Taiwan e-Competitiveness Annual Report 2013-2014

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Preface

The rapid development and use of modern technology has changed the ways of evaluating a country's competiveness. Not only military strength, economic power, and demographics are taken into consideration, but also technological developments and innovative capabilities. In recent years, information and communication technology (ICT) has turned itself into a useful tool for increasing business efficiency, a powerful facilitator for improving business model innovations, as well as a key force for enhancing national competitiveness.

A close look into the ICT trends shows that technologies for humanity are technologies that meet everyone's needs, which make users feel and thus create markets and generate profits. For the public welfare, the government is taking proactive measures to apply new technologies into our daily lives while using technologies to deal with social development issues, such as universal coverage of mobile broadband and better functioning of remote area digital opportunity center, both of which are meant to narrow the digital divide between city and country.

In order to enhance Taiwan's e-competitiveness and the citizens' quality of life, in 2013 the government released its 4G mobile broadband licenses, and in May, 2014 Taiwan made the 4G service available to the public. Meanwhile, Taiwan makes continual efforts on constructing a friendly mobile broadband environment as well as developing innovative application services and advanced technology of next generation mobile broadband service.

Concerning the food safety issues, the government has built cloud services, offering track-and-trace tools and read-to-use systems for the food industry to manage food traceability and distribution, and at the same time, for the authorities to supervise the upstream and downstream operations of the food supply chain for timely response to any misgivings. All these measures are taken to ensure food safety for the welfare of the citizens.

The publishing of *Taiwan e-Competitiveness Annual Report* provides comprehensive understanding of the status of Taiwan's ICT infrastructure and its relevant applications. Based on the reports, the government is able to observe the changing trends of the technology industry and to make plans for future development. In addition to presenting international ratings regularly observed in previous years, the *Taiwan e-Competitiveness Annual Report 2013-2014* has also included more innovation and entrepreneurship-based indexes to better highlight the power of Taiwan's innovation-driven economy. As well, this year's yearbook incorporates digital quality-of-life evaluations indicators in its initial planning items. Through such indicators, objective and quantitative methods can be used to observe how the ICT sector effects the quality of life in Taiwan.

Taken together, the report's key indicators and data analysis provides a testimony to Taiwan's relentless pursuit of industry competitiveness and better quality of life, as well as its continued transformation to a first-class information society. We hope this year's report can help readers further understand progress of Taiwan's e-competitiveness as well as its role in the prosperity of the international community.

Deputy Convener, Board of Science and Technology,
Executive Yuan

October 2014

Preface

In order to face the competitive environment of globalization and stern international political economic situations, the critical issue for Taiwan is to incorporate interdisciplinary resources and develop new applications with its solid foundation of ICT so as to enhance the nation's overall competitiveness.

Taiwan has made remarkable achievements in ICT development with the joint efforts from all parties in the country. Besides, Taiwan's e-competitiveness has been widely recognized across the world. Through 2013 to 2014, among a total of 144 economies evaluated by WEF, Taiwan was ranked 14th in the world and 4th in Asia-Pacific region in terms of network readiness. As for global competitiveness, Taiwan was ranked 12th overall and 4th in Asia-Pacific region. The IMD's World Competiveness Yearbook paints a similar picture, with Taiwan ranked 13th out of a total of 60 economies.

As for infrastructure, fixed broadband subscribers numbered 7.254 million. Out of that total, 41% were using fiber optic cables. Close to 81.9% of the people in Taiwan own mobile phones, of whom 9.70 million opting for smartphones. Over 60% of the cable TV subscriptions are digitized, with more 1.28 million subscribers receiving a variety of multimedia content.

The government has actively promoted applications through the use of Open Data and Big Data. Until now, we have made available more than 3,000 datasets and at the same time signed letters of intent or MOUs with countries including the UK, the US, and South Korea for cooperation on this field. Later, the government will discuss with local industries regarding their needs for government open data, covering topics on transportation, health and medicine, e-commerce and logistics.

In the hope of producing research results beneficial to policy administration towards 2015, the government also plans to consolidate innovations and resources of the academic and research circles to examine the government-owned Big Data through in-depth statistical analyses.

This year's report gives a comprehensive description of Taiwan's ICT policies on digital convergence, e-commerce, and cloud computing, which serves as a reliable reference source for all parties concerned. As the concepts of daily life applications, such as LOHAS community and smart city, are beginning to be recognized and accepted by the general public, ICT will continually play a key role in supporting relevant applications. We believe that in the near future technologies will bring a much better living space and a more dynamic lifestyle to every citizen in Taiwan.

