11th Five-year Plan and the rapid increase in foreign investment in the Mainland economy after its accession to the World Trade Organisation are expected to serve as further catalysts in this process.

Strength of Hong Kong as a technology hub

Hong Kong-Mainland synergy

5.2 With a long history of economic cooperation with Mainland enterprises coupled with intrinsic strengths in customisation, innovative applications and commercialisation, Hong Kong is uniquely placed to foster technological cooperation between Mainland partners and international market players to drive businesses up the value chain. Necessary conditions including the availability of excellent professional and financial services, stringent intellectual property rights protection and enforcement are present here for technological business and trading to thrive. CEPA further enhances our position. Through this arrangement, Hong Kong can harness its role as an effective gateway for overseas

technology providers to tap into the Mainland market.

- 5.3 The Central People's Government has set a clear objective as part of its 11th Five-Year Plan to strengthen autonomous innovation and upgrade the technology capability of industries. The local ICT sector should grasp this golden opportunity to facilitate technological upgrading in the Mainland, leveraging on Hong Kong's position as a two-way platform assisting Mainland enterprises to bring in foreign investment and expand their business in the global economy.
- 5.4 To strengthen Hong Kong's edge as a conduit to the Mainland market, the Government has established channels for cooperation with the relevant Mainland authorities and Guangdong Province in areas such as innovation, technological development and informatisation. Identified areas for cooperation include software development, wireless and mobile technology, automotive parts and accessory systems, integrated circuit design, digital entertainment, digital certificates cross-recognition, development of standards and applications in emerging technologies such as RFID and next-generation Internet. We will establish closer cooperation with Shenzhen. In addition, we will also seek to participate in the Mainland's technology development plans and the formulation of national standards through the Mainland/Hong Kong Science and Technology Cooperation Committee. Setting a public and official agenda for collaboration enhances private sector confidence and interest in ICT investment. The ICT industry, professional bodies and academia from both sides will be involved in such initiatives.
- 5.5 The Guangdong/Hong Kong Technology Cooperation Funding Scheme was established in 2004 to provide financial support for R&D projects in technology areas of common interest, with a view to facilitating industry upgrading and economic development in the Greater Pearl River Delta

Region.

5.6 The Hong Kong Trade Development Council (HKTDC) has identified technology as the new focus of its promotional strategy. With the objective of becoming an international marketing arm for Hong Kong's technology platform, HKTDC will promote Hong Kong as a technology marketplace in the region. A Memorandum of Cooperation was signed in June 2006 with the Shenzhen Government to promote high-tech cooperation, and a high-level advisory committee comprising members from the industry, academia and the government has been formed to advise on the promotion of innovation and technology.

Vibrant ICT industry

5.7 Developing Hong Kong as a hub for technological business must be underpinned by a vibrant ICT industry with a knowledgeable and versatile workforce. We see skill requirements increasingly being moved from operational capabilities in project management to the following key areas further up the value chain:

- ***Information systems and services management:*** with the increasing need for integrating different systems and processes in a complex business and multi-vendor environment, there is a rising demand for skills in system integration, contract management, quality control and risk management.
- ***Business transformation:*** as the ICT needs of individual enterprises progress from basic automation and infrastructure to business transformation with technology as an enabler, the ICT workforce should be equipped with necessary knowledge to work with their clients in such projects.

- ***Information management:*** effective information management for the purpose of business analysis and knowledge sharing without losing sight of information security is critical in the modern era where information is in abundance.
- ***Creative content:*** with increasing media convergence and rising public demand for value-added services with multi-media content, the ICT workforce should be properly equipped to exploit new business opportunities.

5.8 The Government is working closely with the industry to facilitate the continued upgrading of our ICT workforce to meet future challenges. In particular, we encourage the industry to involve relevant stakeholders in developing competency standards to facilitate training and pave the way for professional recognition. Key initiatives are set out below:

- The Education and Manpower Bureau is developing a Qualifications Framework (QF) under which an Industry Training Advisory Committee (ITAC) comprising both employers and practitioners has been established for the ICT industry. The ITAC will develop a set of Specification of Competency Standards to identify standards required for different levels of qualifications under the QF. These new standards will enable training providers to design education and training programmes in accordance with the requirements of the industry. With well-defined standards of qualifications and articulation ladders, the QF will promote lifelong learning and increase the competitiveness of our human capital.

