Advancing Innovative Growth

to Strengthen the APEC Growth Strategy

An Initiative by

ABAC Chinese Taipei

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Introduction

The 2009 APEC Leaders' Declaration stated the necessity of advancing APEC economic growth in a sustainable, balanced and inclusive manner. In addition, Leaders called for APEC to enhance growth through innovation and a knowledge-based economy. Leaders recognized the urgency to create a new growth paradigm for accelerating recovery as a reaction to the economic crisis. APEC has responded to the Leaders' pronouncement in a decisive manner. Japan, the 2010 APEC host, developed the APEC Growth Strategy (AGS) at the Senior Officials' Meeting (SOM), which will be one of APEC's major outputs for 2010. Specifically, the AGS focuses on five dimensions of growth: balanced growth, inclusive growth, sustainable growth, innovative growth (originally termed 'knowledge-based growth'), and secure growth.

During the 2010 1st ABAC Meeting in Melbourne, ABAC Chinese Taipei proposed the ABAC Knowledge-Based Growth Initiative, which has subsequently been renamed the ABAC Innovative Growth Initiative. The Initiative received endorsement from ABAC members. The Initiative comprised an opinion survey, the ABAC Knowledge-Based Growth (KBG) Symposium, held during the 2010 2nd ABAC Meeting in Taipei, and the following report on the current state of innovative growth, and seeks to provide suggestions on advancing innovative growth in the APEC region.

I. Background Review of the Development of Innovative Growth

1. The New Challenges

APEC in 2000 proposed the development of knowledge-based economies in the Asia-Pacific region. APEC advocated knowledge production, distribution and utilization as new forces for driving economic, income, and employment growth. Under globalization and decreasing birth rates, this is a responsive measure to requirements of advanced economies for continuous growth, and needs of emerging economies to accelerate their development.

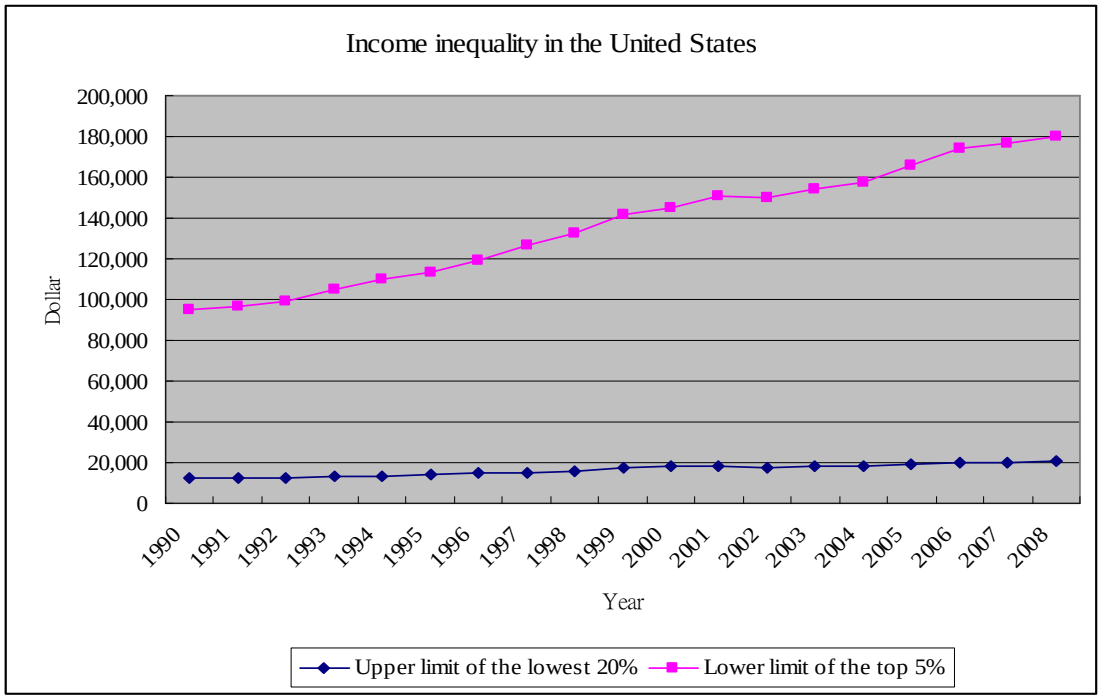
As part of the guidelines and policy recommendations, APEC concluded that the four vital aspects to foster knowledge-based growth, now known as innovative growth (IG) are: Innovation System, Human Resource Development, IT Infrastructure, and Business Environment.

Undoubtedly, knowledge-based activities guided by these four aspects and represented mostly by the technology progress on high-tech hardware and software industries have significantly contributed to economic growth and job creation in the APEC region. However, in recent years, governments and enterprises around the world began facing new issues and challenges, including the aging society, increasing income inequality, and global warming. Therefore, although the four aspects of IG are still robustly important, policy makers and business leaders must also give thought to how IG can achieve other important goals, e.g. balanced growth, inclusive growth, and sustainable growth.

For instance, income equality of the United States, one of the world's leading knowledge-based economies, is facing serious challenges. As shown in Graph 1 below, the income difference between the upper limit of the lowest 20% household and the lower limit of the top 5% household has increased over the last 18 years.

Through this straightforward example, there are indeed limitations on the previous knowledge-based activities in the face of growing challenges. Hence, more strategies related to this rising needs are necessary to insure the continuous prosperity in the APEC region.

Graph 1: Income Inequality in the United States



Source: U.S. Census Bureau, Current Population Survey

2. The Urgent Need

Therefore, the goal and strategy of IG is not only to develop new industrial options that can replace oil-based growth, as well as drive continuous economic growth, but more importantly its content must help economies develop non-traded goods and services to withstand globalization, create jobs, improve income distribution, and become friendlier to the environment; this way they will be able to face new global challenges.

In order to effectively reach these goals, government policies of the APEC member economies should more actively devote resources and provide incentives to capacity building, and collaborate with enterprises to explore new market opportunities and business models, while giving consideration to enterprises' social responsibility.

Box 1: Investment in Intangible Assets and Service Sectors

Table 1 shows the time series development of Greenfield FDI projects worldwide. The number of Greenfield FDI projects in service sectors, especially in communications, business services and software and IT services, are still fewer than many manufacturing sectors.

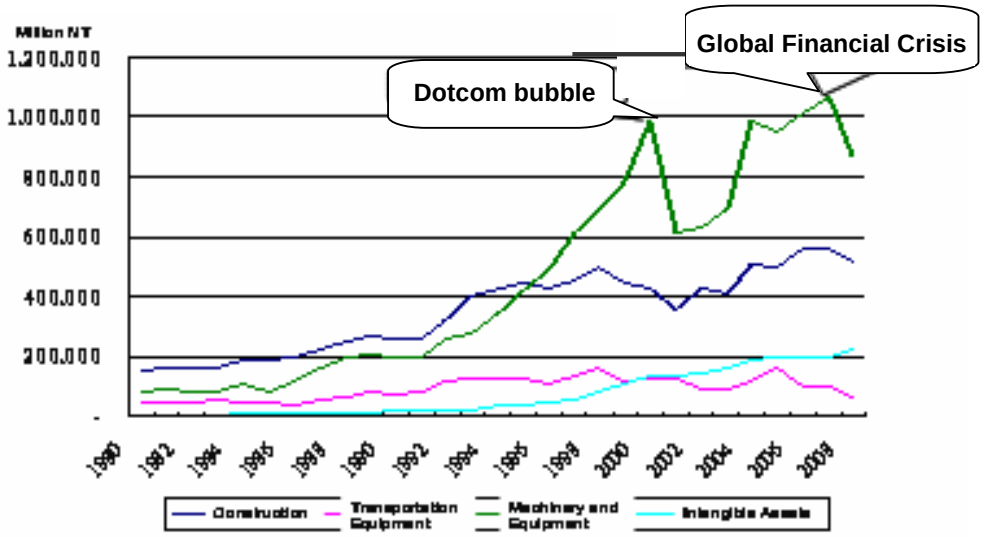
Table 1.1: Number of Greenfield FDI Projects, by Sectors 2006-April 2010

Sector/Industry	2006	2007	2008	2009	2010 (Jan-Apr)
Total Sectors	12 248	12 210	16 147	13 727	4 104
Primary	483	614	1 043	843	161
Manufacturing	6 252	5 978	7 778	6 922	2 111
Services	5 513	5 618	7 326	5 962	1 832
Hotels and tourism	293	297	553	370	130
Transport, storage and communications	1 174	1 024	1 269	1 133	328
Communications	571	448	594	544	161
Transportation	419	464	559	474	132
Warehousing and storage	184	112	116	115	35
Financial services	1 146	1 161	1 616	1 267	406
Business activities	2 639	2 922	3 647	2 927	903
Business services	783	857	1 218	1 262	407
Real estate	510	603	898	417	85
Software and IT services	1 346	1 462	1 531	1 248	411
Space and defence	32	46	40	62	12
Healthcare	56	64	96	87	23
Leisure and entertainment	173	104	105	116	30

Source: UNCTAD, based on information from the Financial Times Ltd.

Graph 1.2 below basically shows the time series development of fixed capital formation in Chinese Taipei. Many APEC economies, with Chinese Taipei as an example, have not made significant investment in intangible assets and service sectors to further foster the development of knowledge-based economy with job creation.

Graph 1.2: Fixed Capital Formation in Chinese Taipei (1980-2008)



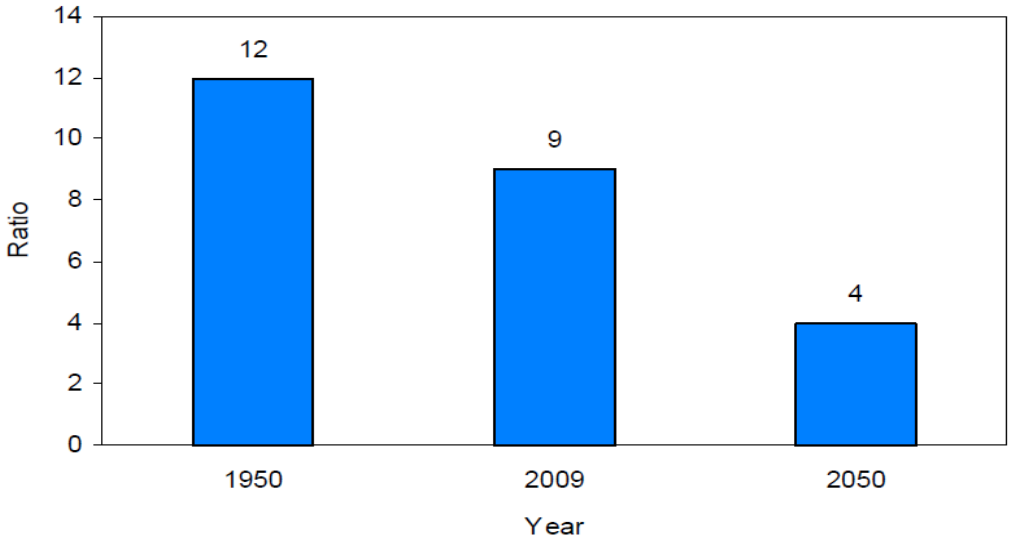
Source: DGBAS, Chinese Taipei

II. Rethinking Innovative Growth

In order to link IG to other goals, the adjusted strategies should focus on the following principles:

Firstly, technology advancements and innovation should increase both labor productivity and create jobs so as to cope with the increasing Potential Support Ratio (PSR)[1] and worsening fiscal conditions among advanced economies. According to the UN study shown in Graphs 2 and 3, the world's PSR will decline from 12 to 4 during 1950 to 2050. The PSR is lower in more developed regions, on average, than other regions. However, the Graph 3 shows that the trend in PSR declining is worldwide, even at least developed regions. APEC member economies are facing a similar challenge.

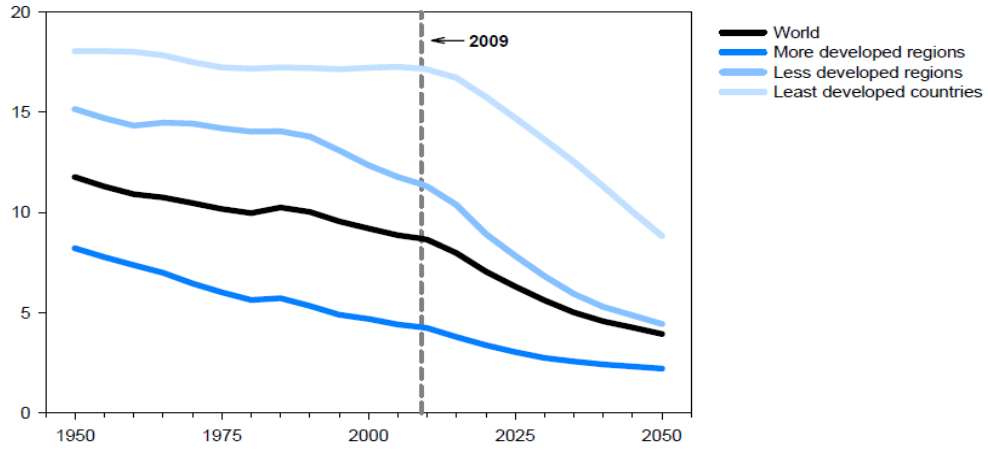
Graph 2: Potential support ratio (PSR), 1950-2050



Source: Published in: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Ageing (ESA/P/WP/212), December 2009

[1] The Potential Support Ratio (PSR) is the number of people aged 15-64 per person aged 65 and above. This ratio describes the burden placed on the working population by the non-working elderly population.