Convener, National Information and Communication Initiative Committee, Executive Yuan
Chief Information Officer, Executive Yuan

October 2014

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2014

Chapter 1
TAIWAN'S PERFORMANCE IN ICT GLOBAL RANKINGS

WEF Networked Readiness Index
14th — 148 Global Countries
4th — 30 Asia-Pacific Countries

Waseda University e-Government
18th — 61 Global Countries
6th — 21 Asia-Pacific Countries

WEF Global Competitiveness Index
14th — 144 Global Countries
4th — 30 Asia-Pacific Countries

World Bank Doing Business
16th — 189 Global Countries
7th — 43 Asia-Pacific Countries

IMD World Competitiveness
13th — 60 Global Countries
4th — 13 Asia-Pacific Countries

GEDI Global Entrepreneurship & Development Index
6th — 120 Global Countries
2nd — 16 Asia-Pacific Countries

Note : Asia-Pacific Region includes countries in Asia and Oceania, but not the Middle East.

Chapter 1 Taiwan's Performance in ICT Global Rankings

The highs and lows of a country's ICT strength are closely bound to the direction of governmental policy and reflected in how widely the implementation and utilization of IT applications has been in the sectors of government, industry, and the life of the individual. Tracking such trends in the ICT sector has been the World Economic Forum (WEF) whose *Networked Readiness Index (NRI)* continues to be one of the industry's most respected reports on e-competitiveness.[1]

Before 2012, the *NRI* was a composite of three subindexes: environment, readiness, and usage. From 2012 on, however, this was expanded to include a fourth subindex—"impact"—to better assess the effects of ICT growth on economic and social institutions. The WEF's change in their evaluation framework echoed the own findings of Organisation for Economic Co-operation and Development (OECD)on ICT development, which showed that once the factors of environment, readiness and usage were met, it was the impact of ICT growth on business environments, a nation's economy, and the average citizen that came to the forefront.

ICT readiness and application are two important factors to consider when assessing a country's international competitiveness. Currently, two of the most respected indexes in this area—the WEF's *Global Competitiveness Index (CGI)* and the International Institute for Management Development's (IMD) *World Competitiveness Yearbook (WCY)* —both include ICT-related indexes in their assessment of an economy's overall competitiveness.[2, 3]

Although both reports cover the technological aspects of ICT, their individual composition, the period during which their information has been gathered, and the number of economies evaluated all show considerable differences. For example, the WEF's *Global Competitiveness Index* technological readiness score is a composite of seven indicators, while the IMD's *World Competitiveness Yearbook* technological infrastructure score is an aggregate of 23 indicators. Out of the combined 30 indicators, only two show any overlap between the two reports. Although the WEF uses far fewer indicators when evaluating a country's technological readiness, the indicators chosen, however, offer a clearer picture when looking to track ICT development and change.

In the WEF's *GCI*, countries will be divided into different economic stages of development depending on their GDP. When assigning rankings, the *GCI* takes these stages into consideration by attributing higher weights to those areas that are more relevant for an economy given its particular stage of development.

Out of the *GCI*'s 12 pillars, "business sophistication" and "innovation" are seen as being key for innovation-driven economies. ICT itself has the potential to bring about new innovation opportunities, change current business models, alter the way people use basic services, as well as pave the way for the emergence of new products and services. Therefore, any observation of innovation-based performance also avails us with a better understanding on a range of ICT application development scenarios.

Japan's Waseda University's *E-Government Rankings* is, next to the *UN's E-Government Survey*, one of most respected reports in the field of e-governance.[4] In the report of year 2014, in line with the continued development of e-government trends, two new evaluation categories were added to the original seven: "open data" and "cyber security."

ICT development leads to plentiful opportunities for innovation and entrepreneurship. The World Bank's annual *Doing Business* report and the Global Entrepreneurship and Development Institute's *Global Entrepreneurship & Development Index* are two of the most important in their class when it comes to indexing and rating entrepreneurial environments and opportunities.[5, 6] When evaluating an economy's competitiveness, the *Global Entrepreneurship and Development Index (GEDI)* reflects the WEF's position that economies at different stages of development need to emphasize different entrepreneurial elements. For developed economies and their continual pursuit of innovative development, the ratings associated with ease of doing business and entrepreneurial development have become increasingly important markers, and innovation-driven economies should pay particular attention to their rank in the *GEDI*'s "entrepreneurial aspirations" subindex.