- Separately, the Hong Kong Computer Society is conducting a Study on a Certification System for IT Professional Qualifications and an IT Manpower Roster for Hong Kong. The Hong Kong Institution of Engineers is also exploring the feasibility of setting up a registration system for IT practitioners. The Government welcomes these complementary efforts by professional bodies.
- While every effort will be made to equip our younger generation with ICT skills through education and to train up local professionals, the Government will also make sure that our immigration regime is flexible in admitting ICT professionals from outside Hong Kong to fill any gap in supply.¹²

Creating a conducive business environment

5.9 The Government has a leading role to play in ensuring the continued presence of a conducive business environment for technological business to flourish. Building on the existing good foundation, the Government will undertake initiatives in the following areas having regard to the emergence of new technology, changing market needs and public aspirations:

5.9.1 Information security

The Electronic Transactions Ordinance (ETO) provides the legal framework for the conduct of e-business and recognition of digital signatures for secure electronic transactions. There is a

¹² Professionals from the Mainland or overseas belonging to any sector, including the ICT sector, may apply to work in Hong Kong under the Admission Scheme for Mainland Talents and Professionals or the General Employment Policy, provided that they possess skills not readily available locally and are offered a job in a local firm at market rate remuneration. The ICT sector can also potentially benefit from the Quality Migrant Admission Scheme introduced in June 2006 under which quality immigrants may compete for an admission quota under a points test.

growing list of authentication and encryption tools that take advantage of the latest technology to suit different business and security requirements. In particular, the Hong Kong Smart Identity Card that contains in the chip SAM (Secure Access Module) protected digitalised Card Face Data, a reserved personal identification number that can only be set and changed by the card owner and optional storage of a recognised digital certificate presents a new means of authentication. To help businesses determine the appropriate assurance level and security requirements for different electronic transactions, the Government will publish a risk assessment and electronic authentication framework for public reference in 2008. The ETO will be reviewed and revised where necessary, taking into account the shape of the new electronic authentication framework.

5.9.2 Privacy safeguards

The Government recognises growing concern in the community about data privacy relating to electronic transactions. Protection of data privacy is not a simple issue. Different components of a personal data record may require different security treatment. We will continue to work with the Privacy Commissioner for Personal Data to cultivate respect for and to safeguard personal data privacy. Apart from developing guidelines for ICT professionals, promotional efforts will be made to instil a greater sense of corporate social responsibility in the private sector to accord proper protection of personal data for their clients.

5.9.3 Protection of intellectual property rights

Development and exchange of digital content can effectively take place only in the presence of adequate intellectual property rights protection. With the support of the Innovation and Technology Fund, a Digital Rights Management (DRM) infrastructure employing state-of-the-art technologies was set up at Cyberport in November 2005 to provide a channel for digital content creators to distribute their products to consumers efficiently at a very low cost. With funding support from the Government, the Hong Kong Cyberport Management Company is implementing a two-year programme starting from June 2006 to promote the use of DRM among ICT system developers, digital content developers and consumers, particularly young people, so as to cultivate a legal software download culture in the community.

Separately, an Intellectual Property Servicing Centre was established in June 2006 as part of the Integrated Circuits Design Centre at the Science Park. The Intellectual Property Servicing Centre provides a platform to support and facilitate the wider use of semiconductor intellectual property and to protect the technological investment of the integrated circuit design companies.

At the same time, the Government will continue with its efforts to provide a robust system to safeguard intellectual property rights in Hong Kong. This includes keeping our intellectual property legislation up to date, taking vigorous enforcement action against infringement activities and conducting public education to increase community awareness of, and respect for, others' intellectual property rights. Specifically, the Government will

launch a public consultation exercise on the review of copyright protection in the digital environment by the end of this year.

5.9.4 Development of data standards

An important prerequisite for the provision of integrated services and deepening of business collaboration is the availability of data standards. With the experience gained in the development of the Interoperability Framework for e-government systems, the Government will collaborate with different sectors to develop industry-specific data standards having regard to international standards and best practice. A successful example is the Digital Trade and Transportation Network (DTTN), which provides a common platform for information exchange and integration of business processes for the trade and logistics industries. In the process, we will also attempt to enhance interoperability between the data standards of different sectors to facilitate the provision of joined-up, value-added services.

Another area we are going to work on is the development of data standards for geospatial information. Geospatial information underpins different areas of public administration and commercial activity, such as property information, transport, public health and emergency operations. Effective coordination, integration and management of geospatial information will generate business opportunities for the provision of value-added services to the public. The Government will conduct a study in 2007 to assess the potential of developing a Spatial Data Infrastructure and associated data standards.

5.9.5 Regulatory framework

With the advent of media convergence under which telecommunications, broadcasting and information technology are intertwined to provide multi-media and value-added services to customers, major operators are moving into the triple-play business model of providing telephony, television and Internet access services. To tie in with new market conditions, we propose to establish the Communications Authority as the single regulator for the converging communications sector by merging the Broadcasting Authority and the Telecommunications Authority. The mission of the Communications Authority is to promote competition, innovation and investment in the communications market. The legislation to set up the Communications Authority will be introduced into the Legislative Council in 2007. Separately, a review is under way to formulate a responsive and transparent radio spectrum policy to enable the community to reap maximum benefits from radio spectrum deployment.

5.9.6 Tackling unsolicited electronic messages

Following the launch of administrative measures in June 2006, the Government introduced the Unsolicited Electronic Messages Bill into the Legislative Council in July 2006 to tackle the problem of spam. The objective of the Bill is to achieve a proper balance between respecting the rights of individual recipients of electronic messages and allowing the development of e-marketing in Hong Kong.

