Suggestions in response to the "Public Consultation on 2004 Digital 21 Strategy" of the Communications and Technology Branch of the Commerce, Industry and Technology Bureau

1. BACKGROUND

1.1 In 1998, the Government promulgated the first Digital 21 IT Strategy with the aim of enhancing and promoting Hong Kong's information infrastructure and services. An updated Strategy was issued in 2001 to position Hong Kong as a leading e-business community and digital city in the globally connected world.

1.2 To sustain the momentum created in the last five years and to harness the benefits of IT for business, the community and Hong Kong's position in the world, the Government has reviewed the implementation of the 2001 Strategy and intends to issue an updated Strategy in early 2004. To enable this exercise to benefit from the input of the IT industry, the business sector, professional bodies, educational and training institutions, and other relevant bodies are being invited to comment on the 2004 Digital 21 Strategy before finalizing it.

1.3 Vested with the mission to provide quality infrastructure and support facilities for innovation and technology development, the Hong Kong Science and Technology Parks Corporation (HKSTP), in consultation with representatives from professional bodies, the industry, Science Park tenants and incubatees of HKSTP, formed a Working Group, met for 3 times in the last few weeks and come up with the following recommendations in response the "Public Consultation on 2004 Digital 21 Strategy"

1.4 Members of the Working Group include:

Chairman: Ir. SW Cheung, V.P., Business Development and Technology Support, HKSTP

Members: Mr. Peter Li, G.M., Agile Software Ltd and also a tenant of the Hong Kong Science Park

Mr. Charles Mok, President, Hong Kong Information Technology Federation (HKITF)

Mr. David Chow, Chairman, Hong Kong Linux Industry Association (HKLIA), and also M.D, Shaolin Microsystem Ltd, an incubatee of HKSTP Incu-Tech Programme

Mr. Edmund Ma, President, Hong Kong & Mainland Software Industry Cooperation Association (HKMSICA)

Dr. Elizabeth Quat, President, Internet Professionals Association

(iProA)
Mr. Henry Lau, Chairman and CEO, Skyworth Multimedia International Ltd
Mr. S. H. Pau, V.P., Projects and Facilities, HKSTP
Mr. Thomas Chan, G.M., Finance and Administration, HKSTP
Mr. Ricky Ma, Senior Manager, Marketing and Admission, HKSTP
Mr. Joseph Leung, Manager, Information Technology, HKSTP
Mr. Stewart Wan, Manager, Projects and Facilities, HKSTP

Secretary: Mr. Frederick Yung, Senior Manager, Business Development and Technology Support, HKSTP

2. TOPICS OF INTEREST

2.1 Open Software Technology and Open Standard Adoption in the HKSARG

Overview:

2.1.1 Linux as an open source operating system has been around for a while and gradually gaining acceptance in the market, though the de-facto Microsoft Windows operating system is still the most widely used one for personal computers.

2.1.2 Governments of many countries or regions have been incorporating open software technology and open standard with varying degrees. However, the HKSARG is a very late adopter of open source and open standards on computer systems. Many of the electronic forms or documents for submission to the HKSARG have specified the requirement in existing proprietary platform, instead of allowing alternatives, such as open source operating system and application software. Actually, many counties, like the UK, Brazil, India , Finland, Singapore and S. Korea have announced a clear open software technology and open standard migration strategy since 2001.

2.1.3 There is a policy in the China Mainland to adopt an open software technology and open standard and its development will impact the local IT industry in developing application software for use in the Greater China Region.

2.1.4 Details of open software technology and open standard is attached in Appendix 1.

Recommendation:

2.1.5 We recommend that the HKSARG adopts the open software technology and open standard in parallel with the Microsoft Windows platform so that things will synchronize with the Mainland as and when required. The Government should also work very closely with the corresponding Ministry in the Mainland to receive first hand information on its policy and adoption of open source computing.

2.2 Setting up of Software Testing Laboratory

Overview:

2.2.1 Hong Kong is actually competing with the world in developing application software. However, there are applications already dominated by a few international renowned brand names which make competition from a local software developer extremely difficult. Domain knowledge is also important in application development. Good examples are MRP, ERP and CRM applications, Hong Kong just do not have big enough enterprises locally to acquire the needed domain knowledge to develop a world class software in these areas.

2.2.2 Thus, we should concentrate software development that we have very good domain knowledge, experience, manpower and partners and the general consensus of our strong-hold industries include financial, clock and watch, toy, clothing, broadcasting and logistics. An example is a garment related software, developed by Prima, called Primavision, that has gained a world wide leading marketing share. (The company was acquire by a French company)

2.2.3 Details of Software Testing Laboratory is attached in Appendix 2.

Recommendation:

2.2.4 We recommend that in order to encourage software developers to develop application software in these targeted industries, Hong Kong should set up a Software Testing Laboratory. Software testing is an important step in the software development cycle, which includes a few well defined steps such as market requirement, design, architecture, implementation, testing, release and sustaining. This cycle is being practiced by global software companies in releasing different product versions after versions.

2.2.5 Professional software testing necessitates different hardware combination and

software platforms. Hardware includes PC desktops and servers, Sun Sparc workstations and servers, IBM mainframe, etc. Software platforms include different operating systems, databases, application servers, etc. These facilities are costly to build and also need constant upgrades. Only large companies can afford such infrastructures in-house. It would be very helpful if a neutral party like HKSTP has such common facilities for all to share. We can even have a formal test laboratory for ISO certification and performance benchmarking.

2.2.6 Software development tools should be made available to all as well. For example, Microsoft development tools, BEA Weblogic, Oracle database, Rational clearcase, etc. For the same reason, these tools are quite expensive to acquire and upgrade. Since these are common tools for most software development companies and yet they need to be used in-house, HKSTP is also in a good position to deal with relevant software vendors and secure deep discounts.

2.2.7 The above implementation can be considered in conjunction with the Hong Kong International Exchange Centre under section 2.4

2.3 Setting up of Grid Computing / High Performance Computing (HPC) Centre

Overview:

2.3.1 Grid computing refers to the seamless and scalable access to wide-area distributed resources. Computational Grids enable the sharing, selection and aggregation of a wide variety of geographically distributed computational resources (such as supercomputers, computer clusters, storage systems, data sources, instruments, people) and presents them as a single, unified resource for solving large-scale computing and data intensive computing applications (e.g. molecular modelling for drug design, brain activity analysis and high energy physics.) The idea is analogous to electric power network (grid) where power generators are distributed, but the users are able to access electric power without bothering about the source of energy and its location. Grid is a type of parallel and distributed system that enables the sharing, selection, and aggregate of geographically distributed "autonomous" resources dynamically at routine depending on their availability, capability, performance, cost and users' quality-of-service requirements. Sometimes grid computing and cluster computing are being mixed up. The key distinction between clusters and grids is mainly lie in the way resources are managed. In the case of clusters, the resource allocation is performed by a centralized manager and all nodes cooperatively

work together as a single unify resources. In the case of grids, each node has its own resource manager and do not aim for providing a single system view (extracted from www.gridcomputing.com)

2.3.2 In order to better utilize computing power, the Grid computing concept has been implemented in many countries / regions to form High Performance Computing (HPC) centres. Shenzhen, Beijing, Shanghai already have their HPC centres, not to mention the rest of the world. In Hong Kong, there is the Hong Kong Institute of HPC, and there is a tremendous computing power within each university. However, these massive computing resources are not yet networked together to form a Hong Kong HPC centre

2.3.3 Details of Grid Computing/High Performance Computing (HPC) Centre is attached in Appendix 3.

Recommendation:

2.3.4 We recommend that all major computing resources in Hong Kong that are publicly owned be networked together to form a Hong Kong HPC Centre. The initial targets are all the computing resources of the universities. The resources of the Hong Kong HPC Centre should then be accessible and used publicly (with control mechanisms). The local IT industry should be encouraged to develop grid application software and related industries requiring massive computing power should be encouraged to tap into using the resources.

2.3.5 HKSTP with its neutral position, is in a good position to work with the various universities to locate this HPC Centre in Hong Kong Science Park.