For 2014, the WEF's *NRI* ranked Taiwan 14th overall, and seventh in the impact subindex, which measures the impact ICTs generate in an economy or society. In the WEF's *GCI*, Taiwan was ranked 30th in the "technological readiness" pillar and 10th in the "innovation" pillar. Moving to the IMD's *WCY*, Taiwan was ranked fourth in the "technological infrastructure" sub-factor. For its rankings, Waseda University's *E-Government Rankings* has Taiwan coming in at number 18, while the World Bank's *Doing Business* report ranks Taiwan two spots up at 16. Finally the Global Entrepreneurship and Development Institute's *Global Entrepreneurship & Development Index* ranks Taiwan at number six overall and in second place in its "entrepreneurial aspirations" subindex. An overview of Taiwan's ICT global rankings for 2014 can be seen in • Table 1.

• Table 1 Taiwan's ICT Global Rankings 2014

Institutions & Indexes	Overall Rank		Number of Participating Economies	
	Global Ranking	Asia-Pacific Ranking*	Global Ranking	Asia-Pacific Ranking*
WEF, Networked Readiness Index 2014	14	4	148	30
- Impact Subindex	7	3		
WEF, Global Competitiveness Index 2014	14	4		
-Technological Readiness Pillar	30	6	144	30
-Innovation Pillar	10	3		
IMD, World Competitiveness Yearbook 2014	13	4	60	13
-Technological Infrastructure Sub-factor	4	3		
Waseda University, E-Government Rankings 2014	18	6	61	21
World Bank, Doing Business 2014	16	7	189	43
The Global Entrepreneurship and Development Institute, Global Entrepreneurship & Development Index 2014	6	2	120	16
-Entrepreneurial Aspirations Subindex	2	1		

■ Note: Asia-Pacific Region includes countries in Asia and Oceania, but not the Middle East.

Source: WEF, IMD, Waseda University, World Bank, GEDI; Compiled by III-FIND

1-1 World Economic Forum's *Networked Readiness Index*

The WEF's *NRI* is the world's most prestigious index with regard to e-competitiveness. In the WEF's 2014 index, Taiwan was ranked 14th overall and fourth in the Asia-Pacific region. The WEF stated that Taiwan continues to be a global leader in high-tech manufacturing and technology-driven economies, as well as affirmed Taiwan's continued progress in its pillars of infrastructure and affordability.

As for the report's "impact" subindex, Taiwan was ranked 7th overall, while coming in 12th in the "economic impact" pillar and sixth in the "social impact" pillar, clearly showing how ICT development has already made its presence felt in both the economy and society of Taiwan. Taiwan's rankings reported in the WEF's *NRI* for 2013 and 2014 are seen in • Table 2.

• Table 2 Taiwan's *NRI* Rankings 2013-2014

Subindex/Pillar	2014		2013	
	Rank	Score	Rank	Score
Environment subindex	25	4.94	24	4.97
Political and regulatory environment pillar	34	4.43	33	4.51
Business and innovation environment pillar	4	5.45	4	5.44
Readiness subindex	7	6.17	17	5.80
Infrastructure and digital content pillar	5	6.81	22	5.99
Affordability pillar	53	5.74	54	5.50
Skills pillar	14	5.96	7	5.91
Usage subindex	17	5.34	15	5.45
Individual usage pillar	28	5.44	20	5.66
Business usage pillar	14	5.24	13	5.19
Government usage pillar	16	5.36	12	5.49
Impact subindex	7	5.43	6	5.65
Economic impacts pillar	12	5.08	7	5.49
Social impacts pillar	6	5.79	6	5.82

Source: WEF *Global Information Technology Report* 2013 & 2014; Compiled by III-FIND

1-2 World Economic Forum's *Global Competitiveness Index*

The WEF's *Global Competitiveness Index* details many of the factors responsible for the improvement of national productivity and competitiveness. The *GCI*'s three main subindexes are, however, weighted differently depending on a country's stage of economic development. For Taiwan, classified as an innovation-driven economy, the "innovation and sophistication" subindex accounts for altogether 30% of its total score— with the "innovation" and "business sophistication" pillars each accounting for 15%, thus making them the most heavily weighted of all the 12 pillars. From the above, it is easy to see just how heavily the *GCI* weighs innovation ability for innovation-driven economies.