Chapter Six: Enabling the Next Generation of Public Services

6.1 Apart from underpinning economic activities and development, technology facilitates service transformation in both the public and private sectors to better cater for the needs and expectations of the public.

Public service delivery

6.2 The Government is committed to leading by example in the use of e-business, both in conducting internal business and delivering public services. Efficiency gains aside, technology-enabled delivery generates opportunities for business process re-engineering and service transformation so that new and improved public services can be offered to users. Enhanced user-friendliness will encourage migration to the electronic channel and drive wider adoption of electronic transactions in the business sector. We believe that increased effectiveness in the delivery of public services through ICT-enabled processes will contribute to an improved business and living environment, which is essential to sustain Hong Kong's competitiveness.

6.3 Having progressed from the initial stage of the e-government programme when information and services were progressively put online, we have reviewed our work based on the objective set out in the 2004 Digital 21 Strategy to focus on service quality and effectiveness so as to strengthen e-government efforts.

6.4 The focus of the next wave of e-government services will be on the citizen-centric mode of public service delivery with strong emphasis on customer engagement and information management both during project implementation and after the system goes live. To enhance value to

users, there is a need to move progressively to more service integration within and between departments, and to drive automation and re-engineering of back-office processes to tie in with front-end electronic services. Key initiatives are set out below.

New government portal

- 6.5 The new portal, GovHK (www.gov.hk), was introduced in September 2006 and is undergoing continuous development to eventually replace the Government Information Centre (www.info.gov.hk) as the single entry point to online Government information and services. The portal provides access to some 1,200 existing Government electronic services and many more new services that are in the pipeline. Rather than adopting departmental divisions as in existing government websites, content of the GovHK is organised based on user groups (e.g., residents, non-residents and business & trade) and subject areas (e.g., immigration services, employment, the environment) for easy access by users. A helpdesk service is available to assist citizens in using the new portal.
- 6.6 We will continue to develop and enrich GovHK in the light of users' comments. One enhancement we will look into is the provision of geospatial information to underpin information and services provided on GovHK. Efforts are also under way to develop a youth portal as an integral part of GovHK to offer convenient access to a range of public services for youth aged 15 to 24. We will seek to identify new high-value and high-volume services to further build up utilisation of the electronic channel. The Guide on Customer Relationship Management promulgated in 2005 will form the basis for government bureaus and departments to design new citizen-centric services to ride on the GovHK platform.

- 6.7 With the improved services of GovHK, we will soon come to a stage where we must critically examine the possibility of rationalising different delivery channels, conventional counter services in particular, having regard to the needs of customers and the potential for efficiency savings. A Channel Management Strategy will be developed in 2007 for this purpose.
- 6.8 Although GovHK is a Government project, it is an open platform that may allow private sector participation in the provision of related value-added services, alongside government information and services. The Government has an open mind on possible forms of collaboration conceived by the private sector and an Expression of Interest exercise will be conducted to gauge ideas and interest. Our plan is to introduce appropriate private sector content and services progressively on GovHK starting from 2007/08, subject to the necessary procurement processes. We believe that private sector participation will enrich GovHK, benefiting users and generating different forms of business opportunities.

Electronic procurement

- 6.9 Another example of e-government initiatives is our plan to embark on pilot electronic procurement (e-procurement) projects in a number of departments that will pave the way for further roll-out to other parts of the Government. The pilot project involves automation of the internal workflow, development of a procurement portal for knowledge-sharing within Government and information exchange between Government and suppliers, as well as e-catalogue and e-sourcing functions. Once the pilot projects are completed in 2009 as planned, a review will be conducted to prepare for extension to all bureaus and departments. We believe that progressive adoption of e-procurement in the Government will

encourage private sector suppliers, including SMEs, to migrate to electronic commerce, thereby generating fundamental changes to their internal processes and competitiveness. Support programmes will be conducted to introduce skills and technology to SMEs to aid the migration process.

6.10 We envisage that the e-government programme is the gestation stage for the development of next-generation government where ICT becomes fully engrained in policy-making and day-to-day business of all government bureaus and departments. Rather than working on the re-engineering of existing processes and services, the formulation and realisation of policy objectives will be done by new ICT-enabled procedures that integrate back-office functions and cross-organisational services spanning government as well as private sector and voluntary organisations.

6.11 Effective transformation to this new model requires strong leadership in change management not only in terms of technology adoption, but also new perceptions in business, people management and citizen expectations. Accordingly, adequate privacy protection and, at the same time, facilitating information management among relevant parties of the Government to provide integrated services to realise policy objectives must be tackled in the process. These are the common challenges faced by all jurisdictions embarking on ICT-enabled governance. Healthcare and transportation, for example, are potential areas for the provision of highly integrated and personalised services to citizens, which transcend the public, private and voluntary sectors. Like governments elsewhere, we are in a learning process, moving incrementally towards the vision of next-generation government.

Electronic health records

6.12 Over the years, we have developed an enviable healthcare system in Hong Kong, but these services require a substantial commitment of resources. While further work is being done to explore a more viable long-term financial framework, there is a parallel need to review the existing healthcare system, taking into account the changing needs and expectations of the community, as well as the challenges we are facing in relation to the ageing population and the risk of communicable diseases.