2.4 Setting up of Hong Kong International Software Exchange Centre

Overview:

2.4.1 Hong Kong has been an international city for decades, and the residents are multi-cultural and speak good commercial English. We also have a good legal system based on common law, a good and financial system with free flow of money, a good land, sea and air transport system and a good tele-communication system. All these make Hong Kong an excellent trading centre for the world, especially involving trading with the Mainland, where Hong Kong has been acting as a window for China.

2.4.2 On the software front, due to the lack of international exposure and language barrier, it has been difficult for Mainland software to export to the rest of the world and vice versa. Hong Kong is unique and well positioned to facilitate as a software exchange centre to add value in project management, sales and marketing, consulting and inject domain knowledge as appropriate in the process.

2.4.3 Details of Hong Kong International Software Exchange Centre is attached in Appendix 4.

Recommendation:

2.4.4 We recommend that Hong Kong set up an International Software Exchange Centre for the purposes of (a) demonstrating software packages from the Mainland, Hong Kong and the rest of the world (b) displaying catalogues, manuals and related information of software packages. The theme inside the Centre can either be geographical or application specific, or both. The ultimate objective is to let overseas software suppliers come to Hong Kong whenever they want to sell to the Mainland and Mainland companies to come to Hong Kong whenever they are looking for a solution from overseas. This will also provide a venue for all parties to foster marketing/distribution partnership.

2.4.5 To cope with the demonstrations, the platforms of which may be common to many software packages, the Centre should be equipped with the most popular software tools and hardware boxes.

2.4.6 HKSTP is in a position to host this Centre because of its neutrality and mission and the Science Park or the Tech Centre are both excellent physical locations. The Hong Kong and Mainland Software Industry Cooperation Association, with its connections in the Mainland and with the various Software Parks and the software industry, is a very good partner to work together with to put this Software Exchange Centre at work.

2.4.7 With the set up of this Hong Kong International Software Exchange Centre, the Government should actively promote to overseas IT companies to use Hong Kong as a window to China to enter into the Mainland market. Hong Kong with its international exposure, sales and marketing expertise, project management experience, and coupled with the Software Testing Laboratory as outline in section 2.2, will naturally function as a localization R&D centre.

2.5 A Unified Approach To Seek Overseas Opportunities For The Local IT Industry

Overview:

2.5.1 There is a limit as to how large the demand of IT solutions in the local market, and in order to promote the local IT industry, we should encourage local IT firms to bid for regional and international tenders.

2.5.2 It is a common practice for countries to set up trade representative offices in foreign countries to explore the business opportunities therein for local firms, so should Hong Kong.

2.5.3 However, some countries have moved one-step ahead by proactively offering chargeable services to support and assist local IT companies to win global IT contracts. Hong Kong is currently lagging behind in such practice.

2.5.4 Details of a unified approach to seek overseas IT opportunities is attached in Appendix 5.

Recommendation:

2.5.5 The Government, and the body responsible for encouraging foreign trade in the IT industry in particular (the Government should appoint one single body instead of having different independent bodies doing a very similar task), should apply more innovative and assertive practices and establish an IT trade representative office in each of the targeted foreign market or strengthen the existing ones to incorporate such role, in active pursuance of business opportunities, such as government contracts, for the local IT industry. These offices will have to be staffed with IT business development professionals to cater for the special needs of the IT industry.

2.6 Active Collaboration With The Mainland On The Progress Of Digital Broadcasting / TV Standard

Overview:

2.6.1 Since the 1980s, digital technology has been used in television remote control, auto-channel searching, storage and on-screen display etc to enhance the user-friendliness of TV sets, but little has been done in the video image and audio quality improvement.

2.6.2 At the end of the 1980s, digital technology was first used in TV signal processing, providing capabilities such as digital color decoding, noise reduction, echo cancelling, interlacing scanning etc. to enhance the video and audio quality on television. However, the TV signal is still transmitted in the analog mode.

2.6.3 The new digital broadcast television uses digital signal in TV programme production, editing, broadcasting and transmitting until the receiving end to ensure maximum video and audio quality received by users.

2.6.4 Digital broadcasting enables the transmission of a massive incremental digital information, including electronic programme guide, multimedia information browsing (stock information, yellow pages, digital newspaper and games etc) and on-line upgrade of television reception software.

2.6.5 A more reliable conditional access system also enables the broadcasting operators to be more flexible in terms of charging according to users, time slots, channels or even programmes. This will allow operators to provide better service and programme. With some modifications in the transmitting network, interactivity can be deployed, such as interactive TV, interactive game, TV banking, video shopping, video on demand etc.

2.6.6 Traditional broadcasting usually employ the following three TV broadcasting methodologies:-

- Terrestrial
- Satellite
- Cable.

Based on these 3 broadcasting methods, Europe has developed the DVB-T, DVB-S, and DVB-C digital TV standards, and they are being used by a lot of countries. The USA has established the ATSC digital TV standard, and is being used in the USA, S. America and S. Korea. Japan has established the ISBD digital standard, and is being used in Japan. The major difference in the 3 standards lies in the terrestrial broadcasting. So far, China has not established its own terrestrial television broadcasting standard.

2.6.7 Because of the large number of analog color TV sets still being used, coupled with the rapid change in the development of digital broadcasting standard, digital set-top box will play a major role in popularize digital television without the need of replacing all the existing analog TV sets.

2.6.8 In China, the digital television industry is being coordinated by the following ministries:-

- 国家计委
  - 从国民经济宏观调控的角度制订数字电视产业政策；参与制订技术标准。
- 国家安全部、中宣部
  - 从国家安全、国民文化、宣传口径的角度控制电视广播的播出内容、内容供应商、运营商。
- 科技部
  - 从国家科技发展的角度参与数字电视标准的制订。
- 广电总局
  - 从内容供应商、广电运营商的角度制订数字电视产业政策、技术标准。
- 信息产业部
  - 从设备供应商、通讯行业运营商的角度制订产业政策与技术标准。

2.6.9 The China's digital broadcasting standard is mainly based on the European standard, with the total adoption of DVB-S, and adaptation of DVB-C with modifications. As to terrestrial broadcasting standard, the original plan is to establish it by the end of 2003, but now it is unlikely that it can be done. The 2 major proposals came form Tsinghua University and Shanghai Jiaotung University, the platforms of which are based on the European DVB-T and American ATSC standards respectively.

2.6.10 The market for digital television in China is substantial. It was planned to have 1 million digital TV users by 2003 and increase to 30 million by 2005, requiring a equal number of set-top boxes. With a retail price of RMB600 per set-top box, the market is as high as RMB18,000 million. With a monthly subscription fee of RMB30 per user, the annual subscription fee will be RMB10,800 million. There will also be value added services revenue coming from stock information, VOD, games etc.

2.6.11 Details of active collaboration with the Mainland on the progress of digital broadcasting/TV standard is attached in Appendix 6.

Recommendation:

2.6.12 The markets for set top boxes, value added services and eventually the digital

TV sets are very large, Hong Kong should not miss out in developing the related components, hardware, software and value added services (IT&T related) in the migration of digital broadcasting and digital television in the Mainland. We recommend that the Commerce, Industry and Technology Bureau maintains a high level contact with the related ministries of the Mainland to channel back in time the needed technical information and development to the industries in Hong Kong.

2.6.13 HKSTP will also assist its IC design and system design tenants and incubatees to participate in the huge growth opportunities in China. HKSTP will work with FHKI to evaluate the need of setting up shared facilities in Hong Kong Science Park to support the digital broadcasting industry in Hong Kong.

3 CONCLUSION

3.1 In mapping out the 2004 Digital 21 Strategy, we recommend to put emphasis on how Hong Kong can ride on the digital era and established infrastructure that we have developed in the last 5 years and benefit from them business-wise by the related industries, especially the IT one.