In 2014, Taiwan was ranked 14th overall by the index, a ranking that has been more or less consistent over the past few years. Taiwan's top-notch performance among the index's innovation indicators points to its continued strength in innovation. In fact, Taiwan's highest ranking (10th) was precisely in the "innovation" pillar. In its report, the WEF further pointed out that Taiwan's goods market efficiency, world class infrastructure, stable higher education institutions, and innovative strengths have given it the competitive edge to remain constant in the rankings year after year. • Table 3 lists Taiwan's rankings in the WEF's *GCI* report for 2013 and 2014.

• Table 3 Taiwan's *GCI* Rankings 2013-2014

Subindex/Pillar	2014		2013	
	Rank	Score	Rank	Score
Basic requirement subindex	14	5.75	16	5.70
Institutions	27	4.84	26	4.95
Infrastructure	11	5.82	14	5.77
Macroeconomic environment	23	5.83	32	5.60
Health and primary education	13	6.49	11	6.49
Efficiency enhancers subindex	16	5.14	15	5.16
Higher education and training	12	5.63	11	5.65
Goods market efficiency	11	5.23	7	5.26
Labor market efficiency	32	4.59	33	4.67
Financial market development	18	4.91	17	4.95
Technological readiness	30	5.24	30	5.19
Market size	17	5.23	17	5.24
Innovation and sophistication subindex	13	5.11	9	5.22
Business sophistication	17	5.12	15	5.20
Innovation	10	5.10	8	5.25

Source: WEF *Global Information Technology Report* 2013 & 2014; Compiled by III-FIND

1-3 IMD's *The World Competitiveness Yearbook*

The International Institute for Management Development (IMD)'s *World Competitiveness Yearbook (WCY)* is currently one of the world's most well known indexes. Part of that reputation stems from the breadth of the *WCY* index, as well as the impressive number of criteria used to calculate its findings. In the *WCY*'s 2014 report, as a result of a drop in government and business efficiency, Taiwan's overall rank slipped to 13.

Taiwan was ranked fourth in the *WCY*'s technological infrastructure sub-factor, one place higher than last year. According to the IMD, Taiwan's strengths in the technological infrastructure sub-factor were seen as being in high-tech exports and fixed broadband tariffs, while weaknesses were noted in the areas of mobile phone costs, telecommunications investment relative GDP levels, and Internet connection bandwidth to foreign countries.

Looking at the areas where Taiwan lost ground compared to last year's rankings, it becomes obvious that although Taiwan currently offers a relatively complete "hardware" environment, it still lags in "software" environment such as regulatory control and business financing. Taiwan's complete rankings in the IMD's 2013 and 2014 *World Competitiveness Yearbook* are found below in • Table 4.

• Table 4 Taiwan's *WCY* Rankings 2013-2014

Factor/Sub-factor	2014 Rank	2013 Rank	Factor/Sub-factor	2014 Rank	2013 Rank
Economic Performance	14	16	Business Efficiency	17	10
Domestic Economy	21	24	Productivity & Efficiency	14	20
International Trade	14	10	Labor Market	22	15
International Investment	31	30	Finance	16	12
Employment	21	24	Management Practices	11	5
Prices	11	26	Attitudes and Values	19	6
Government Efficiency	12	8	Infrastructure	17	16
Public Finance	17	13	Basic Infrastructure	18	19
Fiscal Policy	4	4	Technological Infrastructure	4	5
Institutional Framework	20	16	Scientific Infrastructure	9	13
Business Legislation	27	20	Health and Environment	31	30
Social Framework	26	20	Education	22	21

Source: IMD *World Competitiveness Yearbook* 2013 & 2014; Compiled by III-FIND

1-4 Waseda University's *E-Government Rankings*

Japan's Waseda University has been conducting researches to monitor and survey worldwide e-government development. International e-government evaluations and rankings are completed according to selected indicators. In the 2014 rankings, Taiwan came in at number 18 overall, sixth in the Asia-Pacific region, and eighth among APEC members. Taiwan's overall ranking for the past five years is shown in • Table 5.