6.13 In July 2005, the Health and Medical Development Advisory Committee (HMDAC) issued a discussion paper entitled “Building a Healthy Tomorrow”. The paper reviews Hong Kong’s healthcare model to ensure that the community will continue to enjoy a quality healthcare service that is sustainable, affordable and accessible to all. The discussion paper pointed out a number of challenges, including the ageing population and over-reliance on the heavily subsidised public healthcare system. The paper further suggested that a key element of the future service delivery model is the development of well-integrated public and private sectors in order to promote healthy competition for service quality and professional standards, and provide a choice for the public. The role of the family doctor as a first point of contact and gate-keeper in primary medical care is also emphasised. The future healthcare system is one that can integrate care across organisational boundaries and quickly adjust to the changing needs of patients.

6.14 Continuity of care across different players in the healthcare system would not be possible if patient information remained segmented and stopped at organisational boundaries. Consistent with developments

elsewhere in the world, the HMDAC discussion paper sets out the vision of a territory-wide electronic health record (eHR) system, with ownership by the individual who would then authorise access to his or her own records by selected healthcare professionals, as an integral part of the future healthcare system. Subject to confidentiality and security safeguards and the patient's consent, eHR could be accessed by a healthcare professional in public and private hospitals, clinics and residential care homes for the elderly. The availability of comprehensive records will enable timely and informed decisions to be made at the point of care. Other valuable spin-offs from eHR include enhanced capabilities in medical record management, medical analysis and planning, monitoring of healthcare outcomes and detection of epidemiological changes in disease patterns. Integration with other industries in the healthcare eco-system, such as insurance companies, pharmacists, social welfare agencies, can also be achieved subject to security and privacy safeguards based on patient choices.

- 6.15 While an eHR system should promote healthy competition and collaboration, thereby generating more choices and better quality services for patients, it raises a series of fundamental questions that must be addressed. These include a body to oversee or regulate the eHR operation, whether legislative backing is needed, financing of the capital investment and recurrent costs, ownership of the records and limitations on access to these records, security and privacy protection of individual data and the entire system, and whether any penalty should apply to proven cases of unauthorised use of the data. These questions must be properly addressed by all stakeholders before consultation with the community. Such a territory-wide project involves multi-faceted transformation programmes and a progressive, developmental and consultative approach should be adopted. A territory-wide eHR system that cuts across different sectors has far-reaching implications. It must

be a system that the population embraces and has confidence in before it is launched.

6.16 We have a good foundation on which to build. The Hospital Authority (HA), which caters for over 90% of hospital care and represents about 50% of total healthcare activity in Hong Kong, keeps all the clinical data of its patients in electronic form in a Clinical Management System. The HA has embarked on a pilot project to share its eHR with a number of private hospitals and private medical practitioners. But this pilot project is primarily one-directional at this stage. We will learn from this experience to see how we might further develop eHR progressively.

6.17 To strive towards this vision of a citizen-led system of integrated healthcare services, the Health, Welfare and Food Bureau (HWFB) will form a working group with members from the HWFB, HA and Department of Health (DH) to address the series of complicated questions raised above. The Government needs to work out pragmatic solutions to these questions before a proposed roadmap can be drawn up for further discussion with stakeholders. In parallel, the HWFB and DH will explore how eHR can be implemented in DH and its interface with HA's system.

6.18 Given the significance of eHR to the entire population and its instrumental role in transforming the healthcare delivery system, the eHR system cannot be determined in isolation and will be considered in conjunction with other proposals for healthcare reform.

Intelligent transport systems

6.19 Hong Kong has developed over the years an efficient and world-class transport system. To meet rising expectations of motorists and public

transport users for quality services and to ensure that our transport infrastructure is put to the most efficient use, the Government intends to establish a Transport Information System (TIS), which will provide two key services:

- ***Intelligent Road Network (IRN)*** is a Geographical Information System platform providing up-to-date information on traffic directions, turning movements at road junctions and stopping restrictions.
- ***Public Transport Information Service (PTIS)*** will be a web-based information service for public transport users and motorists. It will allow public transport passengers to search for optimal routes based on distance, cost and number of interchanges. Likewise, motorists will be able to search for optimal driving routes on a digital map according to pre-set options such as distance and toll.

Implementation of the TIS is scheduled for completion in 2008. It will open up new opportunities for the private sector to provide value-added services such as car navigation, fleet management systems and the provision of personalised services to the public through the application of technologies such as GPS and RFID.