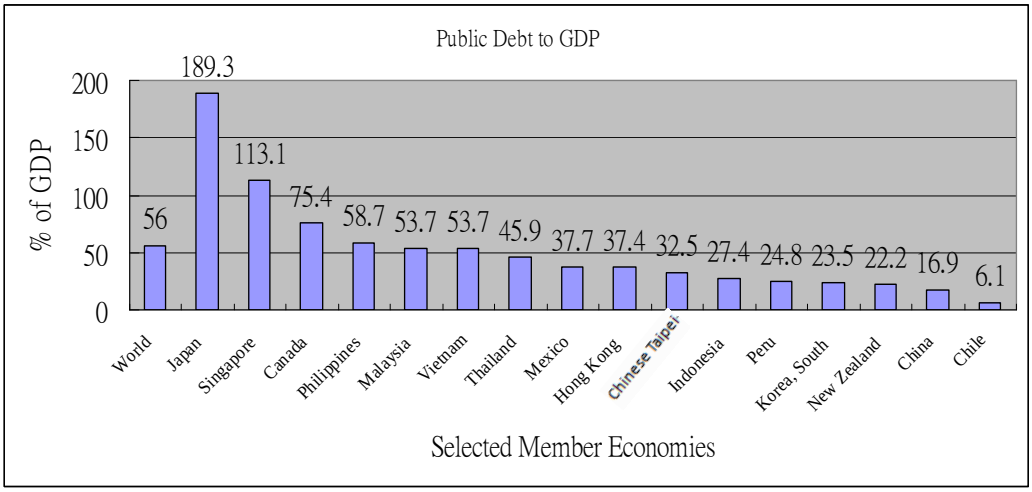
Graph 3: Potential support ratio world and development regions,1950-2050



Source: Published in: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Ageing (ESA/P/WP/212), December 2009

In addition, the fiscal conditions in many APEC member economies are facing difficulties (Graph 4). These issues must be tackled through raising productivity per person, which can be achieved at least in part by raising the knowledge intensity of economic activities.

Graph 4: Ratio of Public Debt to GDP among APEC Economies (2009)



Source: The World Factbook, CIA

Secondly, technology advancements and innovation should increase both capital productivity and energy efficiency so as to alleviate the increasing risk of climate

change on the environment. Many developed economies in the region are Annex I economies of the Tokyo Protocol, while other developing economies in the region still rely on mass production and exportation to boost their economy. In the long-run, the revised IG must develop new strategies and business models to enable economies to meet their international responsibility for the next generations.

To meet these two principles and to tackle the global challenges ahead, a two-fold strategy can be given further consideration. On the one hand, knowledge-based activities should continue to contribute to production efficiency in terms of reducing environmental cost, saving energy, and replacing risky and dirty work in which the new generation of labor force has little incentive to participate. On the other hand, knowledge-based activities should also contribute to developing more emerging products and services for the provision of new employment opportunities and for social demand in a changing future.

Up to now, the first direction has received more attention in terms of R&D expenditure and investment, mostly implemented in the developing or manufacturing-oriented economies. However, the second direction has also been gradually receiving more policy attention in developed economies, especially since the global financial crisis. Among several important means of industrial transformation, the fostering of service-added manufacturing (SAM) and developing interdisciplinary applications is well supported by the consensus of ABAC members and could potentially be an important step to represent the adjusted IG for some member economies where manufacturing sectors still represent an important role in terms of GDP growth.

Box 2: Opinions from ABAC

To understand how members of ABAC consider the challenges ahead and their definition of the adjusted IG, we conducted a simple survey focusing on the challenges and the potential ways to better link IG with other growth objectives. Moreover, in the ABAC KBG Symposium held in Taipei, some members of ABAC and guest speakers also shared their views on what the priorities would be for the member economies to cooperate on capacity building initiatives. Those primary ideas are listed as follows.

- Most members agreed that "job creation for various skill-level workers" should be prioritized to better link IG with other growth objectives.
- With manufacturing sectors being equally addressed continuously, most members chose the improvement of service sectors to be the most promising field of application for better linking the new IG concept with other growth objectives.
- Most members agreed that with continuous product innovation, more service diversity and efficiency could be reached.
- Making prices for associated products affordable via product standard harmonization, cross-licensing and open innovation was largely seen as the key way to help the development of certain emerging services.
- Most members chose either to transform manufacturing into service-added manufacturing (SAM) to some extent or to develop green production technology as the means to link product-oriented innovation to other growth objectives. However, no specific model of service-added manufacturing is prioritized.

III. Suggested Business Model and Potential Applications

1. Potential Types of Service-Added Manufacturing (SAM)

At present, quite a few leading enterprises with foresight in the Asia-Pacific region have begun developing service-added manufacturing; their approaches can be generalized into the following four categories:

- **Provide extended services for back-end products:** Such services include marketing, repair, financing, and other agent services. If manufacturers integrate these professional services together, then the enterprise will not only be manufacturing products, but also creating new value from these services. This is the approach of Chinese Taipei's Acer Inc.

- **Include content service into products:** This approach is commonly found in the ICT industry (e.g. mobile phone, GPS, and e-book products); besides the basic hardware device, the most important element of a product is the service value created by its software, such as Apple Computer has done with its App-Store and iTunes.

- **Total solution providers:** Such companies seldom manufacture hardware products; if any hardware is required as part of a complete business solution, it is provided by subcontractors within its system. Companies that adopt this approach include IBM and Oracle.

- **Companies that provide product manufacturing services:** In comparison with total solution providers, such companies are subcontractors that provide hardware for product manufacturing. If they can provide integrated services at the manufacturing end, then they will be able to create a market entry barrier in scale, technology and management, and significantly increase profits. Chinese Taipei's TSMC and other major electronics manufacturing service firms all belong to this category.

2. Emerging Application: IT-Enabled Services (ITeS)

Of the many applications of service-added manufacturing, many economies in the Asia-Pacific region are beginning to value service innovation and IT-enabled services (ITeS). According to Nasscom of India, worldwide technology products and related business process outsourcing (BPO) services have reached around 1.56 trillion in 2008-09. Among products and services in this sector, expenditure on ITeS-BPO

services accounted for US$967 billion in the same period and the global IT sourcing market has grown threefold between 2004 and 2008. In turn, many hardware and software giants have joined this fast-growing industry, which has contributed to economic growth in many economies, especially those with a good proportion of English-speaking labour, such as the Philippines and India. Some APEC economies such as China, have also shown interest in developing ITeS-BPO services because of the vast opportunity these offer for employment and wealth generation. A Nasscom-McKinsey study in 2002 also shows that ITeS could provide a long-term viable solution to the problem of unemployment by creating jobs for a large number of educated youths.

So far, the key players in this industry have made significant contribution to global employment. Table 2 below provides information on number of employees hired by some international corporations. The three major ITeS companies in India have contributed over 405,000 positions at different skill levels. International players such as HP, Cognizant, Microsoft and others have also created significant numbers of jobs in both developed and developing economies.

In addition to the current promising development, there are also reasons to believe that the global market of ITeS will continue to grow in the near future due to the increased reliance on IT services for operational cost control, quality and regulatory compliance, large-scale recruitment, variable pricing and the international customer related services.

Table 2: Number of Employees at the Major ITeS Providers

Company	Number of Employees
HP	321,000
Accenture	204,000
Tata Consultancy Services	174,410
Wipro Technologies Ltd	115,900
Infosys Technologies Ltd	114,800
Cognizant Technology Solutions	95,600
Microsoft Corp.	89,000
Cisco	70,710

Source: Named company websites; Wikipedia

Aside from ITeS-BPO operations, in recent years, developed economies in the APEC region have also devoted tremendous resources to developing interdisciplinary applications in which new added-value and efficiency could be derived from the traditional manufacturing and service sectors through the utilization of IT. For instance, by utilizing cloud-computing technologies, many services could be delivered in a more timely and precise manner and therefore may contribute to saving energy, or creating operational and managerial positions with different skill levels.

For instance, Japan has proposed an initiative aiming to “Realize Smart Socioeconomic Activities through ICT Application” as a main strategy of the host economy. In the view of METI, recent developments in ICT have made it possible to collect and distribute important information in a reasonable time and fashion and therefore has enabled related services to be promptly delivered to firms or personal users when necessary. The impact of this advancement in collecting and distributing information can result in greater efficiency in services and create various new types of services as indicated above. METI is currently promoting new applications of ICT in the field of Environment, Water Management, Transportation, Logistics, Medicine, Education, Emergency Response and Administrative Services. The widespread adoption of these services is expected to create more high value positions and even change the way of living for the next generation.

IV Proposed Strategies

1. Findings from the ABAC Survey

Although ITeS and other emerging product and services do show great potential to better link innovative growth with other goals, they also require a totally different set of factors to successfully develop these industries. Many high value services must be delivered by well-trained professionals with interdisciplinary knowledge. The level of operational complexity and demand for in-time coordination is even higher than the products or service on which the process could be standardized. Hence, the consensus of ABAC found in the survey concretely indicates that human capital, along with other vital factors, should be given more policy attention in order to achieve growth objectives.

Here are the important findings from the ABAC survey indicating the policy priorities:

- When asking about the key factor, over half of the members refer to "Human resource development" as the most improvement needed factor for fostering IG in their economies. Among the types of talents needed, members suggest that product technology R&D and customer-oriented interdisciplinary innovation talents are important.

- Furthermore, most members choose "Training programs and personnel" as the priority of software infrastructure for their economy to promote IG. In addition, most members suggest that private sector should be a decisive participant in the national innovation system to promote IG.

- All members agreed that the national innovation system should support SMEs to develop new products or technologies to derive new service innovation, with the strongest support for this statement from developing economies.

2. Recommended Strategies

To promote the IG model, we believe that governments of APEC member economies can consider the following directions for the four aspects: Human Resource Development, Innovation System, IT Infrastructure, and Business Environment.

(1) Human Resource Development

- Expand various programs that combine ICT with other fields for post-secondary students, internally educated professionals and current ICT workers.
- Promote training for ICT applications as part of a lifelong learning system.
- Promote science and technology education
- Set up Institutes of Excellence and technical colleges in collaboration with companies and some of the best universities/institutions in the world. The advisory board should have representation from both academia and industry, and ensure that the curriculum design, certification methodology, etc. are in line with industry needs.

  Stanford University in the heart of Silicon Valley, California, USA, is a good example of how academia and industry can collaborate to fuel an innovative industry cluster and help drive an industry both nationally and internationally; the University, along with its research arm, the now-independent Stanford Research Institute, have played a pivotal role in the area's ICT dominance.

(2) Innovation System

- The innovation system for manufacturing should promote regional standards integration, encourage cross-licensing of technology between the public and private sectors and among firms, and allow open innovation to reduce the fixed cost for developing application services.

(3) ICT Infrastructure

- ICT infrastructure investment should extend its emphasis from hardware to software, so as to boost ICT enabled services, which also accords to the conclusion made by the 8th Telecommunications and Information Industry Ministerial Meeting in Okinawa, Japan, 29 October, 2010.
- Among the possibilities, a certification system set up by renowned institutions may be an important strategy.
- Provide an institutional mechanism and framework for shared training facilities and infrastructure at minimal cost.

The New Zealand government's "Enabling the 21st Century Learner" program, offering network and technology upgrades to schools, commenced in 2005 and has seen considerably increased ICT competence among students and positive changes in teacher attitude, confidence and motivation.

(4) Business Environment

- Work with international developers to provide multi-option ready-to-move-in, industrial parks or living campuses for innovation industries and emerging products and services, and to test emerging applications.

- Equip SMEs with relevant information through "market knowledge centres." Establishment of market knowledge centres will provide SMEs with relevant and first-hand information to allow them to compete and succeed on the international business stage. The services of market knowledge centres may include consultancy, organizing of overseas business missions and providing integrated market research data.

- The government should encourage venture capitalists to vertically integrate important functions, such as market viability research and technology evaluation, in order to provide a more complete service for start-up companies. Especially, venture capitalists investing in various fields should play an important role in helping start-up companies to obtain cross-licensing sources to shorten the process of commercialization.