3.2 The adoption of open software technology and open standard, the setting up of a software testing laboratory and a grid computing/high performance computing centre will provide the hardware and software platforms needed for the establishment of the Hong Kong International Software Exchange Centre to promote Hong Kong as a software hub for the Mainland and overseas companies to do business (including sales and marketing, localization, etc.) via Hong Kong, with the HKSARG playing an active role as a facilitator and promoter for all parties concerned. The Government should also take the initiative in active collaboration with the Mainland on digital broadcasting and digital television standard, and all these will contribute in raising the IT standard of Hong Kong in general and the IT industry in specific, and at the same time create employment and wealth in Hong Kong.

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Open Software Technology and Open Standard Adoption

Evidence of late movement to open technologies

Currently the encourgement from Government to use Linux is not enough. For example, Beijing Government has announced a training scheme to train 100 Linux trainers (teachers), 1000 Linux engineers and 10,000 Linux users. This should spread through the use of Linux in different layers of the society immediately. Also China Government has successful attracted IBM to set up a multi-million Linux centre in China. I believe HK Government can take some initiative in doing something like this.

Thailand government funded the education sector for purchase over 330,000 units of personal computers with Linux preloaded to encourage Linux usage from primary education to secondary education.

In China, in general, Government and major enterprises, they prefer open source software like Linux in preference to other non-open source software. The reason is obvious. They need security and protected from software suppliers hacking into their systems. For example, Beijing Government has made a giant step towards open source software is to award a substiantial tender for replacing all their systems to Linux gradually from year 2001. Another good example is our neighbour country, South Korea. They are the most aggressive Government in Asia in encouraging use of Linux. Because of the copyright problem, most of the organization favours Linux and are widely being accepted in the Country.

UK government also annouced a clear Linux and opensource migration strategy since 2001.

Brazil, India, Finland, Singapore, Korea and many countries' government also did a similar annoucement since 2000 and 2001.

The Hong Kong government is a very late adopter of open-source and open standards on computer systems. However, until now, our government didn't make such annoucement regarding preference to open standard strategy. Having a clear open standard strategy is clearly a world wide initiative rather than a regional or specific industry initiative. It is a pitty that HK government is still lacking behind the **WORLD** trend.

Low awareness of importance of open standard

History of the computing and information industry tells us proprietary platforms played a hard time in the industry. Say, fax machine and mailling systems. In the old days, fax sender and fax receiver must have the same fax machine to communicate. Until we have an open standard protocol so that fax can be commodify. Our email systems todays uses the SMTP protocol which is an open standard protocol existed for than 20 years, which before we have dozens of proprietary email protocols which didn't success. The Internet took more than 20 years to become so successful (as today's Internet), by merging dozens of private networks into a single unified network (The Internet) using the standard Internet Protocol (IP) for exchanging information cross regions, linking up countries and organizations.

We already know open standard drives public adoption to a certain technology. Close source does not imply non-open standard, but open source does implies open standard. For example, an email program such as Netscape mail or Eudora mail is not an open source software, bu they both compliance to open standard email protocols such as POP3, IMAP4, and SMTP such that they can talk to each other.

Government should consider the lowest Total Cost of Ownership (TCO) of a system rather than always the lowest Total Cost of Acquisition (TCA) as a long term cost saving strategy. The most important of a system is the scalability, interoperability and the most importance is resource life-cycle management. As open source guarantees the user herself to control its life cycle, there is no reason why open source and open standard requirement is not in our tenders.

Open standard requirement is always not in government tender requirements. HK government have put on paper in black and white on its purchasing policy to select a service or product from more than one supplier or having at least an alternative solution provided by a secondary supplier. However, the HK government has demonstrated that most of its projects and applications are build on a single proprietary platform (e.g. Microsoft). For example, the mission critical and highly secured HK identify card system has built its front-end (kiosk and card readers) only operable on Microsoft Windows platform, which is a proprietary operating system by a single company named Microsoft. This is extremely dangerous on putting our mission critical security system which involve the whole city on a proven insecure, unreliable and proprietary platform. Microsoft together with its products has also broke the anti-trust law in USA, the court case between the state government of California was closed in August 2003 and Microsoft was guilty for breaking the anti-trust law together with a compensation of 1.2 billion US dollars to consumers.

Software Testing Laboratory

The success of the Digital 21 strategy is highly dependent on how Hong Kong can be transformed into a Hi-Tech centre of Asia. The definition of Hi-Tech centre is a high degree of research and development activities where original ideas and products are developed. A lot of the neighboring cities and countries are pursuing the same goal with substantial government support, infrastructure and policies. There is no doubt that the same measures can be taken in Hong Kong to enhance the transformation. Yet we do not want just a "me too" strategy. Instead, we want to make Hong Kong a leader in the new digital era for Asia. To make the Hong Kong strategy successful and always at the frontier, we need a way to differentiate ourselves from our neighbors.

An important step in the differentiation is to evaluate our strength. Hong Kong has quite a few stronghold industries that has put up in front of other part of Asia. A general consensus of our stronghold industries is financials, clock and watch, toy, clothing, broadcasting and logistics. Within these industries, we have substantial domain knowledge, experience, manpower, expertise and partners. These factors coincide with the ingredients to build a professional software product.

Software has very broad application and is ubiquitous in our daily life. Software usually works with hardware and is designed to solve a particular set of problems. Domain knowledge is always required to get the know-how of the problems before they can be solved. Besides, breath of knowledge in technology is required to design a scalable and flexible system. On top of that, experience in software development cycle is critical to produce world-class software with professional quality. Formal software development comprises what is commonly called a product development cycle. The cycles have a few well-defined steps that are marketing requirement, design, architecture, implementation, testing, release and sustaining. The cycle is being practiced by global software companies in releasing different products versions after versions.

As mentioned before, Hong Kong has considerable domain expertise in our stronghold industries. Therefore, we should focus our software development around these fields for best leverage and chance of success. Being a software technological leader in one or two of our stronghold industries is going to make Hong Kong a very successful R&D center. Together with a good business environment and the premium location within Asia, Hong Kong is well position to lead in the software frontier of these areas. Business processes in these industries can be automated with well-designed software. Software can further enhance the productivities and creativities of these industries to leapfrog other competing nations.

Besides domain expertise, personnel with breath of technology are also required. Hong Kong has a late start in software industry and therefore it will take some time for the skills to be developed locally. There are different ways to solve this problem. First, we need to make it easy to import skilled labor from other places. Hong Kong has done well in this aspect, as there are simplified work visa procedures for this type of people. Second, Hong Kong government needs to provide the right business environment to attract well-

established software company to come and set up their R&D center in Hong Kong. Third, the government needs to instill the right policy to encourage local start-up company in software development.

Hong Kong Science Park, TechCentre and related locations are sites built by the Hong Kong government to promote hi-tech development industry. The parks are supported by the government and serve as magnets and homes for software companies. Various programs and facilities are available in the parks to facilitate hi-tech development. This document will not discuss these existing facilities. Instead, it will focus on what is not available but essential for software development.

For the betterment of the Hong Kong software industry, 2 improvements in the soft-infrastructure can be made:

First, a software-testing laboratory should be built. As discussed above, software testing is an important step in the software development cycle. Professional software testing necessitates different hardware combination and software platforms. Hardware includes PC desktops and servers, Sun Sparc workstations and servers, IBM main frame, etc. Software platforms include different operating systems, databases, application servers, etc. These facilities are costly to build and also need constant upgrades. Only large companies can afford such infrastructures in-house. It would be very helpful if Science Park has such common facilities for all the tenants to share. We can even have a formal test laboratory for ISO certification and performance benchmarking.

Second, software development tools should be made available to all the tenants at cost. For example, Microsoft development tools, BEA Weblogic, Oracle database, Rational clearcase, etc. For the same reason, these tools are quite expensive to acquire and upgrade. Since these are common tools for most software development companies and yet they needs to be used in-house. Science Park should strike a deal with relevant software vendors and secure deep discount for the tenants.

After all, we need to promote entrepreneurships by providing the right facilities and tools at low or zero cost. It is believe local companies are the ultimate driving force for the software industries in Hong Kong and will determine the success of the hi-tech transformation of the Hong Kong economy.