Commercial services

6.20 Technological advancement has significantly changed the landscape and operations in the business and trading community. Different forms of ICT innovation and applications are used in enterprises to improve efficiency, productivity and customer value. We see a number of driving forces for ICT-enabled transformation in private sector services:

- Deepening of the e-government programme and the possibilities opened up for public-private partnership will have a direct impact on private sector entities having business interface with the Government. Large international and local firms equipped with comprehensive e-business solutions will also help push electronic adoption by their business partners further along the supply chain. With increasing erosion of the role of intermediaries as a result of enhanced communication between suppliers and consumers enabled by ICT adoption, SMEs need to maintain their niche by providing personalised, value-added services to consumers. They can be greatly assisted by various types of Customer Relationship Management applications and business intelligence tools.
- The development of data standards and a common platform in different sectors, as epitomised by the DTTN, serve to enhance communication, collaboration and business integration within and across sectors. The Government has been, and will continue to be, a facilitator in this process.
- The emergence of cutting-edge technology and innovation will create new dynamics in a competitive environment, driving companies to exploit new opportunities to transform their businesses in order to stay ahead of competitors. As mentioned in Chapter Four, media convergence, sensor and identification technologies and next-generation Internet are examples of key areas where we expect to see major progress made in the years to come. Pilot projects spearheaded by the Government in the innovative use of technologies, such as RFID and GPS, will promote assurance, encourage wider adoption and eventually drive down costs through building up a critical mass of users.

Chapter Seven: Building an Inclusive, Knowledge-based Society

7.1 The Government undertakes to lead discussions involving the ICT industry and the community in the following five areas in order for Hong Kong to move towards an inclusive, knowledge-based society:

Digital inclusion

- Broadband connectivity for every citizen
- Allowing every student access to ICT facilities to support learning
- More affordable access to industry software solutions for SMEs

Knowledge-based society

- Information management in the community
- Digital rights management infrastructure and culture

Digital inclusion

7.2 Hong Kong is faring well in terms of Internet connectivity and ICT penetration. Broadband Internet reaches virtually all residential buildings and two-thirds of our households are connected to broadband Internet. Penetration rate of the personal computer (PC) among households is over 70%. Large enterprises are adopting ICT extensively in doing business. However, there is a dichotomy in respect of under-privileged groups and SMEs. According to the survey conducted by the Census and Statistics Department in 2005, only 37.6% of households with monthly income less than \$10,000 have a PC at home. And only about half of Hong Kong's small establishments are connected to the Internet.¹³ In this regard, we would like to see progress in the

¹³ According to the 2005 Survey on IT Usage and Penetration in the Business Sector conducted by the Census and Statistics Department, only 56.4% of small establishments and 88.9% of medium establishments have installed personal computers, compared with 97.5% for large establishments; 50.5% of small establishments and 83.6% of medium establishments have Internet connection, compared with 91.5% for large establishments; and 12% of small establishments and 34.6% of medium establishments have a website/webpage, compared with 72.3% for large establishments.

following three areas:

- Broadband connectivity: our vision is to make broadband Internet access available to all citizens in Hong Kong, regardless of whether they are at home or on the move using mobile facilities. The goal is to ensure affordable access to Internet as a utility service available to every Hong Kong resident.
- ICT facilities for students: we need to understand the challenges facing all children, including those from low-income families, and the importance of personal access to suitable ICT facilities to their studies. We will explore with the education community the feasibility of allowing every student access to suitable ICT facilities to support their learning inside and outside school hours.
- Access to industry software solutions: while SMEs may have difficulties in making substantial investment in acquiring software, open source software solutions, network-offered and pay-as-you-go models may offer more affordable choices for SMEs. The objective is to offer a range of affordable software solutions to SMEs for enhancing their productivity and strengthening their communications with business partners.

Knowledge-based society

7.3 Furthermore, ICT is an important enabling tool in our pursuit of building Hong Kong into a knowledge-based society. To foster the continuous creation, aggregation, renewal and use of knowledge in the society, there is a need to facilitate effective sharing of data across different sectors of the community under the following two areas:

- Information management: enabling data/content sharing while protecting privacy and intellectual property rights is conducive to knowledge building. Development of data standards across different sectors can also facilitate the provision of joined-up services.
- Digital rights management: with media convergence, we need to put in place the infrastructure and cultivate a culture to ensure that the intellectual property rights of software and multimedia content, like those of physical goods, are respected and protected.

7.4 The Government will work with the ICT industry and the community to set out specific objectives and action plans for the above five areas.

7.5 Efforts are also ongoing to enhance computer literacy and the capabilities of our younger generation as part of their education and to provide assistance to special groups with access problems.

Education, knowledge creation and sharing

7.6 ICT usage is introduced to students as early as junior primary level. Online learning is more fun for students and helps extend their horizons beyond the set curriculum. Teaching and school administration are also increasingly dependent on ICT for knowledge-sharing and resource management.

7.7 The Hong Kong Education City (HKedCity), set up in 2000, provides an interactive electronic platform with rich e-learning resources for teachers, parents and students. Through the portal, users can exchange experiences and promote effective practices. HKedCity works with a large number of non-government organisations (NGOs) and the ICT industry in promoting electronic learning to portal users.