  Japan has implemented a multi-tier program of SME knowledge centers, with over 3,000 management and technical experts on hand in support centres around the country providing comprehensive business information and consultancy services to SMEs. District-specific projects are supported with relevant information including available government assistance, while services are also available for aspiring entrepreneurs and start-ups. The Organization for SME and Regional Innovation, Japan (SMRJ) ensures collaboration and information sharing between centers.

V Best Practices in Initiatives and Programs

During the CBAPWG meeting in ABAC 2010 third meeting in Bangkok, members referred to the importance of "From incubation to success" and suggested the study define activities required to achieve the recommendations and key benchmarks/milestones to measure progress. Below, the study tries to illustrate these by listing some best practices in government initiatives related to the key policy priorities. Examples are drawn from both developing and developed member economies while also giving considerations to the various needs at each stage of business development.

(1) Human Resource Development

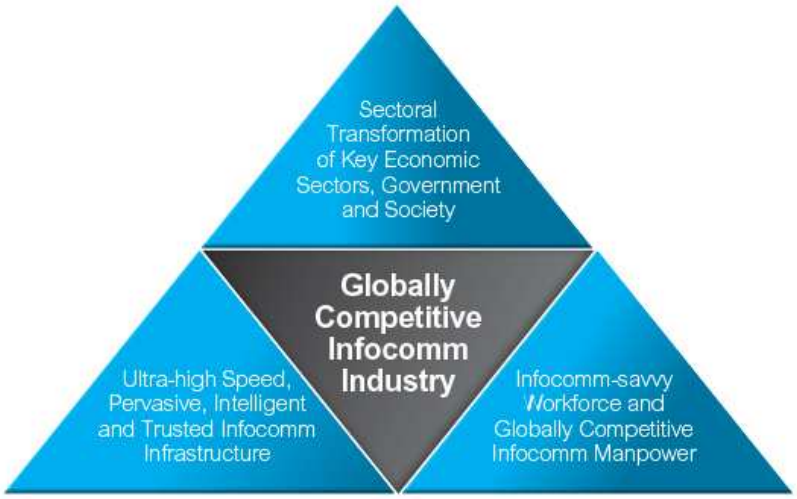
A. Capacity building priorities

- Difficulties in recruiting ICT professionals are an important issue in developing and even developed countries.
- According to the Hudson Report–Employment & HR Trends in Singapore, 73% of infocomm employers in Singapore face such difficulties in recruiting the following jobs: competent technical trainers, telecommunication consultants/specialists and software developers.
- More ICT professionals with deep technical skills are needed in both ICT organizations and non-ICT organizations, since the use of ICT has become more important in many areas.
- With the wide range of ICT applications in many aspects of work and across many sectors, companies are looking for talents with multi-disciplinary skills both in ICT and other fields.
- The primary source of talent is students. Therefore, the quality of ICT-related education defines the quality of the pool of ICT professionals and the whole infocomm industry.

B. Best Practice: The case illustrated by Singapore's Intelligent Nation 2015 Project (iN2015)

With the vision of an intelligent nation and a global city powered by ICT, Singapore designed the iN2015, a 10-year master plan for the ICT industry. One key area of the iN2015 Master plan is the Manpower Chapter.

Diagram 1: Objectives of Singapore's iN2015 Master Plan



Source: Info-communications Development Authority of Singapore (IDA),"iN2015 Masterplan"

To realize the vision and target, there are three main approaches and their supporting programs under iN2015:

- **Strategy I: Develop Globally Competitive Infocomm Professionals**
  In order to cultivate a pool of ICT talents with technology know-how and a good understanding of business, the Singapore government designed the following supporting programs:

  - Critical Infocomm Technology Resource Programme (CITREP)
    This progam is focussing on help ICT professionals learn about emerging and critical skills, to improve the competitiveness of the infocomm industry.

  - Infocomm Leadership and Development Programme (iLEAD)
    In order to have state-of-the-art technology, the iLead program aims at sharpening and deepening the knowledge and capabilities of ICT professionals.

  - National Infocomm Competency Framework (NICF)
    This framework is designed to help professionals and employers understand what skills are required for various ICT jobs and how to develop relevant training programs for professionals.

- **Strategy II: Develop Infocomm Competencies in Key Economic Sectors**

To strengthen business leaders' belief in the value of ICT, this strategy aims at raising their skill levels and improving business competitiveness.

- Techno-Strategists Program (TSP)
  Inculcating ICT professionals with both technical foundation and domain knowledge of industry sectors, in order to maintain their competitiveness in Financial Services, Healthcare, Hospitality and Retail and other fields.

- **Strategy 3: Develop, Attract and Retain Infocomm Talent**
  There is no doubt that talent will be the engine to drive the growth of the ICT industry. Therefore, government has to ensure that this industry attracts a fair share of talent to devote to technology innovation.

  - National Infocomm Scholarship (NIS)
    In order to develop young infocomm talents, the government offers both scholarships and valuable private sector work exposure.

  - Integrated Infocomm Scholarship (IIS)
    This opportunity is open to outstanding 'O' level students (usually taken at age 16), taking them through infocomm studies at both the polytechnic and university levels.

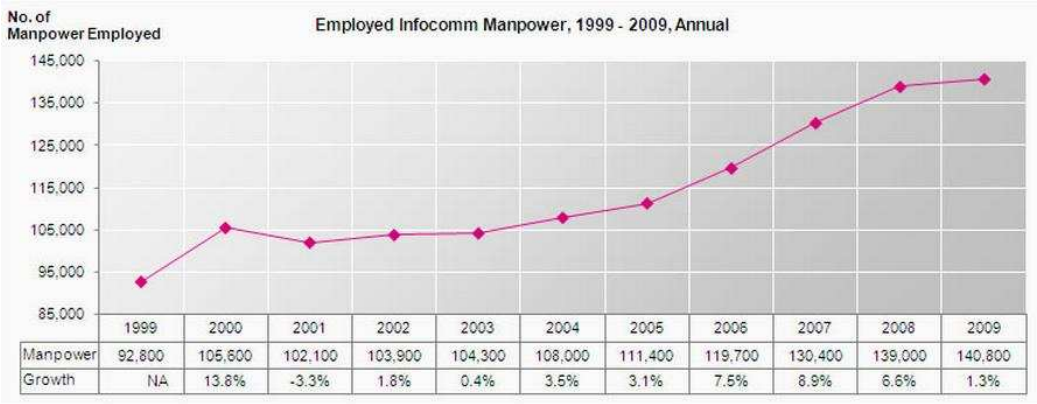
  - Enhanced Learning in Infocomm Technology (ELITe)
    The idea of ELITe is to develop "industry-ready" infocomm graduates, giving undergraduates the opportunities to be equipped with practical exposure. The whole project will include industry attachments, mentorship, projects and skills development through certifications.

  - Infocomm Clubs Programme
    This program is run in partnership with industry to attract young students, including a Co-Curricular Activity (CCA) for primary, secondary and junior college students.

  - National Infocomm Competition (NIC)
    In order to generate awareness among students and the public, the government has designed a series of competitions regarding incocomm, hoping to attract young talent into this field.

Driven by the iN2015 Masterplan, Singapore has already made some achievement in recruiting infocomm talents. According to IDA's Annual Survey on Infocomm Manpower (Graph 5), the number of employed ICT manpower has grown significantly in recent years, especially since the start of the plan in 2005. In 2009, this single category of employment had reached 140,800 and showed a compound growth rate since 2005 of over 6%.

Graph 5: Employed Infocomm Manpower, 1999-2009



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Manpower	92,800	105,600	102,100	103,900	104,300	108,000	111,400	119,700	130,400	139,000	140,800
Growth	NA	13.8%	-3.3%	1.8%	0.4%	3.5%	3.1%	7.5%	8.9%	6.6%	1.3%

Source:IDA's Annual Survey on Infocomm Manpower (2009)

Notably, the sector showed modest growth in 2009 despite the contraction in the economy over the year due to the global financial crisis. The strongest growth over the last couple of years has been seen in the areas of software development, digital media and animation R&D.

The program has also boosted the use of ICT manpower both in infocomm organisations and in end-user organisations. In an IDA survey, 52% of the ICT manpower worked in infocomm organizations and the rest worked in end-user organizations.

Table 3: Infocomm manpower in infocomm organizations by market segment

Segment	2005	2006	2007	2008	2009
IT Services	22%	23%	35%	33%	32%
Software	20%	19%	25%	21%	24%
Hardware	26%	28%	22%	27%	22%
Telecommunication Services	23%	22%	16%	18%	21%
Content Services	9%	8%	2%	1%	1%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: IDA's Annual Survey on Infocomm Manpower (2009)

Table 4: Infocomm manpower in end-user organizations by economic sector

Sector	2005	2006	2007	2008	2009
Wholesale and Retail Trade	21%	18%	18%	18%	21%
Real Estate, Renting and Business Activities[3]	13%	13%	20%	18%	21%
Manufacturing	12%	14%	22%	17%	19%
Financial Services	20%	37%	11%	12%	10%
Construction	1%	2%	6%	7%	5%
Transport and Storage	10%	3%	5%	4%	4%
Education	11%	4%	5%	5%	3%
Others[4]	12%	10%	11%	18%	17%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: IDA's Annual Survey on Infocomm Manpower (2009)

Furthermore, the National Infocomm Competency Framework has now mapped 562 skill sets to 250 ICT positions, and the Framework has been adopted by leading corporations including SingTel and Crimson Logic.

(2) Innovation system

A. Capacity building priorities

- According to UNIDO, SMEs lack interactive networks, waste resources constantly, and are not able to circulate and extend information and technology.
- The national innovation system in developing economies should put priority on enhancing the competitiveness of SMEs so as to build a sound foundation for long-term economic growth and create jobs in different level of skills.
- An open innovation system assisted and maybe managed by government initiatives, including assistance in cross-licensing and skill sharing, could help SMEs obtain vital information, technology and managerial knowledge.

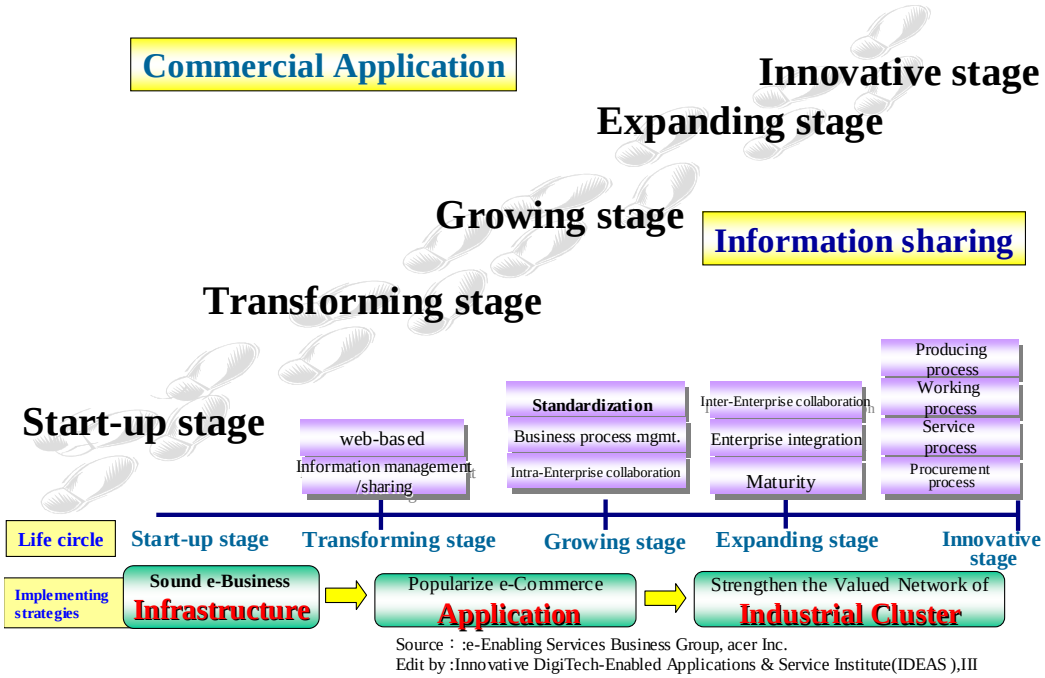
B. Best Practice I: The case illustrated by the SME Administration of Chinese Taipei

The Small and Medium-sized Enterprises Administration (SMEA) of Chinese Taipei set up its open innovation system for SMEs by initiating programs in three major areas:

1. Apply the information technology to enhance SMEs' open innovation
2. Use the networked knowledge capital to innovate and create high added value.
3. Concentrate on cross industry innovation networks to develop unique service models

- **Aspect 1**: In terms of applying ICT technology, SMEA designs e-business strategies for each stage of the business life-cycle. The key concept of these strategies is to build up a knowledge management and information sharing platform by using ICT.