• Table 5 Taiwan's *E-government Rankings* 2010-2014

	2014	2013	2012	2011	2010
Overall Rank	18	8	10	13	10

Source: Waseda University *E-government Rankings* 2014; Compiled by III-FIND

Taiwan's performance show variances among the nine indicators used in the 2014 ranking. As for "national portal", "government CIO", "e-Government promotion", and "open government" indicators, Taiwan ranked 11th, 12th, 8th, and 11th respectively (see • Table 6). With regard to the other five indicators, Taiwan failed to break into the top 13, signaling that Taiwan has succeeded in its promotion of e-governance yet there is still room for improvement regarding a well-balanced e-government development. With above-average ICT readiness and e-government performance, ease and convenience of everyday life for the public will be achieved if Taiwan continues making progress in e-government development.

• Table 6 Taiwan's *E-government Rankings* 2014

Indicator	Rank
National Portal	11
GCIO	12
e-Government Promotion	8
Open Government	11

Source: Waseda University *E-government Rankings* 2014; Compiled by III-FIND

1-5 World Bank's *Doing Business*

The World Bank's *Doing Business* report offers understanding of business friendliness in terms of oversight mechanisms and regulations through quantitative evaluations on regulatory processes involving starting and closing a business entity. For any countries concerned about their business environment, this report also serves as a reference for policy planning and legislation purpose.

In the World Bank's 2014 report, released on October 2013, Taiwan's "ease of doing business" ranking was 16th out of a total of 189 countries—unchanged from the previous year. Taiwan's ranking among the individual topics that make up the backbone of the report also remained stable. In 2014, out of a total of 10 topics, Taiwan was ranked 20th or higher in half of them. It was ranked seventh in both "dealing with construction permits" and "getting electricity", but 84th in "enforcing contracts" (an improvement over last year's rank, however). Taiwan's rankings in the 10 topics of the *Doing Business* report for 2013 and 2014 are shown below in • Table 7.

• Table 7 Taiwan's Ease of *Doing Business* Rankings 2013-2014

Topics	2014 Rank	2013 Rank
Starting a business	17	16
Dealing with construction permits	7	9
Getting electricity	7	6
Registering property	31	32
Getting credit	73	70
Protecting investors	34	32
Paying taxes	58	54
Trading across borders	18	23
Enforcing contracts	84	90
Resolving insolvency	16	15

Source: World Bank *Doing Business* 2013 & 2014; Compiled by III-FIND

According to a 2013 white paper on Taiwan's small and medium enterprises (SME), SMEs takes 98% of Taiwan's businesses. There is no doubt that improved business environment will result in a more vigorous development of the nation's SMEs.

1-6 GEDI's *Global Entrepreneurship & Development Index*

In the *GEDI*'s 2014 rankings, Taiwan came in sixth overall, five places higher than the previous year. In the index's three subindexes—attitude, ability, and aspiration—Taiwan came in 15th, 10th, and 2nd, respectively. Among the 15 pillars that comprise the three subindexes, Taiwan's best showing was in "product innovation" (1st), "high growth" (1st), and "risk capital" (3rd)—all found within the aspiration subindex. Conversely, pillars in which Taiwan performed the worst—"gender" and "competition"—were both found in the ability subindex. Taiwan's rankings in *GEDI 2014* are shown below in • Table 8.

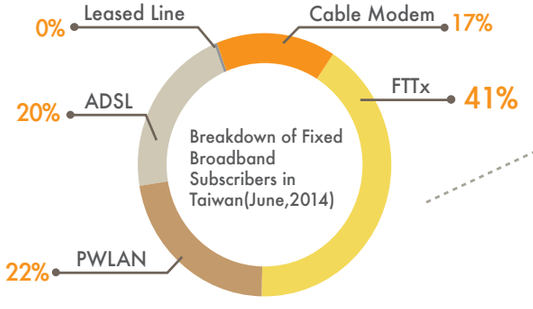
• Table 8 Taiwan's *GEDI* Rankings 2014

Subindex/Pillar	2014	
	Rank	Score
Entrepreneurial Attitudes	15	61.7
Opportunity Perception	25	0.68
Start-up Skills	50	0.49
Risk Acceptance	8	0.78
Networking	25	0.65
Cultural Support	27	0.61
Entrepreneurial Abilities	10	68.2
Opportunity Startup	5	0.95
Gender	62	0.62
Technology Absorption	12	0.85
Human Capital	13	0.85
Competition	55	0.43
Entrepreneurial Aspirations	2	78.6
Product Innovation	1	1
Process Innovation	17	0.78
High Growth	1	1
Internationalization	37	0.64
Risk Capital	3	0.99

Source: GEDI *Global Entrepreneurship & Development Index* 2014; Compiled by III-FIND

Chapter 2 2013-2014 ICT INFRASTRUCTURE IN TAIWAN : A SNAPSHOT

When assessing the state of fixed broadband environments, we can draw information from several different areas: fiber optic cable subscriber numbers, internet speeds, related digital convergence indicators, and household broadband penetration.