Grid Computing/High Performance Computing (HPC) Centre

Grid and high performance cluster computing is the emerging technology, and is believe to be the most disruptive technology of the next decade. Cluster computing technology using as high performance computing (HPC) is a mature technology and has been widely adopted worldwide in the past decade. Many universities and governments including China, Singapore, Korea and Japan government have already made a movement on setting up high performance computing centers to facilitate HPC users on sharing high computing power and as for developers for R&D usages. Universities in Hong Kong has also setup HPC facilities for their own use. Government has also adopted high performance clustering computing technology for in some departments. This shows Hong Kong has been a fast technology adopter. However, just being a technology adopter it is not good enough and cannot gain enough econormic advantage for the Hong Kong IT industry through this emerging technology wave. As Grid and high performance cluster computing are very important and not just Hong Kong, the Hong Kong IT industry should make use of this opportunity by technology innovation and creation in this area. At the same time, Government should react quickly on encourage and facilitate local IT industry on developing cluster, Grid, distributed network applications or related resources. For example, we can set up publically accessible HPC R&D facilities in HKSTP to facilitate developers and users. This can not just to serve users and developers, but also promoting Hong Kong as a high tech city and attract technology invesntments. To ensure our industry could catch up this wave, this must be done as soon as possible. Since Hong Kong already have the experience on implementing HPC centers and related projects as users and adopters. This means we already have the domain knowledge of users of HPC. Hong Kong also have its unique advantages on being a HPC technology adopters. With its geographical nature of high density of population which is very suitable for Grid computing infrastructure. Hong Kong also have good HPC user candidates, for example, Bioinformatic industry and digital entertainment in which are encouraged by the Hong Kong Government. Other industries such as online gaming, financial services and banking, the Government, and of course the IT industry are all good candidates of HPC users. Hong Kong Science and Technology Parks with the initiatives on setting up an internation software exchange centre and the software testing and certification center, the HPC R&D center can further enhance and complement the scene. With already a high potential market and good networking infrastructure, Hong Kong should have no reason on not pushing this emerging technology aggressively in the region.

Hong Kong International Software (Exchange) Centre

The Digital 21 IT Strategy, which promulgated by Hong Kong Government in 1998, with the aim to enhance and promote Hong Kong's infrastructure and services, did bring to Hong Kong a new age of electronic information. The ESD, smart ID cards and many other projects did expedite the development of IT application in daily life.

After 5 years, Digital 21 is entering the second stage. It's the right time to consider implementing benefit to the IT industry in a more direct aspect. As software is becoming more important to the IT industry, the topic of how we can gear up the local software industry becoming a more and more hot topic the industry is discussing.

China spends a lot of effort in stimulating the software industry; besides granting a special VAT (value added Tax) rate from 17% to 3 %, the Central and district Government also allocates the budgets to help grow the industry. China expects the software industry to have a big growth in the coming five years and to become one of the key software exporting or outsourcing country like India. The whole country is trying its best to draw talents, expertise, investment and customers of the software industry. In differentiating among themselves in this booming industry, some of the provinces/cities have found their values and have repositioned themselves to meet the competition.

How can the local software industry takes this opportunity to expand their business, how can Hong Kong be benefit from this up growing industry as a whole and how can we grap this opportunity? Hong Kong has values and advantages comparing to the cities in Mainland in developing the software industry. However, Hong Kong has to identify clearly these values, then reposition itself, re-define the role it is going to play in this industry and this environment. These values and advantages are fading with time since the Mainland is catching up fast. If we can form a good strategy with an effective action plan and start quick to grap this opportunity, we are confident that Hong Kong will still be in the winning side.

(A) STATUS

Hong Kong has some very valuable advantages in the software industry at this time comparing to the cities in Mainland:

(1) Hong Kong is traditionally a trading port, with good transportation facilities and world reputation for commerce activities.
(2) Hong Kong is an international city for decades, thus the people used to be in multi-cultural background and speaking good commercial English.
(3) There are good practice of law system, financial environment, mentally intellectual property protection.
(4) The City is full of expertise in software industry, including the experienced marketing and sales, the project management expertise, the consultants with domain knowledge. Besides the local professionals working in the multinational companies for long time and used to the international

methodology, there are also many others expertise coming from other countries, grouping into forming a strong professionals pool here.

(5) Hong Kong is a key financial centre in the world, thus capable of raising investment for software companies.

(6) The international trading network which can help the companies in Mainland to export software or negotiating outsourcing software projects.

(7) Traditionally a commercial window for China and for industry, it can be also for software industry.

(8) Through the hardworking of the other industries leaders, Hong Kong becomes the centre of watch, toys and etc, so we can also try to make Hong Kong a software centre.

(B) THE PROPOSAL----

Promote Hong Kong as the Software Hub, Set up the "International Software Exchange Centre"

Our Association, the Hong Kong and Mainland Software Industry Cooperation Association, help promoting the local software/IT companies to expand business outside Hong Kong. We helped to bring in, from time to time the business opportunities information from China, we worked with TDC, HKPC to help the local software companies in matching with mainland companies. In order to help the local software industry to grow in a larger scale, to make use of local software companies as the partners for those in Mainland for expanding business overseas, we propose to set up the "Hong Kong International Exchange Centre" as one of the important strategy.

(i) VENUE

We propose to set up, in a building in the Hong Kong Science and Technology Park, name it to be the "Hong Kong International Software Exchange Centre" (called Centre). The Centre rents to the local software companies and those from outside, including from Mainland, serves a permanent location, available any time for the purposes of (a) displaying of catalogues, manuals, and other related information of the renters, and (b) to demonstrate the software packages of the renters (i.e. software companies) at any time required by interested buyers or parties. The renters can authorize the Centre to conduct the demonstration, or directly with their own staff.

There are larger region partitions in each floor by districts, like China, Japan, Korean, USA or etc, and also partitions by business sectors, like software packages of ERP, Accounting, Education, Cad/Cam and etc. The renters can choose by themselves to rent any right size and right location (booth) in the building.

We welcome all software companies from the world to rent any size in this building. More companies to join will make it more reputable. The Centre should incorporate a computer room, which should accommodate as many as possible the different

most updated models of computer systems from vendors. Also, the Centre should also install the most popular software tools. In this case, the renters (software companies) can just bring their software packages and then they can show on terminals located in their booth, and no need to worry the rest.

This Centre is different from the exhibition, which just last for a few days.

To be an extension, the computer room can be developed into a software laboratory which can help to test the software packages to match any required standards, or to test the compatibility, stability or comparison.

To start with, it's easy to set up the "China Pavilion", to attract the software companies from Mainland China, then other countries like Japan, Korean, USA, Canada, Australia and etc.

(ii) FUNCTIONS

This centre serves the business sectors and also the community.

For business:

(1) Let software companies from the world to demonstrate their software products (not just catalogues) permanently, by contract terms of year or months.
(2) Any people or any software companies in the world, when they want to source some software products (from China), or some companies to be their partners (of China) in representing their products in the region(or China), outsourcing software projects, understanding the industry situation in the region and etc, they can source from this Centre, and it just serves as the "Hub". With this arrangement, Hong Kong is definitely the first place they must visit.
(3) Extend the usage of the computer room to serve as a software testing centre, the renters can test their software packages, or even open to the public for the testing purpose on a chargeable basis.
(4) This is a centralized place for meeting candidate partners, or even holding small scale seminars in hot topics of business, technologies, or training. The Centre will provide consulting service even if the renters or visitors want to negotiate cooperation or contracts.

For Community:

(1) The building can be decorated in the first two floors as a scientific park for education purpose at holidays.
(2) Or any non-profit game room for students, children or even adults making use of the software products.
(3) We can have films to explain to them what is software or the history, etc.
(4) They can come on holidays, or even trips organized by schools on weekdays.

The new buildings in HKSTP of Taipo needs two to three years to build, at the present stage, we suggest to start with the temporary site at the Tech-Centre of Kowloon Tong.