Diagram 2: The Stages of e-Business Implementing Strategies



Source: SMEA (2010) "Building Competitive SMEs in a Knowledge-Based Economy"

- Success story: DOIT, a household goods provider, joined the "Knowledge Management System Program" initiated by SMEA in 2009 and benefited from the networked knowledge management platform. With the ICT-enabled knowledge management system, DOIT is able to collaborate with its R&D and marketing strategic partners to speed up new product development and lower its marketing cost. Their activities through the program improved their work processes and initiated a more creative atmosphere in the company.

Source: SMEA (2010) "Building Competitive SMEs in a Knowledge-Based Economy"

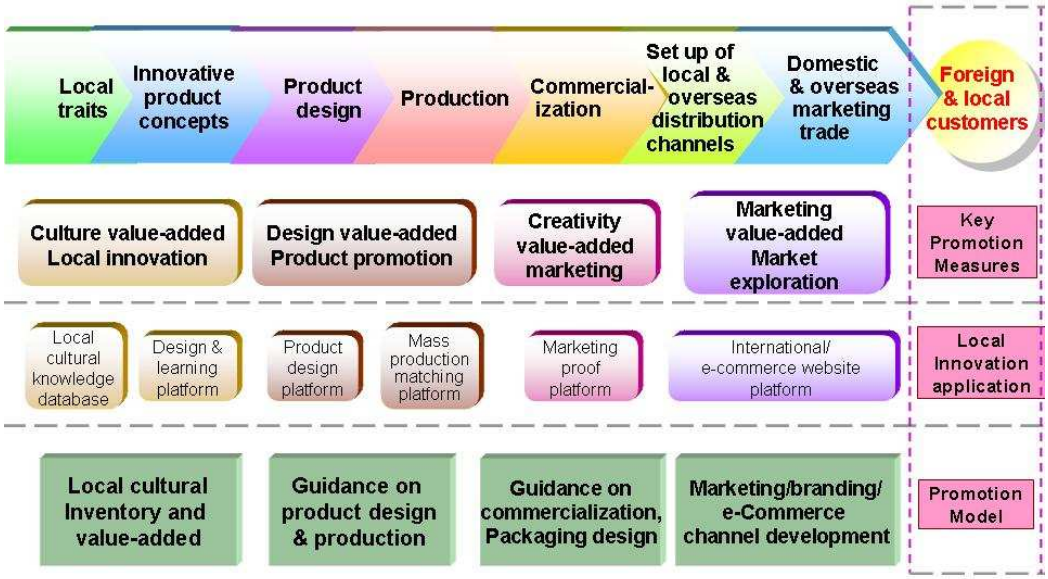
- Key measures included:
  - Strengthening their capability to collect market information and respond to customer feedback in a more timely manner

- Joining the upstream development process
- Setting up a business interaction platform based on the cluster interaction
- Setting up an information and knowledge sharing mechanism

- **Aspect 2**: In terms of using networked knowledge to innovate and create higher added value, the SMEA also builds business platforms for each value-chain element to foster co-innovation among both vertically and horizontally related firms.

- Success story: In the SMEA's "Local Industry Promotion" program, traditional local product and service providers have been assisted to build up their own innovation platforms from local cultural knowledge, design, production matching, co-branding to marketing. So far, 127 local products and services have benefited from this program and become icon products within the region.

Diagram 3: Framework of Key Promotion Guidance



Source: SMEA (2010) "Building Competitive SMEs in Knowledge-Based Economy"

- **Aspect 3**: In terms of cross industry innovation networks to develop unique service models, the SMEA is currently promoting a networked innovation system across different industries to develop new product or process, new services and new business models.

- Success story: Beitou Hot Spring Cluster. Through the support of the SMEA, local

community tourism services providers in Beitou Hot Spring area in northern Chinese Taipei were able to combine efforts from academic and technology supporters to set up a unique innovation network, providing both cultural content and convenient tourism information through ICT technology. The resulting cluster successfully attracted KAGAYA, a top-ranked hot-spring hotel from Japan, to open its first overseas location. Many high quality health care centers and clinics are also planning to locate in this area to enrich the development of Beitou.

Businesses in the cluster have collaborated on specially-priced schemes that combine hot spring bathing with health food.

Also out of the collaboration between business, government and academia has come the Silver Light Alley Ecological Tour, Chinese Taipei's first virtual "Electronic guidance" footpath; this integrates GPS navigation and positioning systems with handheld devices such as smart phones to provide a location-based tour guide service on the go, in which information is provided through a combination of content types for viewing and listening.

Source: SMEA (2010) "Building Competitive SMEs in a Knowledge-Based Economy"

Other initiatives from the SMEA include the SME Online University, which now offers 860 courses and has over 300,000 participants enrolled. The SME Innovation Awards initiative, which has been running for 16 years, has awarded over 600 prizes in that time.

The result of this solid support for SMEs, and especially integrating ICT utilization, is that 90% of the 1.1 million companies in Chinese Taipei are SMEs, and it is one of the most vibrant SME sectors in the region.

C. Best Practice II: The case illustrated by the Industrial Technology Research Institute of Chinese Taipei

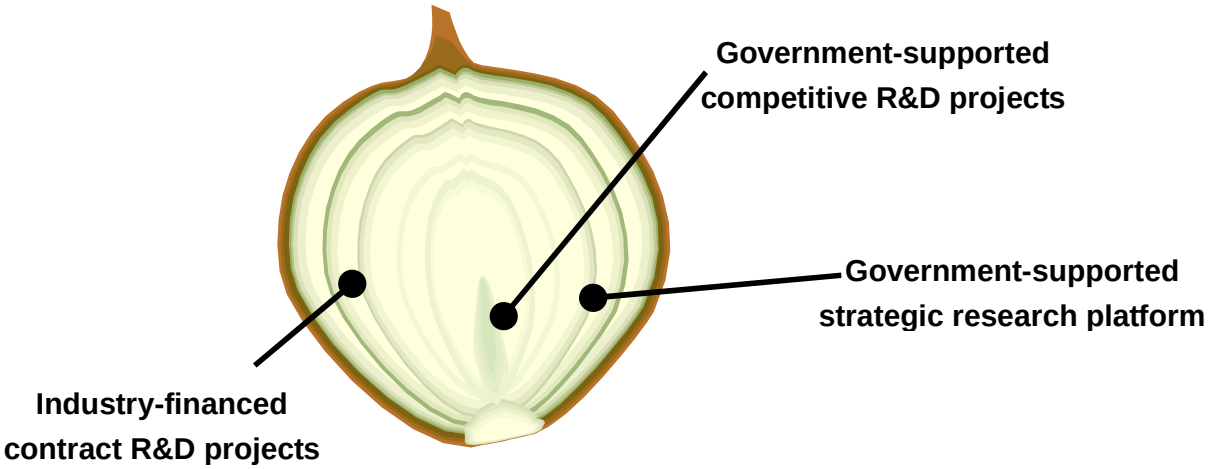
Applying the concept of fostering new industries through government-sponsored R&D, open innovation and cross-licensing, the Industrial Technology Research Institute (ITRI) was founded in 1973 by the Chinese Taipei government to advance private sector ICT industry growth, with a focus on the following areas:

- Conduct R&D in applied technologies in collaboration with sponsor companies
- Cross-license technologies to boost the local ICT industry
- Incubate technology-based SMEs

- While most renowned for its research in semiconductors and electronics, ITRI also conducts research in areas such as biomedical, chemical and mechanical engineering, energy, and applied materials. This research is usually highly capital-intensive, and beyond the research of many SMEs working on their own. SMEs sponsor research at ITRI in a certain area, and the outcome is then further developed by the SME and brought to market.

- ITRI has been responsible for the development of many cutting-edge technologies, registering over 10,000 patents in several key areas, many of which have been brought to market under cross-licensing agreements. Some research units with strong patents are spun off, such as Taiwan Semiconductor Manufacturing Corp. and United Microelectronics Corp.

Diagram 4: The ITRI Model of Open Innovation



Source: ITRI (2010) "How Innovation Helps Taiwan's Growth"

- ITRI also has an Incubation Centre and Open Laboratory that lease space and provide logistical support as well as an environment highly conducive to product development to ICT technology-based SMEs. To date, 163 companies have been incubated under ITRI's wing.
- ITRI is largely seen as the foundation of Chinese Taipei's industrious semiconductor and electronics sectors, which in turn were a key engine of the economy's rapid growth over the last 30 years.

(3) ICT Infrastructure

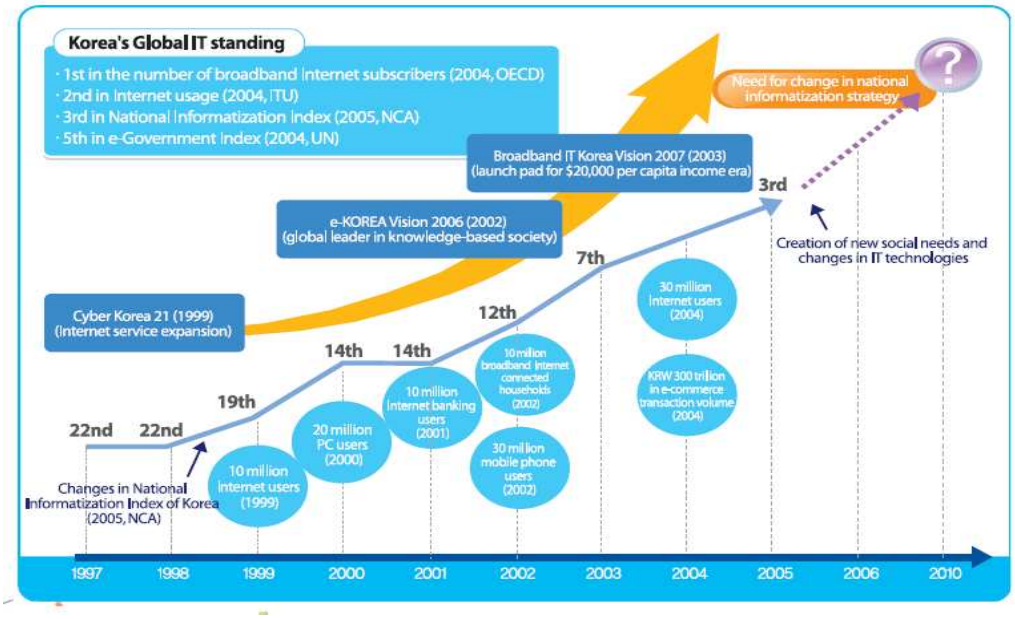
A. Capacity building priorities

- Governments should start by drawing a clear picture of their practical ICT application requirements before developing an ICT infrastructure.
- To reinforce the policy priority in human resource development, the ICT infrastructure should be practically implemented in a life-long education system focusing on the future development of IT-enabled services and other applications.
- In the APEC region, there are disparities among the member economies in terms of quantity and quality of training personnel, so there is room to explore an education and training cloud for the whole region
- By providing information communication network and ICT application software and ICT equipment, efficient and effective education and training can be realized, such as distance education utilizing video communication tools over broadband communication networks, interactive whiteboards, education clouds, office e-learning systems, etc.

B. Best Practice: The case illustrated by u-Korea from South Korea

- Given the importance of ICT applications as a key growth engine for the future, South Korea has made great efforts in ICT investment for decades. From the Cyber Korea 21 campaign from 1999) to e-Korea Vision (2002) and Broadband IT Korea Vision to the latest master plan, “u-Korea”, the Korean government has modified their strategy with the times.
- The “u-Korea Masterplan” is aimed at building Korea as a country with “Ubiquitous information technology”, which will solve future problems of society and satisfy the demands of the economy. According to the vision of “The First u-Society on Best u-Infrastructure”, the plan is divided into establishment and stabilization phases, and is developed in five areas including government, land, economy, social environment, and life services.