- 7.8 The Education and Manpower Bureau will publish its third IT in Education Strategy¹⁴ in 2007. The updated strategy will focus on how best to take advantage of the connectivity and infrastructure built up over the years to encourage more interactivity among teachers, students and parents. Managing the cultural and behavioural change in the use of technology, rather than the technology itself, is often the most challenging aspect of ICT-enabled transformation in education. New technology provides teachers with a wide range of content choices and delivery options. Through ICT adoption, teachers will be partially relieved of the burden of content construction and delivery, assessment and testing; they will have more time for individual students.
- 7.9 There is a need to move from just putting content online by encouraging teachers to make better use of technology in delivery, assessment, curriculum development and knowledge management. Also important is the sharing of knowledge and effective educational practices through the HKedCity platform and Centres of Excellence on IT in Education. The coming IT in Education Strategy will propose specific measures to empower the education sector to better exploit the potential of ICT in enriching learning and knowledge management.
- 7.10 For syndicated testing delivered through ICT to progress further, the strictest security controls will be necessary to ensure important examinations are not compromised.

¹⁴ The Education and Manpower Bureau published the IT in Education Strategy in 1998 and updated it in 2004 with the objective of harnessing IT in the delivery of policy objectives and outcomes, in areas such as curriculum development, professional development of teachers, lifelong learning, sharing of knowledge and effective practice, and fostering collaboration among schools, parents and the community.

Holistic approach to bridging digital divide

- 7.11 Education may enhance ICT adoption and knowledge building in some, but not all, segments of the community.
- 7.12 The digital divide is not a simple binary problem. Cost is only one of the barriers to take-up. Some individuals may not have the skills to use computers, even though they may actually want to get online. Most simply do not see ICT as a powerful tool to transform their lives. The content and application divide, on top of accessibility problems, have to be tackled. We need to discern the different needs of individual groups in order to devise proper measures to address their problems.
- 7.13 The Government takes a leading role in bridging the digital divide through forging partnerships with NGOs in running digital inclusion programmes, expanding the availability of free computing facilities and sponsoring the Digital Solidarity Fund.
- 7.14 Currently around 5,300 public computers have been installed at various places for free public use, and some are equipped with special devices for the disabled.¹⁵ The Government will explore with NGOs and the private sector the possibility of setting up more cyber points staffed by people with technical knowledge to help citizens gain access to online information and services, including those hosted on the GovHK portal.
- 7.15 To ensure that a holistic approach is taken in tackling the digital divide issue having regard to the different needs of sub-groups, we propose to set up a task force comprising representatives from relevant government departments as well as industry and community stakeholders to

¹⁵ To cater for the needs of special groups, such as the elderly and the visually impaired, devices such as screen reader software, voice synthesiser software and Braille display have been installed in the personal computers at selected community cyber points.

formulate a strategy and initiatives for digital inclusion.

7.16 The task force will refer to the findings of a recent Impact Analysis Study on the Degree of Digital Inclusiveness in Hong Kong conducted by the University of Hong Kong on the accessibility, usage, knowledge and affordability of ICT, which show that different segments of the community have different needs:

- **The elderly**

Affordability and physical access is less of a concern than the lack of incentive and knowledge. They need ICT training at a slower learning pace to build up their knowledge. Development of suitable web content (e.g., healthcare, Cantonese drama, games) will help arouse their interest.

- **New arrivals**

They need tailor-made ICT training conducted in their native languages to enhance their ICT literacy and interest.

- **Female homemakers**

Basic ICT training of a suitable mode (e.g., usage relating to management of family affairs and education of their children) that suits their work schedule may arouse more interest.

- **Single parents**

Just like female homemakers, they need basic ICT training that suits their family and work schedule. Relevant applications and content should be identified to encourage adoption.

- **Children of low-income families**
They may need assistance including financial help in access to suitable ICT facilities outside normal school hours.
- **Disabled people**
ICT creates the opportunity for the disabled to achieve parity and independence in more areas of their lives. There is a need to develop easy-to-use tools and technologies to assist disabled people. They also require support in acquiring affordable assistive tools, such as screen readers.

7.17 Focus groups will be organised to better understand the particular needs and interests of individual groups.

Upgrading SMEs' capabilities

7.18 At the business level, there is also a huge divide in the level of ICT adoption between large companies and SMEs. Very often, SMEs do not see the need to use ICT in their daily business, and even if they do, they may lack the resources or knowledge to upgrade their ICT capabilities. Assistance in the form of raising awareness of the benefits of ICT adoption and appropriate technical and financial support is required to drive changes among SMEs.

7.19 Ongoing measures are taken to encourage greater ICT take-up among SMEs:

- The Support and Consultation Centre for SMEs (SUCCESS) of the Trade and Industry Department promotes ICT awareness by organising free seminars and workshops. It also tenders advice to business start-ups on ICT and e-business applications. Electronic

business content, such as market intelligence, relevant laws and regulations and product information are provided to SMEs to encourage them to use the e-channel;

- Through the SME Development Fund and other relevant government funding programmes, the Government will sponsor worthwhile ICT projects that can contribute to improving SMEs' business efficiency, productivity and competitiveness; and
- The Government will continue to conduct support programmes for different sectors¹⁶ in collaboration with professional bodies to enhance awareness and ICT capabilities of SMEs by disseminating best practices, rendering technical support and assisting in the development of industry portals for knowledge-sharing and collaboration.