(iii) BUDGET

Besides the cost of the building, the basic cost of the Centre will consist of two parts; namely, the Computer Room with computer systems cost and other matching equipments. The second is the cost of the basic decoration, the decoration of the hall and meeting rooms, the business centre, administration centre ant etc.

To start with, the Centre can just host the Hong Kong and China (Mainland) Pavilions. Pavilions of other countries can be set up later.

If computer systems can be donated by the vendors, the total budget can be much reduced.

We expect the Centre can be on its own balance after the first initial investment and the first 3 years expenses.

<u>This is a very key international project with the least investment from government and to raise the status of Hong Kong</u>

(C) BENEFITS TO SOCIETY----STATUS

(1) If we starts with China Pavilion, then, it raises the global status of Hong Kong in the IT/Software industry as people from all around the world of the industry can come to Hong Kong as the one-stop-shopping place to look for technology partners and to meet with all of the best selected representatives of innovation and technology companies in China.

(2) Innovation and software companies all over China will recognize Hong Kong as the best place for them to meet with overseas partners and to showcase their innovations and technology skills for export.

(3) It's Success will in turn attract more innovation and software technology companies from other parts of the world which leads to be the true worldwide software "hub"

(4) It's success will reflect and prove the underlying strength of the infrastructure and business environment of Hong Kong as a world leading free trading port and financial centre with world class telecommunications, convenient transportation from overseas and within the territory, well established and highly respected legal and arbitrary system, reputation in practicing protection of intellectual property rights, most importantly, a large pool of professionals with international experience.

(5) This is a chance of re-positioning IT/Software industry in Hong Kong to match the mainstream trend in China as well as worldwide----making Hong Kong a perfect link in cooperation of East and West in the software industry and executing the perfect Tripartite collaboration. Software industry is the prime engine of American economy in the 90s and into 21st century. The China central government position highly the software as its national grand strategy in building the economy of China. It institutes aggressive policies and continue to refine them to aggressively support and foster the industry. Hong Kong should leverage and ride on this global and national wave and not to miss this opportunity of growing this industry in Hong Kong. Without the support from the government, we would be seeing the industry withering and diminishing in Hong Kong, ironically, in a growing worldwide and national software market.

(6) This is a golden opportunity for Hong Kong to reach for the status of international centre city of software beginning with this establishment of the "Software Centre". We should have the support from the Ministries and Central government to execute the spirit of CEPA.

(D) BENEFITS TO LOCAL SOFTWARE INDUSTRY

(1) The Centre will benefit both Hong Kong and China. There will be more visitors from overseas (and from China) to visit Hong Kong for more business negotiation. More successful stories will be reported which will breed more successes.

(2) Local software companies in Hong Kong, besides a centralized place to show their catalogues, to demonstrate the software packages, in addition, they will have more to gain as their cost of doing business locally will be lower than for them to travel all over China mainland or overseas to look for business. The proximity to customers will help them understand customers better and win more business.

(3) Hong Kong Companies can position themselves as a business facilitator, importer/exporter or marketer in the value chain and partner with Mainland companies present at the Software Centre to leverage on their research and development capabilities. They can thus capitalize ion their strength in English skills, international marketing/sales experience and project management. The cluster effect will sure be benefit to the local software companies, and they can then complete for more business with the dual shop-and-factory relationship with China mainland.

(4) Due to the proximity, local software companies in Hong Kong enjoy priority in matching and forming partners to promote their products to China market and to export software from China to overseas markets.

(5) Other business sectors related or not directly related to the IT/software business will benefit as well. These are such as training, management consultancy, software export/packaging companies etc.

(E) BENEFITS TO PROFESSIONALS

(1) More overseas and China Mainland companies will come to Hong Kong to set up branches if they see more business can be collaborating with the Software Centre.
(2) There would be then be an exponential multiplying effects on more employment opportunities for IT professionals and other related professionals. Since more products to be export or projects to be outsourcing, Hong Kong is capable of providing experienced project managers and consultants of specified domain knowledge to work with the team in China.
(3) Seminars and training will be held to coach the technology companies on how to get financing to support their business growth. Professionals in the finance sector will find more business opportunities with the hundreds of potential customers.

(F) CRTERIA OF SUCCESS

The success of the Software Centre depends on a few criteria.

(1) The most important criteria of the success of the concept of setting up this International Software Centre in Hong Kong, is to be initiated by Government of HKSAR, then propose to, and to be supported and endorsed by the Central Government of China. The market requires only one of this kind of centre, and it's un-sufficient to have two. Therefore, if the Central Government endorses Hong Kong's idea, there should not be other centers to be set up serving similar target in other cities in China. Other cities can set up technical centers in other particular area, like ERP, embedded software, Cad/Cam or etc. However, only the centre in Hong Kong serves the general purpose of demonstration, testing, trading and business negotiation.
(2) Promotion is very important. The government of Hong Kong and Mainland China have to jointly or separately promoting, advertising the idea of permanently displaying/demonstrating the software packages in Hong Kong, the idea of one-stop-buying, overseas software companies visit at anytime can have chance to meet the most of software companies around the world (to start, from China) here in Hong Kong.
(3) Central government can help more by encouraging companies in Mainland and other parts of the world to visit Hong Kong and rent their demonstrating slot. Central government might issue policies which give privileges to software companies who join the Hong Kong Software centre.
(4) Good set up, good management and aggressive attitude to attract renters.

(5) Free rentals for the overseas government technology organizations, so that they can help to promote in their countries the idea and attract more companies to come.

(G) CONCLUSION

The idea of making Hong Kong a Technical Hub, or start with easy one, the Software Hub, is the wish of the industry for long time. This matches the concept of Digital 21 to make Hong Kong a digital city, and also a digital business city. Actually, to set up a centre to consolidate software information and software products from around the world has been the target many cities in Mainland and Asia, including Singapore, pursuing. However, Hong Kong has most of the advantages in comparing. Hong Kong is more neutral, geographically centre of Asia, advance in all the legal and other infrastructure, convenient in traveling. As a financial centre, Hong Kong provides a short cut for software companies to raise fund for development. A Software Centre can help, most important the local software innovation to demonstrate their products and technology. The rich in IT professionals in Hong Kong can fill the gap that China needs. More over, CEPA would facilitate the decision from Central government in endorsing Hong Kong to achieve this target.

If Hong Kong is late in making this decision, the other cities in Asia, or even in Mainland China will catch up in time and once they established and enjoying the result, there should no longer a second chance for Hong Kong.

There are of course a lot of problems and details in implementing the concept in front of us, however, we wish Hong Kong SAR Government listen to the industry and can act immediately, appoint and set up a committee to make research and study on the feasibility of the concept, and the operation in future. Hong Kong & Mainland Software Industry Cooperation Association is willing to join the committee to help the industry, and achieving this great concept to turn Hong Kong to be recognized as an international software hub.

A Unified Approach to seek Overseas Opportunities for the Local IT Industry

Taking a more unified and proactive approach in encouraging foreign trade in the IT industry

- The roles of attracting foreign investments to local IT industry and seeking foreign business opportunities for local IT industry are now separately performed by several independent bodies, namely, InvestHK, HKSTP, Cyberport and TDC (TDC being more involved in matching local firms with foreign business opportunities).

- Each of these bodies promotes and manages its own standard "one-stop service plan", whose major selling point is Hongkong's existing business environment, IT infrastructure, and the plan's other value-adding services.

- Such scenario of individual body promoting its own programs creates confusion to foreign investors, deterring foreign investments from entering the local IT industry. This also indicates inefficient resources allocation.

- In addition, these bodies may not possess the IT domain knowledge necessary for encouraging foreign investments. And for foreign investor, difference between investing in Hong Kong or investing in mainland cannot be easily identified due to inefficient education and promotion programme.

- Moreover, Hong Kong is promoted as the gateway to China but do not offer one-stop service to investors seeking to operate both in Hong Kong and in China collectively as a whole.