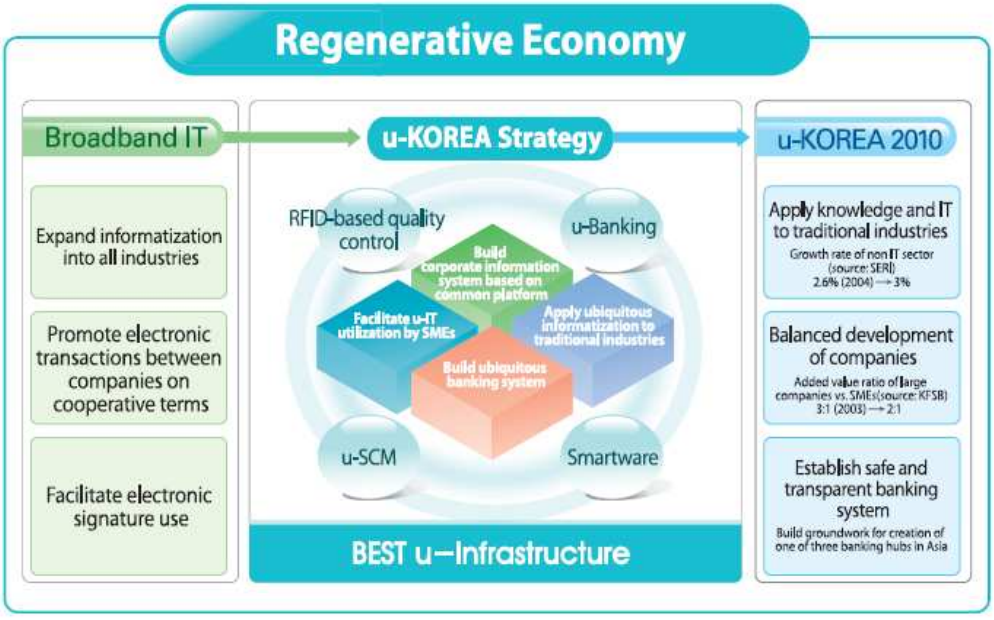
Diagram 5: Progress and Achievements of Korea in IT Infrastructure



Source: Ministry of information and Communication (MIC), Korea, "u-Korea Masterplan" (2007)

- In each area, Korea government made several strategies to support the development of ICT infrastructure, in order to achieve their goal of ICT applied service. Here are some examples:

Diagram 6: Key Strategies of the u-Korea Master Plan



Source: Ministry of information and Communication (MIC), Korea, "u-Korea Masterplan" (2007)

- By building an environment of RFID, u-payment, mobile Internet, real-time and other technologies, the Korean government aims to build a corporate information system based on a common platform to facilitate the IT utilization of SMEs, to apply ubiquitous ICT to traditional industry, and to build a ubiquitous banking system.

- In several building programs, “U-City” is the one which has received the most attention and made significant progress. The first U-City, Hwaseong-Dongtan U-City, was partially completed and in operation in 2008; since then, dozens of cities in South Korea have devoted themselves to the construction of a u-city under this program, such as New Songdo City.

- New Songdo City is the largest project, constructed on reclaimed land off the coast of Incheon. The construction of a comprehensive ICT infrastructure has already brought changes in the city. For instance, there has been a high uptake of IP services such as IPTV and VoIP. New Songdo City is expected to formally open in 2015. The city’s promising future has encouraged Cisco to relocate their global headquarters in the city and invest USD 2 billion.

(4) Business Environment

A. Capacity building priorities

- Many studies have shows that the industrial cluster is a well-functioned measure for developing economies, designed to be an agglomeration based on the network of raw materials for production, financing institutions, provision of human resources, and most importantly, networked innovation.

- Comparative analysis of industrial cluster development in Asian countries shows that innovation could be stimulated by the presence of clusters with various human resources in smaller geographic areas.

- The development of emerging industries often requires high quality human resources with multidisciplinary skills. A multi-functional industrial park with good working and living facilities can serve as a vital strategy for developing economies to attract international talents.

B. Best Practice: The cases illustrated by Zhongguancun Science Park in China and Quang Trung Software City in Vietnam

There are many examples around APEC of good, government-supported "industrial cluster" formations for innovation industries, demonstrating the agglomeration economies and cost advantages common to many industry clusters. In this study, examples in China and Vietnam are cited as best practice cases.

a) Zhongguancun Science Park in China

Zhongguancun Science Park (Z-Park) is considered China's 'Silicon Valley', and is the leading experimental zone of China's reforms in economy, science, technology and education. It was established in 1988 by China's State Council to meet the following objectives:

- Economic development through the promotion of hi-tech industries
- Job creation
- Creation of a base for innovation for science and technology

- Comprising four major industry clusters – independent software development, IT service outsourcing, finance consultancy, and information knowledge integration – across seven principal parks, Z-Park is primarily located in northwest Beijing.

Diagram 7: Master Plan of Z-Park

Source: Official website of Z-Park (http://www.zgc.gov.cn/english/)

- Infrastructure: Z-Park has zones dedicated to finance, science & technology, administration, culture and recreation, and affordable yet well-designed accommodation, and provides high-tech services such as ISDN, and multimedia broadcast and conference facilities.

- Z-Park's location, close to several of China's best universities, such as Beijing and Tsinghua, provides an abundant source of innovative, trained talent.

- Financial incentives are offered to attract investors, such as tax and export/import preferential rates, and an innovation fund for companies working with new technologies.

- Over the past 10 years, Zhongguancun has enjoyed an annual growth rate of 20-30%, contributing to 60% of the annual industrial growth of Beijing.

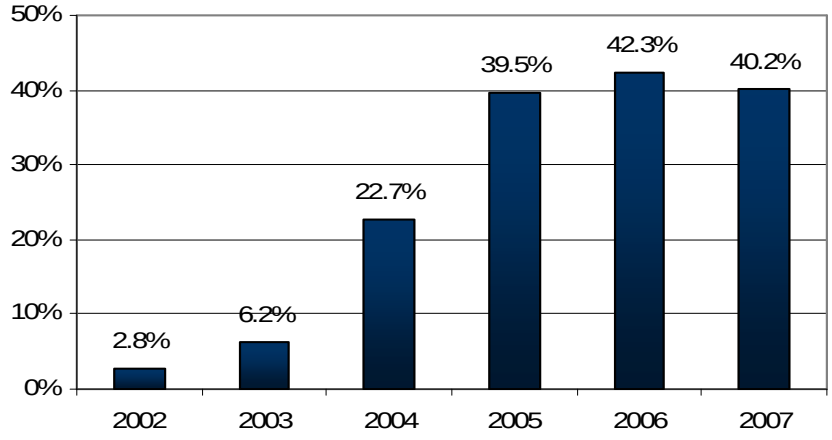
- Increasing innovation knowledge intensity is shown in the growth in patent applications. In 2009, Z-Park companies filed 14,668 patents, up over 90% from 2008, and of which 62.1% were for new inventions.

- Today, Z-Park hosts more than 1 million employees and nearly 20,000 enterprises, making it China's most important high-tech base. Over a hundred Fortune 500 companies have set up research and development centers in the area, along with innovative Chinese corporations such as Lenovo, Founder, and Baidu.com.

- China's 11th Five-Year Plan (2006-2010) gives the development of the ICT industry considerable prominence, and the Ministry of Industry and Information Technology set key goals for the period, including moving of the ICT industry up the global value chain to higher value-added manufacturing and services, increasing domestic R&D capabilities, and continuing to focus on government procurement and subsidies to pursue new technologies.

  According to the Zhongguancun Industry Development Report (see Graph 6), the ICT industry has seen double-digit growth over the last few years, with strong growth set to continue as new technologies are fostered. Z-Park industry revenues are given as RMB 558.43 billion (USD 76 billion at December 2007 rates). The recorded revenues of over RMB 1 trillion (USD 150 billion) in 2008 indicates that Z-Park's new and high technology sector realised the goal set in the 11th Five-Year Plan two years ahead of schedule.

Graph 6: Z-Park ICT Industry Growth, 2002-2007



Source: Zhongguancun Industry Development Report 2008

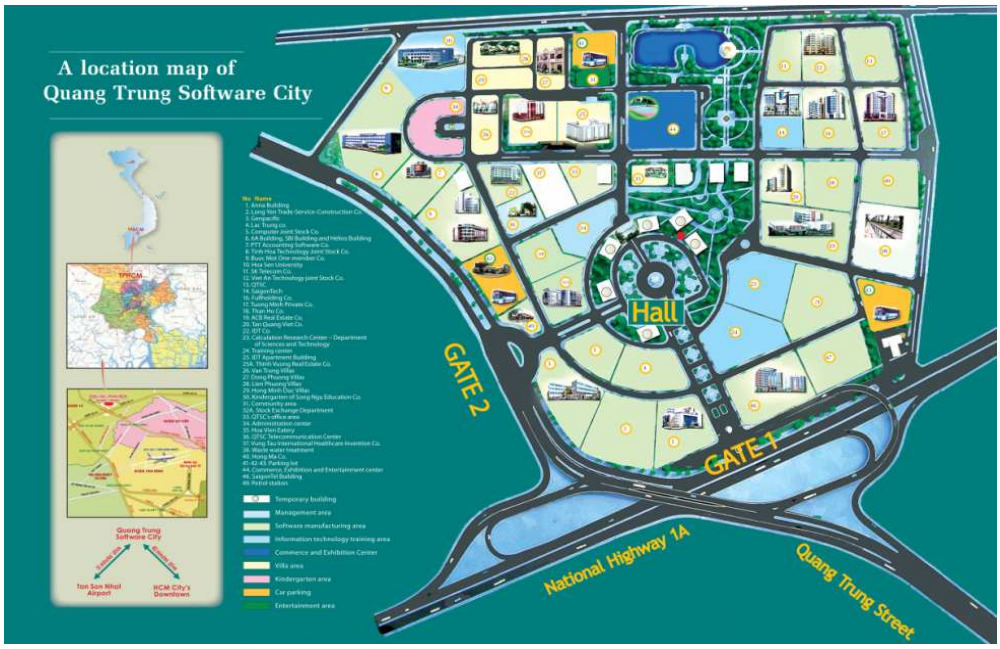
b) Quang Trung Software City in Vietnam

The Vietnam government has been supporting the development and growth of IT industry to improve the ICT infrastructure, cultivate ICT talent, and refine the industrial structure.

- Most IT parks in Vietnam have been established by the government to offer essential infrastructural facilities and linkages to attract investors, in order to overcome the infrastructure-related constraints seen across the country. One of the largest and the most successful IT parks is the Quang Trung Software City, located 15 km away from Ho Chi Minh City (HCMC).

- The HCMC Computer Association conceptualized the software park and the city government served as a facilitator in acquiring and developing the land and setting up the common infrastructure to meet the demand of the developing software industry. The development cost of QTSC, estimated at USD16.25 million, was largely funded by the local government, with the central government contributing a marginal amount. Eventually, the park will be operated and maintained by Quang Trung Software City Development Company (QTSCDC), an enterprise under the administrative control of the HCMC People's Committee.

Diagram 8: Master Plan of QTSC



Source:Official website of QTSC (http://www.quangtrungsoft.com.vn)

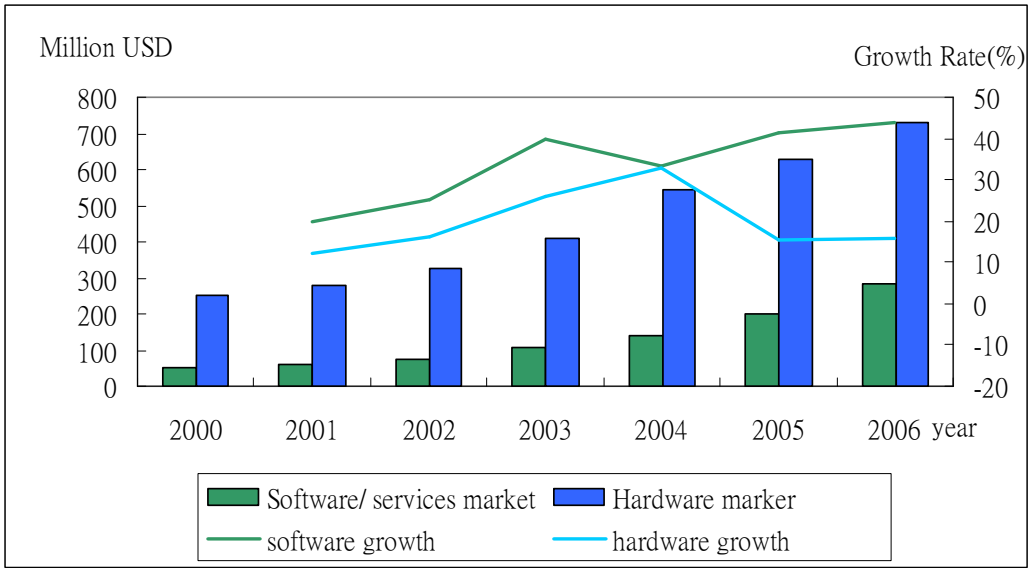
- According to the master plan, QTSC was divided into several parts; each designed for a different purpose, including residential accommodation, IT training facilities, a commerce and exhibition center, healthcare center, car parking area with a bus station, and entertainment and recreational facilities.

- QTSC aimed to provide a multi-option ready-to-move-in, industrial park to test emerging applications. It attracted many IT companies due to its high-speed internet connectivity, which was not available anywhere else in Vietnam at that time, which clearly demonstrates how upgrading the ICT infrastructure affects the willingness of investors.

- To ensure linkage and business relationship amongst the occupants, the city government actively approached development agencies to advertise QTSC as an attractive opinion for the IT industry.