Knowledge management

7.20 The Government encourages citizens and organisations to build up their own digital knowledge database for their development and life-long learning. Such personalised or proprietary databases are valuable assets in a knowledge-based society. To lead by example, the Government has advised bureaus and departments to make good use of the ICT infrastructure for knowledge management and sharing among the workforce, and encourages them to deploy state-of-the-art technology in electronic document management to build up a corporate knowledge base.

¹⁶ Sector-specific Programmes (SSPs) were launched in 2004. Six business types - travel agencies, private medical practices, drugstores, logistics, accounting and beauty services - have benefited under the SSPs.

Chapter Eight: Targets and Outcomes

- 8.1 The Digital 21 Strategy sets out our vision of building on Hong Kong's position as a world digital city through advancing our achievements and seizing new opportunities and the blueprint for ICT development in Hong Kong in the coming years. The realisation of the vision requires the participation of the entire community, including the Government, the ICT industry, other sectors, academia and the general public. The Strategy is a dynamic roadmap that should be flexible and adaptive to take into account any changes in the technological landscape and the evolving needs of the society.
- 8.2 Progress expected under each of the five action areas in the coming three years is set out in the following table. This will be updated in the light of the latest developments.

Facilitating a digital economy	
We will ensure continued Government leadership and commitment in sustaining Hong Kong's position as a world digital city by:	Key bureaus/ departments¹⁷.
<ul style="list-style-type: none"> • Establishing the Communications Authority by merging the Broadcasting Authority and Telecommunications Authority upon enactment of the necessary legislation in 2007/08 subject to the Legislative Council proceedings; • Continued ICT investment; • Enhancing the e-government programme by making possible joined-up services and integration with back-end systems; • Fostering cross-border cooperation in technology and innovation; and • Leading focused discussions among different sectors of the community to help Hong Kong move towards an inclusive, knowledge-based society. 	<p>CITB</p> <p>OGCIO/ITC OGCIO</p> <p>OGCIO/ITC</p> <p>OGCIO</p>

¹⁷ These bureaus/departments will lead, coordinate or heavily engage in the implementation of specific action areas/initiatives under the Digital 21 Strategy. They include Commerce, Industry and Technology Bureau (CITB), Education and Manpower Bureau (EMB), Health, Welfare and Food Bureau (HWFB), Economic Development and Labour Bureau (EDLB), Office of the Government Chief Information Officer (OGCIO), Innovation and Technology Commission (ITC), Department of Health (DH), Transport Department (TD) and Trade and Industry Department (TID). Other bureaus/departments will also contribute to the implementation of the Strategy and the e-government programme.

Promoting advanced technology and innovation	
We will build Hong Kong's innovative capabilities and harness the business opportunities they generate through:	Key bureaus/ departments
<ul style="list-style-type: none"> • Completing Phase Two of Science Park in stages from early 2007 to end 2008; 	ITC
<ul style="list-style-type: none"> • Establishing a policy framework in 2007 for introducing mobile television services; 	CITB
<ul style="list-style-type: none"> • Facilitating a smooth transition from analogue to digital terrestrial television broadcasting with a view to switching off analogue broadcasting in 2012; 	CITB
<ul style="list-style-type: none"> • Completing a review of radio spectrum policy in 2007; 	CITB
<ul style="list-style-type: none"> • Launching the pilot project on On-board Trucker Information System in 2007; 	EDLB
<ul style="list-style-type: none"> • Completing the pilot project on using RFID to enhance our ability to trace the source of food in 2007; 	HWFB
<ul style="list-style-type: none"> • Supporting GS1 Hong Kong to complete the project on the establishment of an EPC network infrastructure in 2007; 	ITC
<ul style="list-style-type: none"> • Government's internal network migration to IPv6 in 2008; 	OGCIO
<ul style="list-style-type: none"> • Strengthening of Cyberport and Science Park as hubs for innovation and technology; 	OGCIO/ITC
<ul style="list-style-type: none"> • Promoting technology transfer and commercialisation of R&D deliverables through the R&D Centres; 	ITC
<ul style="list-style-type: none"> • Facilitating convergence among telecommunications, broadcasting and IT leading to emergence of new products and services; and 	CITB
<ul style="list-style-type: none"> • Building up the international profile of outstanding ICT achievements. 	OGCIO