In June of 2014, fixed broadband subscribers numbered 7.254 million.

Out of that total, **2.982 million** were using fiber optic cables, about **41%** of total.

The state of Taiwan's mobile internet environment can be deduced from the type of networks or technology currently being used, internet speeds, and mobile internet penetration.

Mobile Phone Penetration **81.9%**

Smartphone Penetration **41.6%**

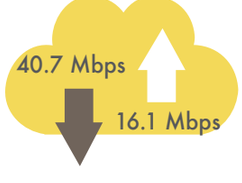
9.706 million Smartphone Users

= 1 million

Fixed Broadband

ICT INFRA STRUCTURE

Mobile Internet



Ookla's Net Index, Fixed Broadband

Upload Speeds **20th** globally

Downloads Speeds **10th** globally

Internet Access At Home **84.8%**

Mobile Internet Speeds: End User Measurements

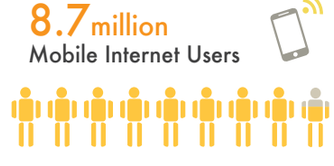
Related Digital Convergence Indicators **60%**

Number of IPTV Subscribers

The number of subscribers saw an increase to **1.286 million** in June 2014.

Mobile Internet Penetration **37.3%**

8.7 million Mobile Internet Users



= 1 million

Nowadays the convenience brought by ICT is tremendous. In Taiwan, with the hope of having everyone benefited, various branches of the government have joined forces to improve Internet infrastructure. In terms of fixed broadband, a goal of 100% 100M fiber-optic coverage was set by the Executive Yuan's Digital Convergence Policy Initiative. As of December 2013, excluding households located in remote areas, household 100Mbps broadband coverage has already reached 89%. If one includes coverage by cable television operators, that percentage spikes to 97%. As for mobile Internet services, in October 2013, the Executive Yuan completed 4G mobile broadband licensing auction. In May 2014, several companies launched 4G services, and thus marking a new milestone in the development of Taiwan's high speed mobile broadband services. 4G high speed broadband is expected to drive more and better mobile applications as well as to attract more users. For the future planning of digital services, the Board of Science and Technology of the Executive Yuan will refer to the OECD's *Better Life Index (BLI)* and establish an *ICT Enable Better Life Index* to evaluate satisfaction levels of the quality of digital life. A snapshot of the current status of ICT infrastructure in Taiwan is found in • Table 9.

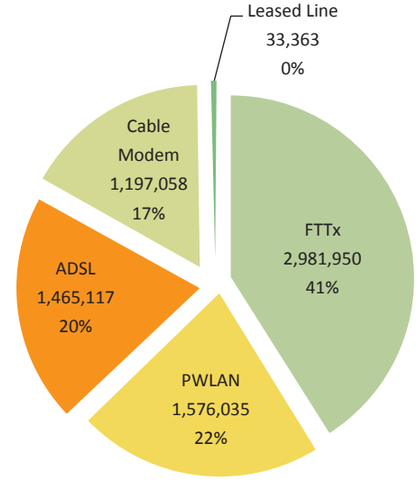
• Table 9 ICT Infrastructure in Taiwan

Category	Indicator	Number/ Percentage	Date of Data	Source
Fixed Broadband	FTTx Subscriptions	2.982 million households	2014/06	NCC
	Cable TV Subscriptions	4.989 million households	2014/06	NCC
	Digital STB Penetration	60 %	2014/06	NCC
	IPTV Subscriptions	1.286 million households	2014/06	NCC
	Household Broadband Penetration	84.8 %	2013/08	III-FIND
	Internet Penetration	75.0 %	2013/08	III-FIND
Mobile Internet	Mobile Phone Penetration	81.9 %	2013/03	III-FIND
	Smart Phone Penetration	41.6 %	2013/03	III-FIND
	Mobile Internet Average Speed on Consumer End Download Upload	 4.4 Mbps 1.1 Mbps	2013H2	NCC
	Mobile Internet Penetration	37.3 %	2013/03	III-FIND