- After decades of investment in the ICT industry, Vietnam is ready to reap the harvest. According to the Vietnam ICT Outlook 2007, Vietnam's ICT market in 2006 reached USD 1.15 billion, and its 22.6% annual growth was 3 times more than the world average, of which hardware growth was 15.8% and 43.9% for software/services. These growth rates are set to continue, with the ICT industry seeing 20% growth in 2009, and the software industry 50% growth.

Graph 7: ICT Market Growth Rate in Vietnam, 2000-2006



Source: Vietnam ICT Outlook 2007

- Today, QTSC is Vietnam's largest IT park. Approximately 5000 people are working and training in the park, and there are 6 IT institutes and 100 companies located there, including more than 50 foreign-invested enterprises from 20 countries. It is reported that the park's annual growth will exceed 130% this year.

These ICT industry parks in China and Vietnam clearly demonstrate the benefits that industry clusters enable, including economies of scale, attraction of talent, competitive innovation, and synergy with local technical universities, and have assisted in creating more knowledge-intensive, multi-skilled employment in their economies.

VI Conclusion

As illustrated in this report, the policy priorities set by ABAC members and many governments alike in recent years highlight the role that innovative growth has to play in building up the region's value proposition for tomorrow's world. The model of innovative growth needed today incorporates a wide spectrum of strategies and capacity-building programs to build up the essential social, economic and technical infrastructures and know-how and form a solid foundation for long-term growth, and drive the region forward into the future in a more sustainable and balanced way.

Appendix I: ABAC KBG Symposium, May 2010

The ABAC KBG Symposium was held on May 17, 2010 at the Taipei International Convention Center and consisted of four sessions. The first three sessions discussed major IG issues and the fourth session focused on suggestions to advance KBG/IG in the APEC region. It was estimated that there were about 200 participants from business, government, and academia.

1. Summary of Session I

The title of Session I was "Development of Knowledge-Based Growth." There were three speakers in this session. Mr. Risaburo Nezu, a Director of RIETI in Japan, was the first speaker. According to Mr. Nezu, there existed several categories of innovation: 1) technological innovation; 2) service innovation; 3) business model innovation; and 4) regulatory innovation. Furthermore, in order to advance regional economic integration, free flow of goods and services, knowledge and people must exist. Governments should reduce and eliminate barriers. It will also be necessary to protect intellectual property rights and to develop region-wide standards. Mr. Nezu also stated that a long-term challenge facing the Asia-Pacific region was the shift from labor-intensive industry to knowledge-based economy. Additionally, APEC economies must address environmental problems, enhance innovation systems, and prepare for an aging society.

Ms. Fauziah Talib, ABAC Member of Brunei Darussalam and Managing Partner of IQ-Quest Company, was the second speaker. She related that APEC economies should match educational outputs with industries' needs. The linkage between

education and technology should be strengthened through the development of innovative and research-intensive educational institutions. Additionally, workers should develop new skills to keep pace with modernization. Ms. Talib also stated that the new economy required workers to pursue lifelong learning, in order to address changes in the workplace and environment.

The third speaker was Dr. Francisco Sandejas, Managing Partner of Narra Venture Capital in the Philippines. Dr. Sandejas mentioned that the Philippines had been trying to focus more on software design, bio-medical research, and scientific research. The majority of work had been linked to multinational corporations. The national innovation strategy called for making technology the foundation of future economic development. Innovation will be the key to competitiveness and the creation of more jobs. Public-private partnership will be an important condition for innovation to flourish. It will also be necessary to strengthen Human Capital, support business incubation, and develop the innovation environment. Dr. Sandejas stated that the major challenges for the Philippines were: 1) Inadequate educational fundamentals; 2) Lack of R&D projects from the public sector; 3) Lack of R&D from the private sector; 4) Lack of role models; and 5) Lack of understanding at the leadership level.

2. Summary of Session II

The second session consisted of two speakers. According to Dr. Guann-Jyh Lee, Director of Business Start-up and Incubation Division of Chinese Taipei's SMEA, globalization had led to strong competition in the global market. Presently, product and process innovation had become important sources of industrial competitiveness. At the same time, the main inputs of innovation activities were now almost dependent on knowledge, instead of raw materials. Furthermore, ICT had created new models of production and services. In the future, patterns of investment and production will closely link with ICT, and the development of ICT becomes the main driver of the knowledge-based economy.

However, because of differences in economic conditions, the knowledge-based economy would not be able to result in equal development opportunities for all APEC economies. Thus APEC should assist developing economies to strengthen the capacity of employing knowledge to lower the digital divide. The existence of digital divide in APEC would widen the development gap between developed and developing economies. Dr. Lee further stated that APEC economies could utilize the opportunities provided by APEC, so as to generate more resources to advance the development of

ICT. He further suggested that ABAC could provide guidance to APEC SMEs, in order to achieve the development of knowledge-based economy.

The second speaker was Mr. Alvin Lee, an Executive Director at TimeWarner, USA. Mr. Lee said that knowledge-based growth could be enhance with the existence of easily accessible and high-quality content that flowed through newer and improved ICT infrastructures. Mr. Lee also stated that there were several ways to ensure successful digital business models. First, there must be measures that prevent unauthorized copying. Second, measures that ensured the legal use and transfer of digital contents must be developed. In addition, Mr. Lee suggested that governments must enact specific provisions that deal with digital content piracy. Government officials should also receive training and increase their awareness of the regulatory issues. Furthermore, consumers should be educated as well, particularly the younger generation.

3. Summary of Session III

Ms. Cher Wang, Chinese Taipei ABAC Member and Chairwoman of HTC Corp. and VIA Technologies, spoke about the latest developments in ICT. Ms. Wang stated that knowledge-based growth consisted of four major elements: 1) Business environment; 2) ICT adoption; 3) government policy; and 4) human resource development. In her presentation, she concentrated on the ICT pillar. Particularly, Ms. Wang related about technology developments, mobile Internet, cloud computing, and social behavior. The recent development in telecommunications had been the movement towards 4G that would enable video calls and instant downloads. Ms. Wang also said that the characteristics of latest semiconductors were: 1) Greater power efficiency; 2) Greater integration; and 3) Greater functionality. Thus new devices had been developed. With regard to mobile Internet, the important points were the ability to use it at anytime and anywhere. The mobile Internet had also expanded the mobile workforce.

Ms. Wang mentioned that cloud computing had resulted in the appearance of many tools and applications. For business, cloud computing could support healthcare, education, and B2B commerce. Cloud computing could also be useful for consumers, such as in the areas of shopping, entertainment, and social networking.

Mr. Peter Barnes, ABAC member of Canada and President of Censiomax Inc., described the Canadian perspective on ICT developments. Mr. Barnes stated that

Canada had faced several challenges. First, levels of ICT innovation and investment in ICT had been low relative to other OECD countries. Second, SMEs had been behind larger firms in ICT adoption. Third, more and more young people had decided not to study math, IT and computer sciences. Fourth, foreign investors had begun to acquire Canadian high-tech companies. In order to address the challenges, Canada had developed the digital economy strategy: 1) Build capacity to innovate using digital technologies; 2) Construct a world-class digital Infrastructure; 3) Strengthen the ICT industry; 4) Promote digital media; and 5) Enhance digital skills.

The third speaker is Dr. Jung-Yun Oh, Senior Researcher of Korea's National Information Society Agency (NIA). Dr. Oh said that ICT had changed the global economic structure. In the area of business development, efficiency and productivity had increased. The digital economy had created new markets and e-business. The public sector had become more transparent. In addition, Dr. Oh stated that green growth could be advanced through the utilization of green ICT. Resources had been used more efficiently and environmental pollutions had been reduced. Green ICT could advance the realization of a low carbon society. Furthermore, Dr. Oh mentioned that ICT increased the ability to make climate change prediction and strengthened disaster management.

4. Summary of Session IV

The main purpose of Session IV was to generate suggestions for APEC. Several suggestions were made. First, APEC developing economies needed venture capital and other mechanisms to promote the commercialization of new industries. It was recommended that APEC established a regional fund to assist developing economies.

Second, it was mentioned that ICT related applications had been discussed, but implementation was less successful. One reason was that many APEC members still had legal obstacles or market protection. APEC should pay greater attention to these challenges.

Third, South Korea's development strategy for the KBG had focused on the use of ICT to enhance the industry's efficiency and differentiation. The Korean government had invested in many programs. It was suggested that APEC developing economies could cooperate with Korea.

Fourth, it was stated that KBG was not a new concept, but the concept had changed over time. APEC economies could start to share experiences and information. The next step would be to discuss ways to cooperate, so as to promote KBG..

Fifth, leaders and businessmen knew about the meaning of knowledge-based economy but did not truly understand the importance. The public could also be educated on this subject. Thus APEC should disseminate more information and develop best practices. In addition, APEC should call for greater investment in ICT hardware and software, so as to advance economic development.

Sixth, many companies had begun to participate in the knowledge-based economy. However, governmental agencies could not keep pace with the latest developments. Thus the suggestion was that governments should enhance their understanding and capability to work in the new KBG environment.

Appendix II: ABAC Knowledge-Based/Innovative Growth Survey

Introduction

During the 2010 1st ABAC Meeting, the ABAC Knowledge-Based Growth (KBG) Initiative was endorsed (later renamed the ABAC Innovative Growth (IG) Initiative). The main purpose of the initiative is to develop policy suggestions for enhancing knowledge-based growth in APEC that benefits businesses and SMEs. As part of the Initiative, the survey has been created to gather information on stakeholders' views.

Background of Surveyed Economies

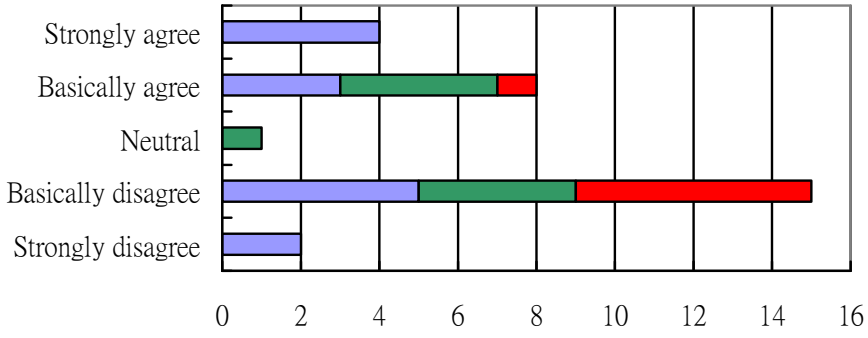
We received a total of 30 responses, representing 12 out of 21 APEC economies till the end of September 16th 2010. The breadth of input adds significant credibility to our results. Surveys were collected from respondents representing the following economies:

Developing Economies	
Brunei	4
Malaysia	3
Mexico	1
Papua New Guinea	2
Vietnam	4
Newly Industrialized Economies	
China	3
Chinese Taipei	4
Korea	1
Singapore	1
Developed Economies	
Canada(CA)	3
Japan(JP)	3
New Zealand(NZ)	1

Response Analysis

Question 1

"The global development of knowledge-based activities in the last ten years did not actually help emerging economies in achieving significant GDP growth in general and balanced growth, inclusive growth, and sustainable growth in particular."

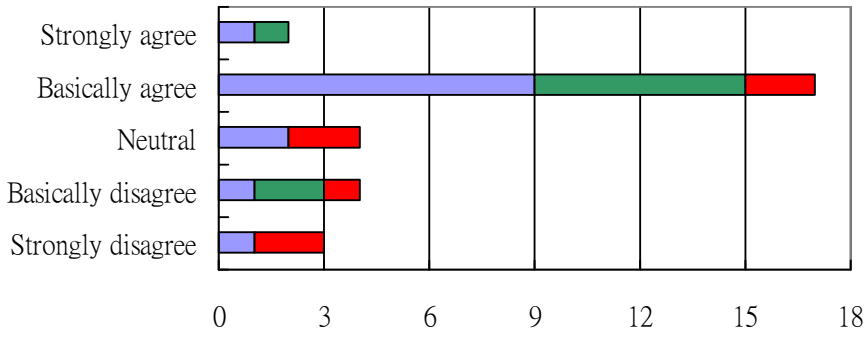


In this question, 17 out of 30 respondents, approximately 56.7%, submitted "Strongly disagree" or "Basically disagree" to this statement, indicating that most respondents do not agree upon this statement.

However, the result also shows that developed economies are less likely, on average, to hold positive opinions like "Strongly agree" and "Basically agree" than developing economies. They tend to hold negative opinions as "Strongly disagree" and "Basically disagree." On the other hand, opinion of developing economies diverged on whether knowledge-based activities in the last ten years helping them in achieving significant GDP growth developing economies.

Question 2

"The knowledge-based activities in the last ten years have been mainly aimed at creating new high-end products or finding more efficient ways of producing existing products in order to achieve economic growth. However, the overall economic consequence of these activities may not have created jobs of multiple skill levels, addressed income inequality or enhanced environmental protection."