Developing Hong Kong as a hub for technological cooperation and trade	
We will groom a conducive business environment for Hong Kong to foster technological cooperation with Mainland and international partners by:	Key bureaus/ departments
<ul style="list-style-type: none"> • Facilitating the ICT industry to develop competency standards under the Qualifications Framework in 2007; • Promulgating an electronic authentication framework for public reference in 2008; • Completing a review of the Electronic Transactions Ordinance in 2007/08; • Enacting the Unsolicited Electronic Messages Bill in 2007 subject to the Legislative Council proceedings; • Completing a study in 2007 to assess the potential of developing a Spatial Data Infrastructure; • Continued Hong Kong/Mainland liaison in setting agenda on cooperation in matters relating to technology and innovation; • Strengthening of Hong Kong's role as a hub for technological cooperation and trade; • Continued partnership with the Privacy Commissioner for Personal Data to protect privacy; • Cultivating a legal software download culture by building on the Digital Rights Management infrastructure; and • Facilitating discussion on and development of data standards in different sectors. 	<p>EMB/OGCIO</p> <p>OGCIO</p> <p>OGCIO</p> <p>CITB</p> <p>OGCIO</p> <p>OGCIO/ITC</p> <p>CITB/OGCIO/ITC</p> <p>OGCIO</p> <p>OGCIO</p> <p>OGCIO</p>

Enabling the next generation of public services	
With special emphasis on customer engagement and information management, we will improve citizens' quality of living through:	Key bureaus/ departments
<ul style="list-style-type: none"> • Introducing private sector participation in the provision of value-added content and services in GovHK from 2007/08; 	OGCIO
<ul style="list-style-type: none"> • Piloting e-procurement project in Government departments for completion in 2009 and formulating plans for further roll-out to other parts of government; 	OGCIO
<ul style="list-style-type: none"> • Progressive roll-out of electronic document management systems in government bureaus and departments from 2008; 	OGCIO
<ul style="list-style-type: none"> • Reviewing the Hospital Authority's pilot scheme on sharing electronic health records with private hospitals and private medical practitioners in 2007/08; 	HWFB
<ul style="list-style-type: none"> • Setting up the Transport Information System in 2008 to pave way for introduction of value-added services; 	TD
<ul style="list-style-type: none"> • Transforming public service delivery through the introduction and continuous enhancement of GovHK; 	OGCIO
<ul style="list-style-type: none"> • Addressing fundamental institutional, legal, security and privacy issues relating to the wider introduction and sharing of electronic health records among public and private medical sectors as well as other closely related sectors in preparation for wider consultation in the community; 	HWFB
<ul style="list-style-type: none"> • Formulating proposals to introduce electronic health records in the Department of Health; and 	DH
<ul style="list-style-type: none"> • Fostering of ICT-enabled change readiness through enhanced communication and partnership among the Government, the ICT sector and other industries. 	OGCIO

Building an inclusive, knowledge-based society	
In cooperation with the ICT industry and the community, we will lay a solid foundation for a knowledge-based economy by:	Key bureaus/ departments
<ul style="list-style-type: none"> • Announcing the third IT in Education Strategy published in 2007; • Establishing a digital inclusion task force in 2007 to pool efforts in bridging digital divide; • Setting out specific objectives and action plans in addressing issues relating to broadband connectivity, ICT facilities for students, access to industry software solutions, information management and digital rights management; • Improving ICT and e-commerce adoption by SMEs; and • Cultivating knowledge creation and sharing in government, industries and the community. 	<p>EMB</p> <p>OGCIO</p> <p>OGCIO/EMB</p> <p>OGCIO/TID</p> <p>OGCIO</p>

Chapter Nine: Conclusion

9.1 Capitalising on the foundations built up in the past three strategies, we have identified five action areas for further driving ICT development and adoption in Hong Kong in the coming years:

- Facilitating a digital economy;
- Promoting advanced technology and innovation;
- Developing Hong Kong as a hub for technological cooperation and trade;
- Enabling the next generation of public services; and
- Building an inclusive, knowledge-based society.

9.2 To sustain Hong Kong's role as a world digital city, we must harness our strengths in creativity and stay at the forefront of technological innovation. Bridging upstream R&D and innovation with industrial applications for wider commercialisation in the local, Mainland and overseas markets is an important area where Hong Kong can create value. On a macro level, Hong Kong can strengthen its position as an international trading centre by serving as hub for technological cooperation and trade, riding on the Mainland's increasing demand and supply of technology and related products.

9.3 The Government has been promoting an e-culture in the community by pressing on with the e-government programme, integrating ICT in education of our younger generation, empowering SMEs and special groups through digital inclusion programmes, and protecting and raising awareness of intellectual property rights. Our vision of a digital city is that ICT is engrained in day-to-day business processes and the way of life of its citizens. With the prevalence of different forms of electronic transactions and the general enthusiasm and maturity of our citizens in

the use of communications products and services, Hong Kong is well positioned to broaden ICT adoption by taking advantage of new technology in service transformation.

9.4 The Digital 21 Strategy is a living document that concerns not only the ICT industry, but the entire community, including other industrial sectors, academia, non-government organisations and the general public. ICT has a direct bearing on almost every facet of our daily lives. The Government would like to invite public comment and suggestions on the blueprint proposed in this document for taking forward ICT development in Hong Kong.

9.5 The Office of the Government Chief Information Officer (OGCIO) is the focal point in the Government for collating and considering public comment received during the consultation exercise, before finalising the 2007 Digital 21 Strategy for announcement in the first half of 2007. The OGCIO will be responsible for coordinating with all relevant parties within Government on the implementation of the Strategy after its promulgation and for measuring progress on an annual basis.