Compiled by III-FIND

2-1 Taiwan's ICT Infrastructure Indicators

When assessing the state of fixed broadband environments, we can draw information from several different areas: number of fiber optic cable subscribers, Internet speeds, related digital convergence indicators, and household broadband penetration. Of Taiwan's fixed broadband subscribers, currently over 40% fall into the the FTTx category. According to findings published by Taiwan's National Communication Commission (NCC), in June of 2014 fixed broadband subscribers numbered 7.254 million.[7] Out of that total, 2.982 million (or 41%) were using fiber optic cables. (See • Figure 1)



Source: NCC; Compiled by III-FIND

• Figure 1 Breakdown of Fixed Broadband Subscribers in Taiwan (June 2014)

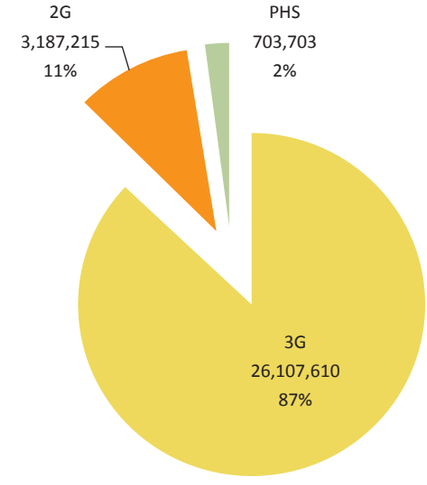
Fiber optic access is an indicator regularly used for evaluating fixed broadband environments. However, besides counting the number of fiber optic subscribers, the actual Internet speeds are the real concern. According to the findings released by Ookla's *Net Index* on July 29, 2014, Taiwan's overall fixed broadband download speed was measured at 40.7 Mbps, making it the tenth fastest in the world. Upload speed was measured at 16.1 Mbps, which put Taiwan at number 20 globally. Finally, Taiwan's ISP promise score (how closely actual download speeds correlate to speeds being advertised) was 99.36%—the fourth highest in the world.

Coming to digital convergence, related indicators include the proportion of cable television digitization and the number of IPTV subscribers. Cable television digitization allows the public to enjoy a diverse and large selection of high-quality video and digital value-added services; therefore, the proportion of cable television digitization is an important indicator of the level of digital convergence. The proportion of cable television digitization in Taiwan already stands at 60%, and will hopefully be at 75% by the end of the year. According to statistics released by the NCC, in June 2014, 4.989 million households had subscribed to cable television, while digital set-top box subscriptions had reached 2.994 million, or 60% of total subscribers. As cable television continues to upgrade to digital cable, cable operators have further opportunities to seize the Internet market share from the telecommunication industry. However, according to the NCC, as of June 2014, Internet access via cable modem provided by cable television operators had only 1.1197 million subscribers, accounting for mediocre 17% of total broadband accounts. These numbers show that cable television operators still have much work to do in the market for Internet access.

According to the NCC, at the end of 2013, two companies offered IPTV and shared a combined total of 1.265 million subscribers. As of June 2014, the number of IPTV providers dropped to one while the number of subscribers slightly increased to 1.286 million.

Currently Taiwan's household broadband penetration stands at 85%. According to a report by the National Development Council (NDC) released on July of 2013, among users age at 12 and up, the household computer penetration was 88.5% with a household Internet penetration of 85.5%, and overall Internet penetration of 76.3%.[8] Coming to a similar conclusion was the August 2013 report of the Institute for Information Industry (III).[9, 10] The III found that the household computer penetration and the households Internet penetration stood at 88.4% and 84.8% respectively while the overall Internet penetration reached 75%, or 17.52 million users.

The state of Taiwan's mobile Internet environment can be deduced from the type of networks or technology currently being used, Internet speeds, and mobile Internet penetration. In June of 2014, mobile cellular subscribers reached 29.999 million, or 128.2 mobile cellular subscribers per 100 inhabitants, with 87% of subscribers currently using 3G networks. (See • Figure 2)