Member economies have different opinions toward this question, regardless of developing, newly industrialized, or developed economies.

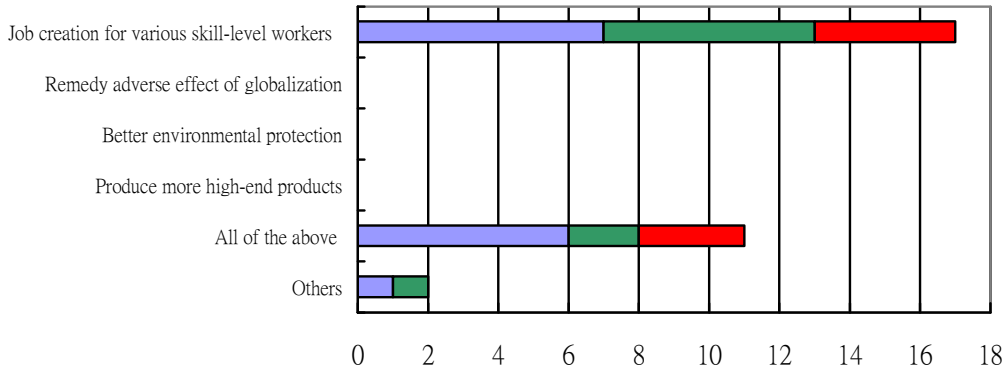
However, most respondents agree with this statement. 19 out of 30 respondents more than a half, approximately 63.3%, submitted positive opinions on this statement, including"Strongly agree" and "Basically agree."

If we put the results of the first and the second question together, we can see that the same number of respondents, 17 out of 30, hold on negative opinion on the first question and positive opinion on the second question.

It shows clearly that most member economies think that KBG help emerging economies in achieving significant GDP growth to some degree, but in terms of the overall economic consequence of these knowledge-based activities may not have created jobs of multiple skill levels, addressed income inequality or enhanced environmental protection in the last ten years.

Question 3

If the new knowledge-based growth (KBG)/innovative growth (IG) concept is to better link knowledge-based activities with other growth objectives, what should be the priority that the new KBG concept achieves or improves?



Other Opinion

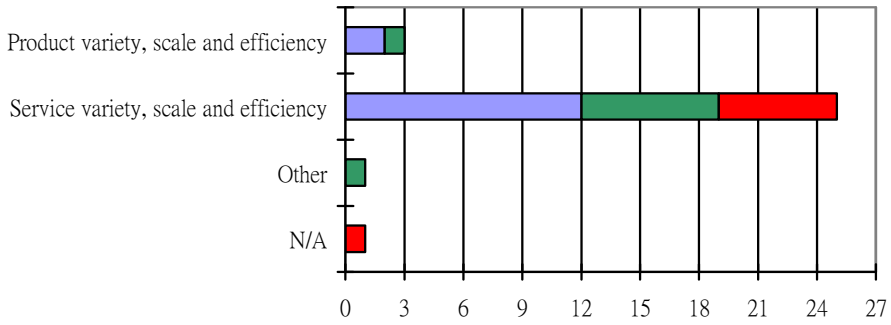
1. Malaysia : Improve capacity building in developing economies
2. Singapore : Productivity levels of our workers

Most members agree that “job creation for various skill-level workers” should be prioritized to better link KBG with other growth objectives. 17 out of 30 responses, proximately 56.7%, chose this option as the priority that new KGB concept should improve.

On the other hand, other members think that besides “Job creation for various skill-level workers”, “Remedy adverse effect of globalization”, “Better environmental protection”, and “Produce more high-end products” also should be the priorities that new KGB concept should improve or achieve.

Question 4

Which of the following can better help in improving the linkage between KBG and other growth objectives?



Other Opinion

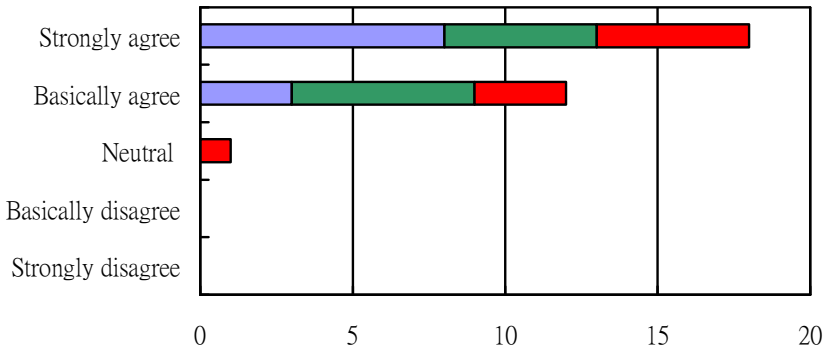
1. Chinese Taipei : both of the above. You can't prioritize one over the other.

Most members choose service sectors to be the promising field of application for better linking the new KBG idea with other growth objectives.

25 out of 30 responses, proximately 83%, think that "Service variety, scale and efficiency" can better help to improve the linkage between KBG and other growth objectives. Only three of them chose "Product variety, scale and efficiency" instead.

Question 5

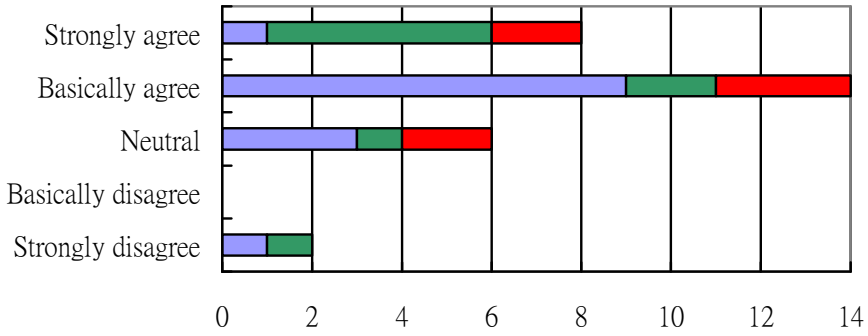
"With continuous product innovation, applying more **knowledge-based activities to create service diversity, enlarge service market scale and improve service efficiency can improve the linkage between KBG and other growth objectives**."



Most members agree that with continuous product innovation, more service diversity and efficiency could be reached. 29 out of 30 respondents, approximately 96.7%, submitted positive opinions on this statement.

Question 6

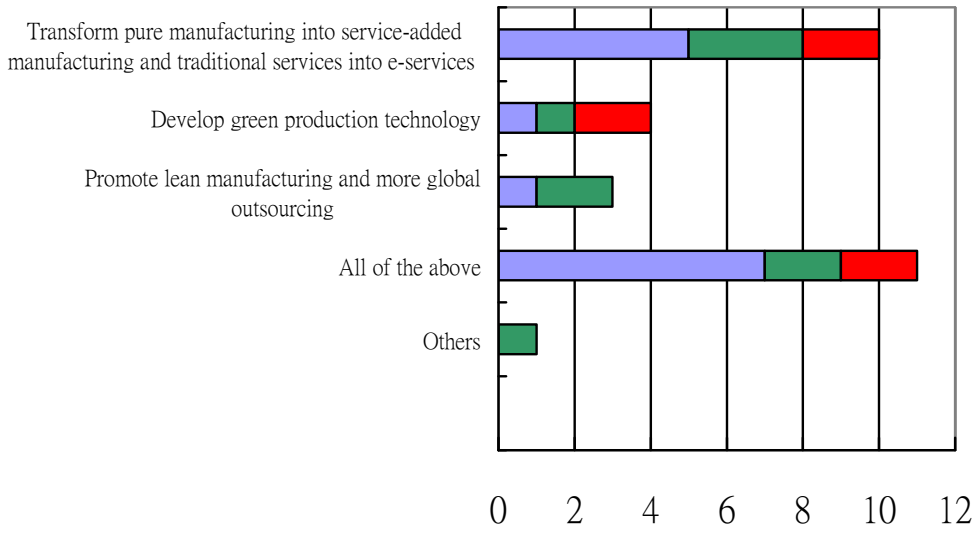
"With the trend of low global fertility rate, the revenue growth of firms in the future **will derive more from providing long-lasting services than selling durable products**."



Most members agree that the revenue growth of firms in the future will derive more from providing long-lasting services than selling durable products. 22 out of 30 respondents, approximately 73.3%, submitted positive opinions on this statement, including "Strongly agree" and "Basically agree."

Question 7

Which of the following ideas can best link **product-oriented innovation** to balanced, inclusive and sustainable growth?



Other Opinion

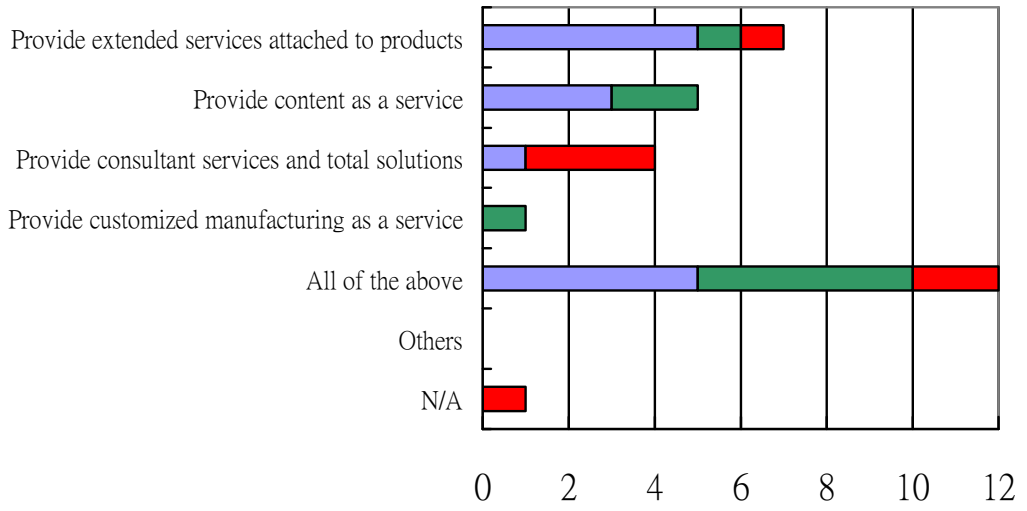
1. Chinese Taipei :

   Comment on point 1: it would not be possible to transform all services into e-services, nor would it be advised to do so. Point 1 implies an all-or-nothing scenario. If this could be modified to 'some' transformation, then I would choose points 1 and 2.

Most members chose either to transform manufacturing into service-added manufacturing (SAM) to some extent or to develop green production technology, as means to link product-oriented innovation to other growth objectives. However, there are also views mainly from developing economies stating that a need for multiple strategies at their disposal.

Question 8

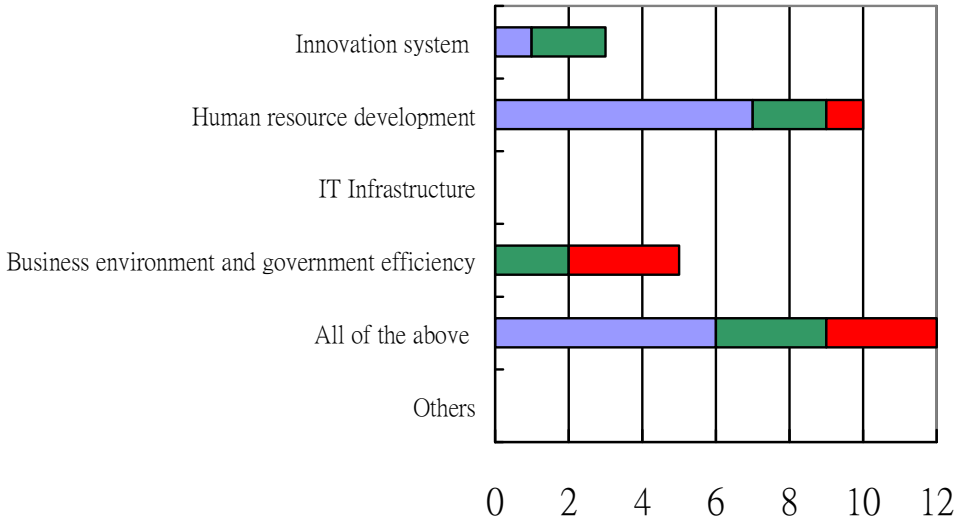
Which of the following models is better for your economy to transform pure manufacturing into service-added manufacturing?



Member economies have different opinions toward this question, regardless of whether they are developing, newly industrialized, or developed economies. Many of them chose either to provide customized manufacturing as a service or provide extended services attached to products, as the models to transform pure manufacturing into service-added manufacturing. However, no specific model is prioritized.