- We therefore propose the Government to allocate the responsibilities of encouraging foreign trade to the IT industry to one single body, so that this body may take a more unified and proactive approach in the following two areas:

  (a) Leveraging Hong Kong's strategic value to the China market in attracting foreign investments; and

  (b) Seeking business opportunities from the foreign market for the local IT industry.

- We shall elaborate on the above as follows, each of which may also constitute an independent proposal.

I. Leveraging Hong Kong's strategic value to the China market in attracting foreign investments

- Hong Kong possesses many advantages that render her the ideal starting point for foreign enterprises aiming to enter into the China market. In addition to her strategic location, Hong Kong's well-established legal and financial system, business environment, human resources and IT infrastructure all contribute to her advantages in this regard.

- However, in order for such advantages to be realised and considered by foreign investors, it is essential that the Government, and the body responsible for encouraging foreign trade in the IT industry in particular, to:

  i. establish concrete linkage with the Mainland IT industry that leverage Hong Kong's strategic position; and
  ii. strengthen the promotion of Hong Kong's advantage by incorporating such close ties with the Mainland.

- It is very important for Hong Kong's claiming as the entry point to the China market be backed by concrete linkage with the Mainland IT industry, so that foreign enterprises may reap the rewards of entrance in the China market while also enjoying the benefits of Hong Kong's established legal and financial system. Successful establishment of such ties will strengthen Hong Kong's positioning as the design and marketing stronghold for the IT industry, while leveraging the Mainland's vast development resources.

- In this regard, strong connection with Mainland's Software Technology Parks plays an important role. Mainland's Software Technology Parks represent R&D resources and human resources that are appealing to foreign enterprises.

- One way to strengthen the connection with Mainland's Software Technology Parks is to invite all Mainland Software Technology Parks to set up a representative office in Hong Kong to facilitate communication.

- The Government should also actively seek for other means to enable foreign enterprises' entry to the China market through Hong Kong. Examples of this include business matching with Mainland firms and assisting foreign enterprises to set up branches in the Mainland.

- In parallel with these measures to facilitate foreign enterprises' entry to the China market, the Government should take a more proactive approach in promoting Hong Kong's such unique advantages as the entry point to China. The close linkage with conducting business in China shall constitute one of the emphasises in such a promotion package.

II. Seeking business opportunities in the foreign market for the local IT industry

- It is a common practice for countries to set up trade representative offices in foreign countries to explore the business opportunities therein for local firms, so should Hong Kong.

- However, some countries have moved one-step ahead by proactively offer chargeable services to support and assist Local IT companies to earn global IT contract.

- Hong Kong is currently lagging behind in such practice.

- The Government, and the body responsible for encouraging foreign trade in the IT industry in particular, should apply more innovative and assertive practices and establish an IT trade representative office in each of the targeted foreign market in active pursuance of business opportunities, such as government contracts, for the local IT industry, or strengthen the existing ones to incorporate such role. These offices will have to be staffed with IT professionals to cater for the special needs of the IT industry.

数字电视简介

数字电视——概念与分类

- 数字控制电视
  - 八十年代开始采用数字技术，用于电视遥控、自动搜索和存储节目、实现OSD显示，提高了电视机的易用性，但是在图像、声音质量方面没有变化。可以称为“数字控制电视”。目前这已经是标准功能，几乎没有人再称呼这种电视机为“数字电视”。
- 数字处理电视
  - 八十年代末，开始采用数字技术进行电视信号处理。实现诸如数字彩色解码、降低噪声、消除重影、100Hz或逐行扫描等功能，提升了电视机的画面质量，但电视信号在传输过程中仍然是模拟信号，不需要电视台做任何改造，运营商提供的还是传统的服务。
  - 现代的许多新型显示器件，譬如LCD、PDP、DLP、LCOS等，都要采用数字技术进行信号处理。
  - 目前市面上常见的许多“数字电视”正是这一类产品，可以称为“数字处理电视”。但不是这里所叙述的全新一代的数字电视系统。

数字传输电视——新一代的电视

- 从节目采集、编辑、播出直到传输到用户终端都采用数字信号，避免了传输过程引入的雪花、抖动、重影等噪声和失真。
- 采用数字压缩技术(MPEG-I,II,IV等)，现有传输通道节目容量可以提升数倍到数十倍，使得高清晰度电视广播(节目信息量是标准清晰度电视的6倍以上)、准视频点播(NVOD)成为可能。
- 可以传输大量附加数字信息，实现电子节目指南(EPG)、多媒体信息浏览(股票、黄页广告、电子报纸、游戏等等)、电视接收设备软件在线更新等等。
- 更可靠、更强大的条件访问(CA)系统。运营商能实现多种灵活的按用户、按时段、按频道、按节目收费。使得运营商有能力为用户提供更好的服务和节目内容。
- 经过双向传输改造的网络可以实现各种双向应用。例如打电话、互动电视、互动游戏、电视银行、视频购物、视频点播(VOD)、Internet访问等等。
- 下面提到的数字电视既是指数字传输电视。

数字电视——运营商

- 传统的以模拟信号进行传送的广播电视媒体运营商，在设备进行适当改造后即可以提供数字电视服务。已经具有相当的规模(全球数千万到一亿用户)。
- 数字电视技术的出现使得原本就提供数据通讯的电信、宽带网、移动通讯等领域的运营商提供数字电视服务成为可能。尽管目前成本较高，但更容易实现多媒体、个性化的服务，譬如VOD、交互电视等。目前已形成具有相当规模的产业(电信、宽带网电视节目内容服务，数亿美元)；或开始启动(3G移动电视)。成为传统电视运营商的强有力竞争者。
- 本文主要叙述传统广电行业的数字化。

数字电视——传输与标准

- 传统广电行业通常用三种方式广播电视信号：
  - 地面(Terrestrial)无线电波传送电视广播。
  - 卫星(Satellite)传送电视广播
  - 有线(Cable)传送电视广播。
- 欧洲针对上述3种传输方式分别制定了DVB-T, DVB-S, DVB-C数字电视标准。世界上多数国家选用。
- 美国制定了ATSC数字电视标准。美国、南美、韩国等采用。
- 日本制订了ISBD数字电视标准。日本采用。
- 三个标准的主要区别在于地面数字电视的传输。
- 中国尚未确定自己的地面数字电视广播标准。
- 标准之争实际上就是利益之争。目前数字电视标准牵扯到的主要专利有MPEG(所有标准都采用MPEG，都有同样的专利费问题)、Dolby Digital(ATSC、澳洲DVB-T采用的伴音标准)、COFDM(DVB-T传输技术，专利费约$0.75)

数字电视——标清与高清

- 上述三种标准都可以支持多种不同分辨率的电视信号，包括标清与高清。
- 多数采用DVB标准的地区采用标准清晰度广播作为数字电视产业的切入点。计划以市场调节为杠杆逐步过渡到高清晰度电视。
- 美国地面数字电视广播直接以高清晰度切入。但卫星电视和有线电视则还是以标准清晰度为主。

数字电视——机顶盒与数字电视机

- 由于以下几个原因，数字电视机顶盒在一段时期之内还将扮演数字电视普及的主角：
  - 市场上现在已经保有的十多亿台模拟彩电过渡到数字电视的最佳方式就是加装一台机顶盒。
  - 由于数字电视行业的高速发展、传输方式的多样性，其技术、服务、需求等方面的不确定性使其标准也在不停地更新。电视机整机厂商难以用合理的成本生产出通用的接收机，往往需要为不同的运营商研制专用的机顶盒。
  - 目前一些团体正在开发“机卡分离”的技术。希望将各种不同的需求用一块可以分离的插卡实现，但该技术尚不成熟。
- 由于不需要淘汰老的模拟电视机，因此，接收地面数字电视广播的高清晰度电视机会最先嵌入数字电视解码器。

数字电视——核心技术

- 视频、音频压缩编码——软件、硬件
- 数字信号传输——软件、硬件
- 实时操作系统(RTOS)——软件
- 条件接收（Conditional Access)——软件、硬件
- 业务管理系统——软件、硬件
- 用户管理系统（SMS）——软件
- 中间件技术（MiddleWare)——软件
- ……