Question 9

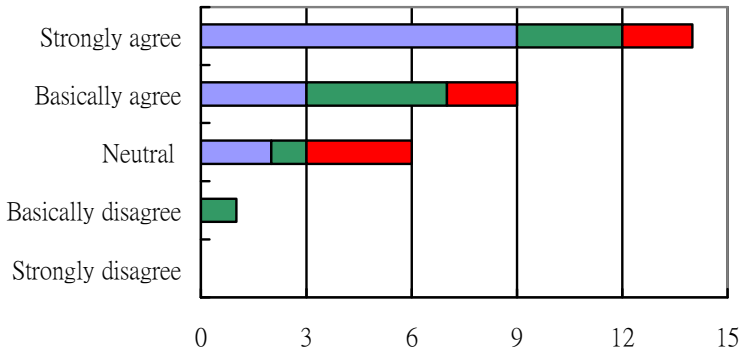
Which of the following key factor is the most important improvement needed for fostering KBG/IG in your economy?



From many factors listed, “Human resource development” is considered to be the most important improvement needed for fostering innovative growth. 10 out of 26 respondents submitted this option. Furthermore, it appears that developing economies value human resource more, but developed economies, on average, emphasize “Business environment and government efficiency” more.

Question 10

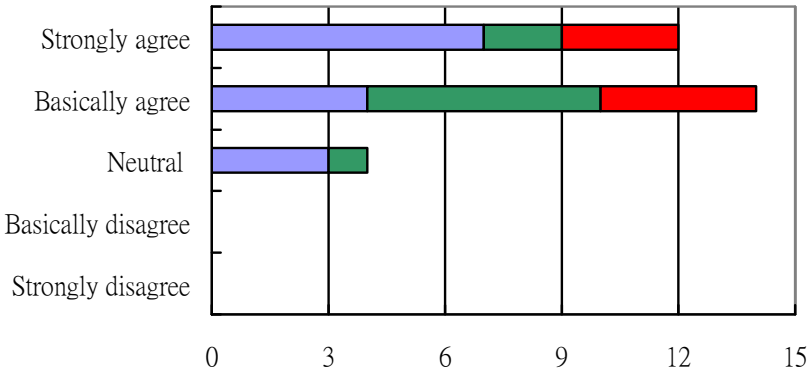
"In order to **create more emerging services and jobs**, such as service-added manufacturing or e-services, **the products associated with those emerging services should have more affordable prices**."



Most members agree that the products associated with those emerging services should have more affordable prices in order to create more emerging services and jobs. 23 out of 30 respondents, approximately 76.7%, submitted positive opinions on this statement, including"Strongly agree" and "Basically agree."

Question 11

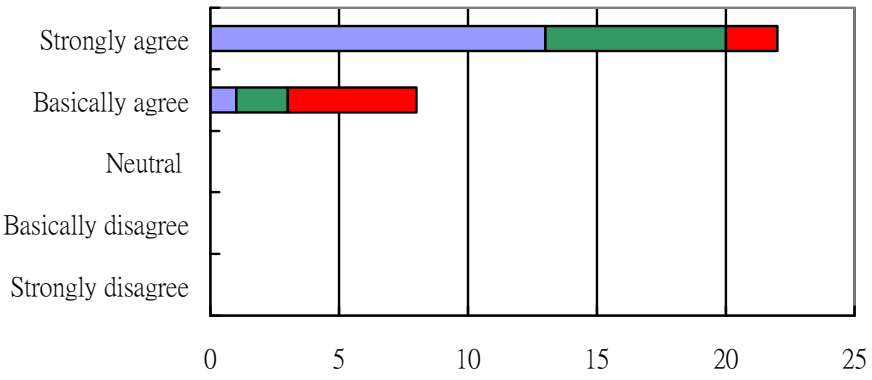
"Product standard harmonization, cross-licensing and open innovation can help the lowering of prices of emerging products attached to emerging services."



Most members agree that making prices for associated products affordable via product standard harmonization, cross-licensing and open innovation can help the development of certain emerging services.

Question 13

Given the fact that SMEs play an important role in fostering the development of emerging products and services, such as service-added manufacturing or e-services, do you think the **national innovation system should support SMEs to develop new products or technologies to derive new services innovation?**

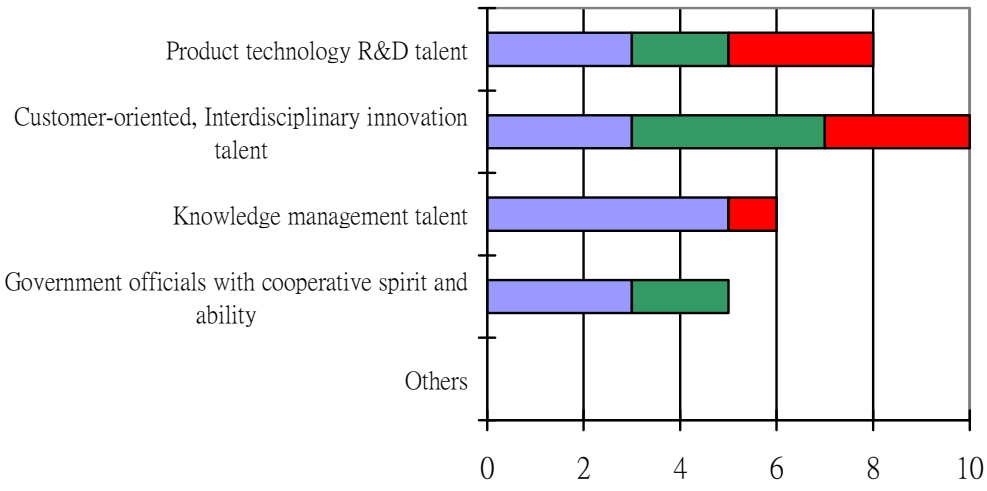


Generally speaking, all member economies agree unanimously upon the statement that national innovation system should support SMEs to develop new products or technologies to derive new services innovation.

However, in terms of intensity, developing and newly industrialized economies, on average, are more likely to submit “Strongly agree”, which shows that they are more in favor of the intervention from governments to support SMEs than those developed economies.

Question 14

Which of the following aspects of **human resource development** is the priority for your economy to promote KBG/IG?

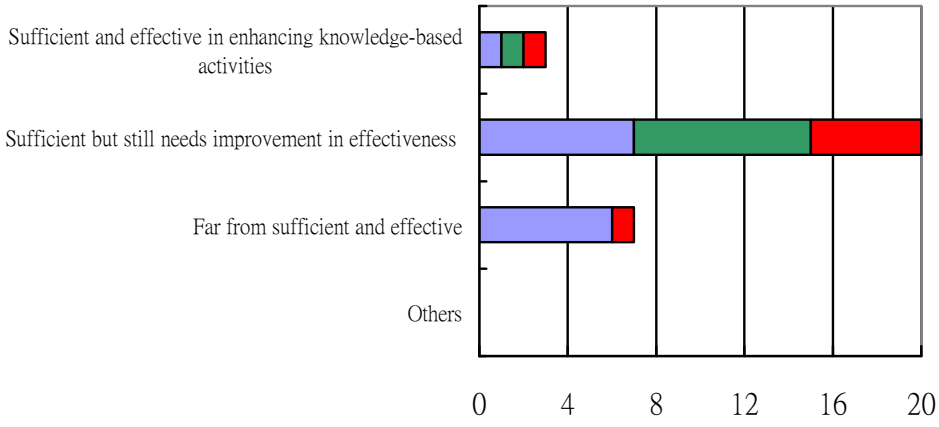


In terms of human resource development, most members chose either "Customer-oriented, Interdisciplinary innovation talent" or "Product technology R&D talent" as the priority for their economies to promote innovative growth.

However, in terms of human resource development, the result also shows that opinion of developing economies diverged on which aspect should be the priority for their economy to promote IG. It may imply that developing economies or different businesses in developing economies are facing different challenges. Furthermore, the requirement for better government officials is the priority in several developing economies, but not in developed economies.

Question 15

Do you think the investment in ICT hardware infrastructure in your economy is sufficient for the development of KBG/IG?

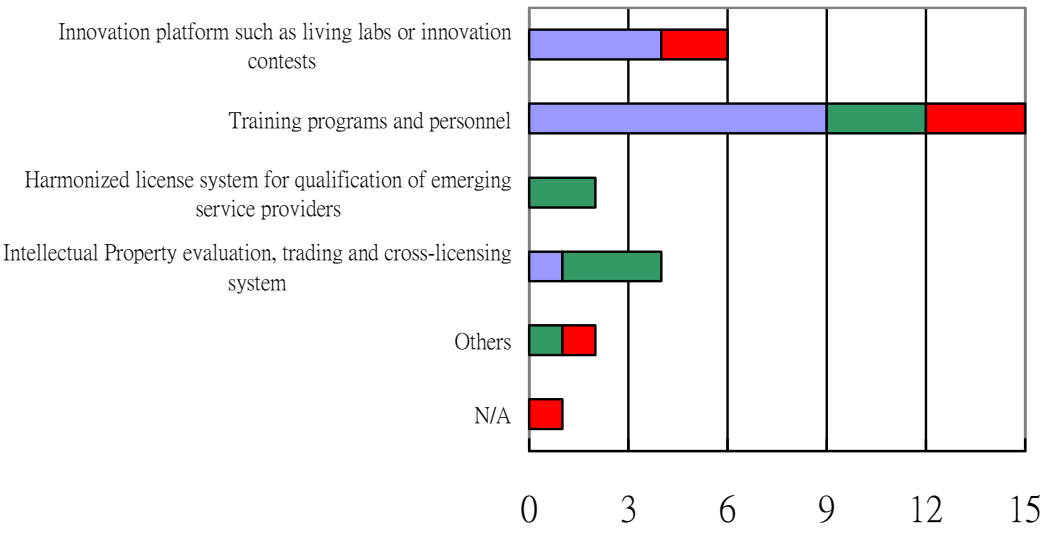


In terms of ICT hardware infrastructure for the development of KGB, most member economies described themselves as “Sufficient but still needs improvement in effectiveness.” 20 out of 30 respondents, approximately 66.7% submit this answer. 7 of them chose ”Far from sufficient and effective”, especially those developing economies. Only few respondents think ICT hardware infrastructure is “sufficient and effective in enhancing knowledge-based activities” in their economies.

Nevertheless, there are three respondents of developing, newly industrialized, and developed economies representing industry holding company, manufacturing company, and financial bank respectively submitted option 1 to this question. All of them agree that the investment in ICT hardware infrastructure in their economy is sufficient for the development of innovative growth.

Question 16

Which of the following is the **software infrastructure** priority for your economy to promote KBG?



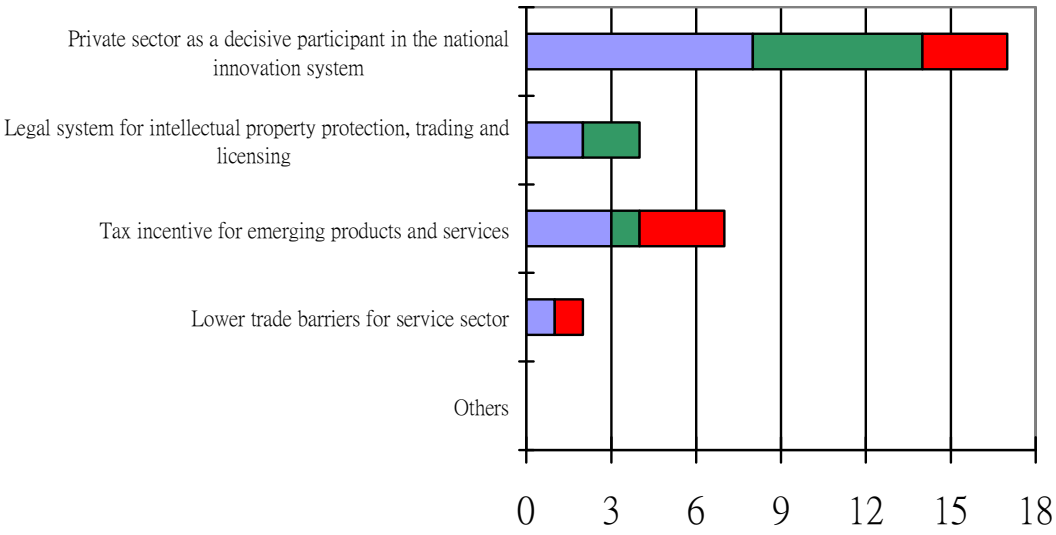
Other Opinion

1. Japan: Education/ human resources development
2. Chinese Taipei: The Chinese Taipei government undertakes several of the above, but it is not clear which if any is given priority.

In terms of **software infrastructure**, most members chose either "Training programs and personnel" or "Innovation platform", as a means to promote KBG, especially for developing economies.

Question 17

Which of the following is the priority in your economy for **enhancing the business environment** to promote KBG/IG?



In terms of **enhancing the business environment**, most members think that "Private sector as a decisive participant in the national innovation system" should be their priority to promote innovative growth.

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