目前数字电视的核心技术基本都掌握在国外公司手中，用户端设备技术提供商主要包括：

硬件方案：ST、 Philips、Fujitsu、LSI、TI、IBM等

RTOS：Psos、WinCE、VxWorks、OS20

CA：Irdeto、Nagravision、NDS、Canal+、中视联、同方、算通科技等

MW：OpenTV、 MsTV、 Liberate、Canal+、OCAP1、NDS、Aliticast等

数字电视——产业链

数字电视是一个巨大的产业，其发展依赖于产业链各个环节的整合。而科技的发展、社会经济环境、政府的政策、技术标准的制订等是这一产业链生存的基础。

机顶盒供应商

增值业务系统

节目供应商

系统集成商

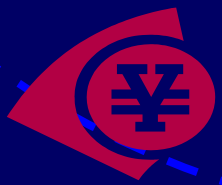
运 营 商

用户

前端设备提供商：编码、复用、卫星接收机

技术/商业咨询服务商

用户管理系统

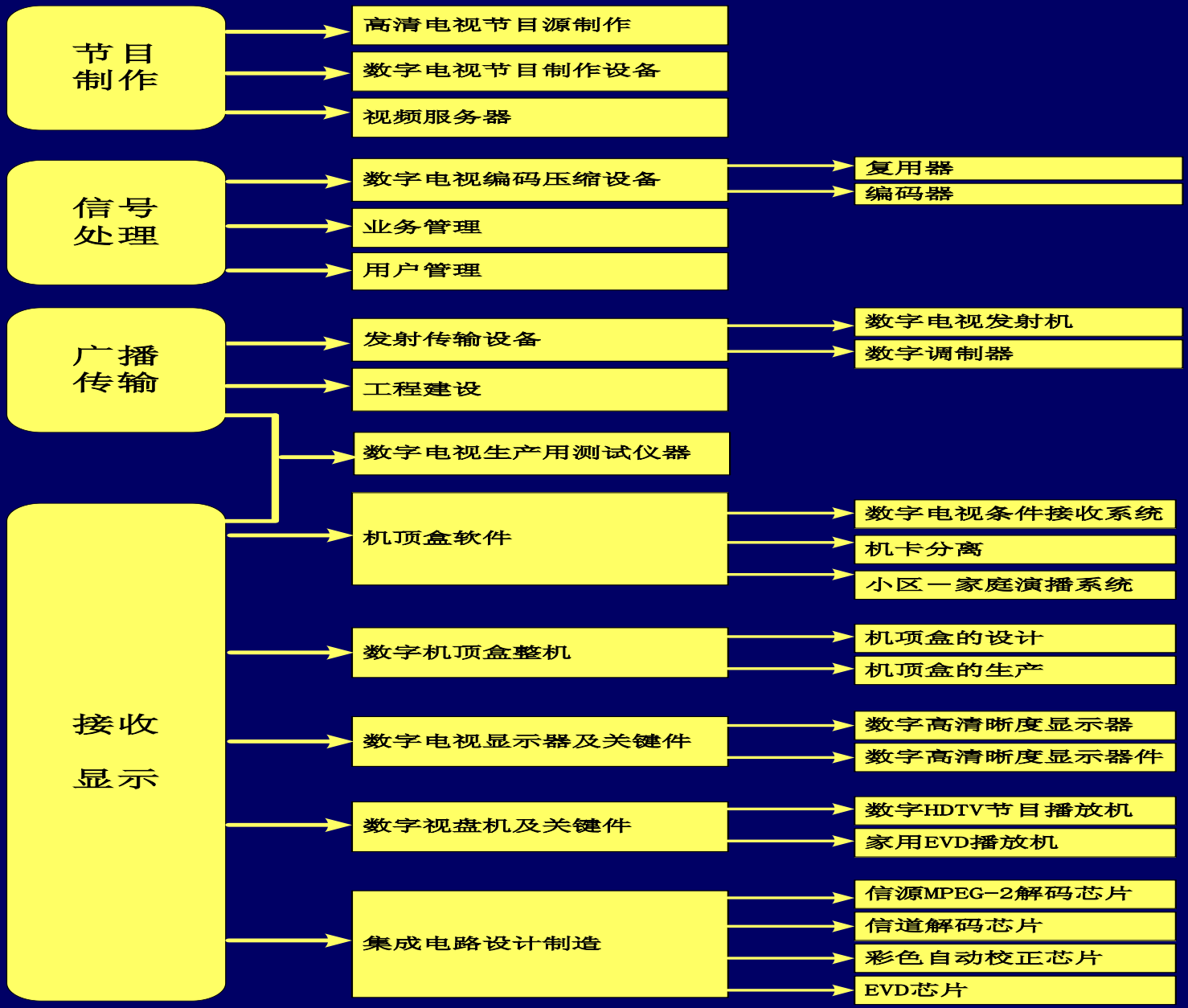


资本合作商

售后服务

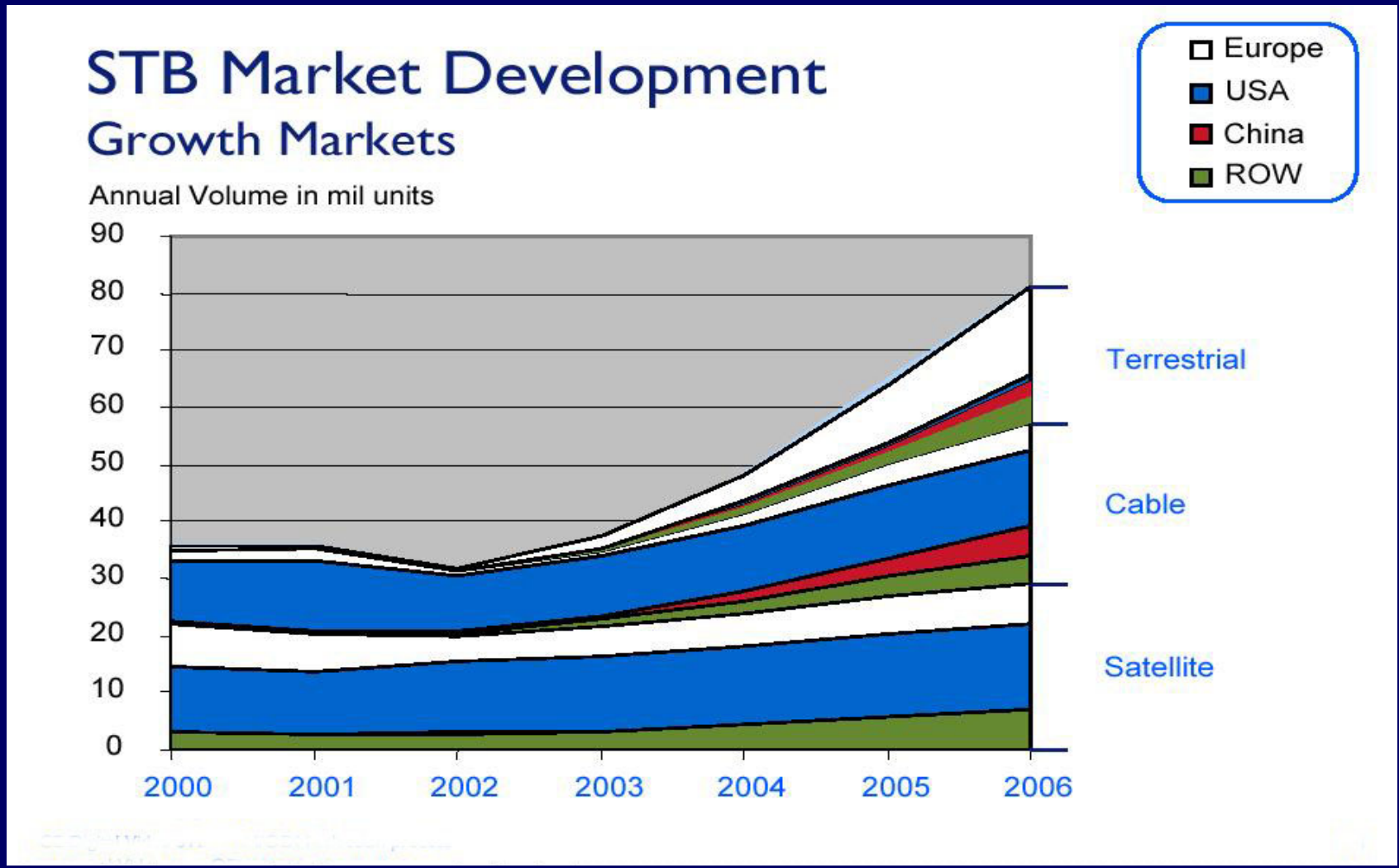
CA系统

数字电视——产业链：设备


节目制作
高清电视节目源制作
数字电视节目制作设备
视频服务器
信号处理
数字电视编码压缩设备
复用器
编码器
业务管理
用户管理
广播传输
发射传输设备
数字电视发射机
数字调制器
工程建设
数字电视生产用测试仪器
接收显示
机顶盒软件
数字电视条件接收系统
机卡分离
小区一家庭演播系统
数字机顶盒整机
机顶盒的设计
机顶盒的生产
数字电视显示器及关键件
数字高清晰度显示器
数字高清晰度显示器件
数字视盘机及关键件
数字HDTV节目播放机
家用EVD播放机
集成电路设计制造
信源MPEG-2解码芯片
信道解码芯片
彩色自动校正芯片
EVD芯片

数字电视——市场统计与预测

- 某著名家电企业提供的数字电视机顶盒的统计及预测，但是对于中国的数据可能有较大误差



中国的数字电视产业

中国数字电视产业的主管部门

- 国家计委
  - 从国民经济宏观调控的角度制订数字电视产业政策；参与制订技术标准。
- 国家安全部、中宣部
  - 从国家安全、国民文化、宣传口径的角度控制电视广播的播出内容、内容供应商、运营商。
- 科技部
  - 从国家科技发展的角度参与数字电视标准的制订。
- 广电总局
  - 从内容供应商、广电运营商的角度制订数字电视产业政策、技术标准。
- 信息产业部
  - 从设备供应商、通讯行业运营商的角度制订产业政策与技术标准。

中国的数字电视标准

- 中国的数字电视标准主要是参照欧洲的标准，根据传输方式不同，介绍如下：
  - 卫星电视：完全采用DVB-S
  - 有线电视：DVB-C为主体，在SI部分适当修改（经过了三年的孕育期）
  - 地面电视：希望能够制定中国自己的标准，原计划在2003年底之前出台，但经过五年的准备，目前仍然有许多变数，今年之内难以有定论。主要推荐的两家：
    - 1、以清华大学为代表的多载波方案；
    - 2、以上海交大为代表的单载波方案；
    - 这两种方案的基础平台分别是欧洲的DVB-T和美国的ATSC标准。两种方案在实际测试中都反映出一些不足。
    - 为加速地面数字电视的应用，目前已经有多个运营商避开国家标准直接选用了DVB-T开展地面数字电视运营，应用于公交广告系统，还有进一步扩展应用的计划。包括：上海东方明珠、广东技术中心、北京、长沙
- 标准的制定将对产业发展产生深远的影响，必须具备各个方面的足够强大的综合实力。

中国发展数字电视的规划

- **卫星数字电视：** 95年开始的卫星电视数字化工作已经结束，由于政策约束，有条件的发展用户；计划于2005年开通直播卫星。
- **有线数字电视：** 全国有线电视数字化改造正在如火如荼的展开，除西藏外的所有省份均开通了数字电视播出系统，目前拥有用户约40万户；广电总局制定了关闭模拟有线电视进行数字电视整体平移的时间表，具体如下：

  第一阶段：到2005年，直辖市、东部地区地（市）级以上城市、中部地区省会市和部分地（市）级城市、西部地区部分省会市的有线电视完成向数字化过渡。

  第二阶段：到2008年，东部地区县以上城市、中部地区地（市）级城市和大部分县级城市、西部地区部分地（市）级以上城市和少数县级城市的有线电视基本完成向数字化过渡。

  第三阶段：到2010年，中部地区县级城市、西部地区大部分县级以上城市的有线电视基本完成向数字化过渡。

  第四阶段：到2015年，西部地区县级城市的有线电视基本完成向数字化过渡。

  目前全国共有33个城市被选为数字电视试点城市，要求2005年以前关闭模拟电视，发展数字电视用户3000万户。
- **地面数字电视：** 还处于等待标准出台的阶段，试运营的地区也基本以公交广告运营为主，没有开展广播电视覆盖的运营。
- **高清晰度电视：** 2008年奥运会一定要实现高清晰度电视实况转播。

中国数字电视的市场规模

- 中国有中央及省级网络33个，地市级网络301个，县级网络2880个；
- 中央及省级电视频道约215个，其中覆盖全国的有50个；
- 广电总局已经明确数字电视的运营基础平台是地市级网络，那么我们至少应当建设334个数字电视前端系统，以每个系统投资规模500万元计算，则前端总投资规模为16.70亿元；
- 2003年总局计划发展数字电视用户100万户；
- 到2005年发展3000万数字电视用户，至少需要3000万个机顶盒，以600元/台计算，则机顶盒市场规模为180亿元；收视费以30元/户计算，则收视费将达108亿元/年；
- 到2015年全部实现数字化，就会有1亿数字电视用户，机顶盒的市场规模达到600亿元；设备更新可达100亿元/年，收视费将达360亿元/年。
- 高清晰度电视机的更新换代更可达数千亿市场规模。
- 数字电视的增值业务将会成为网络运营商收入的另一重要来源，例如：股票信息、数据广播信息、视频点播、游戏等；未来的市场将伴随新业务的推出而得到不断拓展；新业务的规模应用必将带动相关产业的发展；
- 如果完成了有线电视的双向化改造，将孕育成倍增长的商机，包括网络、设备改造，新的增值服务等。

中国数字电视产业的困惑

- **政策：**国家对数字电视的政策目前还不是很清晰，包括国家计委、科技部、信息产业部、广电总局等部门都在参与制定相关政策；
- **标准：**数字电视产业是跨行业、技术性很强的产业，没有统一的标准是阻碍其发展的重要因素，虽然目前已经推出了一些标准，但是还远远滞后现在的需求；
- **运营体制：**广电四级运营的体制是由于历史原因而形成的，广播电视形成了区域性的网络，互不相关，不能形成网络资源的规模优势，导致了大量的重复建设和投资，也增加了机顶盒供应商的技术难度；如果运营体制不能理顺，网络资源不能有效整合，数字电视就很难实现大的跨越；
- **节目源：**数字电视产业出售的主要产品是广播电视节目，目前国内的电视制作水平还不能满足用户的需求，一段时间内也很难提高，境外节目又有较多的限制，很多现有的数字电视用户仍然反应数字电视没什么可看；节目源问题是数字电视产业的最基本问题；
- **资本：**广播电视运营商是从政府部门改制而来，没有企业运营的经验，缺乏资本的前期积累，而数字电视的发展需要很大的前期投入，顺利解决融资问题将对运营有关键性的影响；
- **市场：**广播电视是一个垄断的行业，一个区域内只存在一个运营商，没有市场的竞争，就很难提高产品和服务的质量，从而也制约了数字电视的发展；或许，引入通讯行业的运营商参与竞争会使这一局面有所改观。
- **设备价格：**广电运营商认为用户设备价格(STB)是制约电视数字化的主要因素之一，本人认为这是一种片面的看法。
  - 1. 目前STB生产商供给广电运营商的STB的价格在600-700元之间，而运营商通常收取用户的初装费在1000元左右。就算是STB出厂价降低到人民币300元以下，按现在运营商的思路，初装费还是要600-700元，对用户来说并没有实质性的变化。
  - 2. 必须有一定的市场规模才可能导致STB成本的下降，而市场规模的扩大，首先要有广大用户喜闻乐见的充足的节目源。