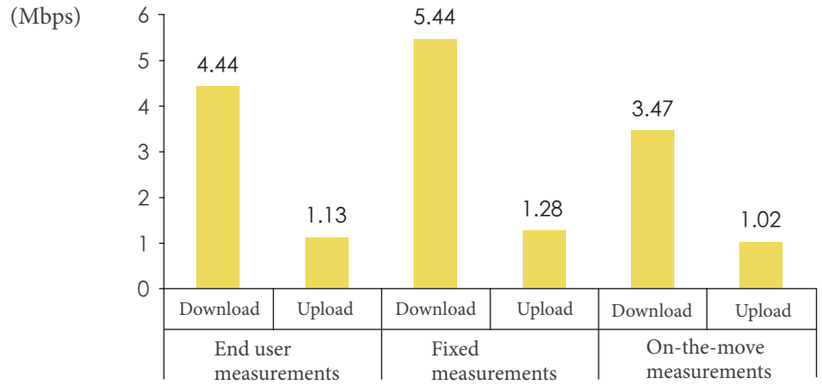


Source: NCC; Compiled by III-FIND

• Figure 2 Breakdown of Mobile Telecom Networks in Taiwan (June 2014)

According to a survey by III-FIND, in Taiwan, mobile phone penetration was 81.9% with 50.8% of subscribers using smartphones as of March 2013.[11] In other words, the smartphone penetration was 41.6%, or 9.706 million users. And according to the National Development Council, as of July of 2013, smartphone penetration in users 12 years and older reached 60.5%, with a total of 12.628 million users.

As for mobile Internet speeds, according to a 2013 report by the Telecom Technology Center (TTC) commissioned by the NCC, end user measurements for the three months of August through October showed mobile Internet download and upload speeds averaged 4.4 Mbps and 1.1 Mbps respectively.[12] (See • Figure 3) In addition, according to findings released by the webpage Ookla's *Net Index* on July 29, 2014, Taiwan's mobile Internet download speeds reached a maximum of 20.7 Mbps—making Taiwan the fourth fastest in the world.



Source: TTC; Compiled by III-FIND

Figure 3 Taiwan's Mobile Internet Download & Upload Speeds

As for 4G service, on September 3, 2013, the NCC held a mobile broadband (4G) spectrum auction. A total of 135MHz of frequency spectrum in the 700MHz, 900MHz, and 1800MHz bands was auctioned for mobile broadband use. After 393 bids over 40 days, Chunghwa Telecom, Taiwan Mobile, Far Eastone Telecommunications, Asia Pacific Telecom, Taiwan Star Cellular, and Ambit Microsystems all won spectrum. The auction raised NT$118.65 billion, with Chunghwa Telecom, Taiwan Mobile, Far Eastone Telecommunications winning spectrum in the highly sought after 1800MHz band. Out of the six winners, Taiwan Star Cellular and Ambit Microsystems were newcomers to the telecommunication field, with Asia Pacific Telecom and Taiwan Star Cellular buying the least spectrum (10 MHz each) of the six winners. As of May 2014, Chunghwa Telecom, Taiwan Mobile, and Far Eastone Telecommunications have all started offering 4G service.

One in three residents in Taiwan have access to mobile Internet. According to the III's FIND, mobile Internet penetration as of March 2013 was 37.3%, or around 8.7 million users. While a similar NDC report showed that as of July 2013, the ratio of smart phone Internet users in users 12 years old and older was 53%, or 11.04 million.

Regarding Internet subscribers, according to the NCC, 3G monthly subscribers reached 9.913 million in March 2013 (or 42.5 users per 100 inhabitants). That number rose to 10.89 million in July 2013 (46.6 users per 100 inhabitants) and, as of June 2014, stands at 13.635 million (58.3 users per 100 inhabitants). For a complete list of ICT infrastructure related performance indicators, please refer to Appendix 1.

2-2 ICT Policy Impact Analysis

In 2002, the Executive Yuan passed the *2002-2006 National ICT Development Initiative*, which set promoting the e-Taiwan Project as its primary focus. The strategic thinking behind the initiative lay in building a foundational environment for ICT on the island. The government hoped to achieve its objective of providing six million households with broadband access within six years in order to turn Taiwan into one of the most digitized nations in Asia. Simultaneously, employing the concept of Internet networks replacing road networks in policy-making, the government used public construction funds for the first time to promote basic infrastructure for ICT and ICT applications in Taiwan.

In response to the 2008 financial crisis, the government in Taiwan centralized public construction funds and prioritized the implementation of the 2009-2016 iTaiwan 12 Projects. Through the five concepts of (1) advancing regional development that caters to the needs of each area, (2) establishing an innovative industrial environment, (3) forging a new look for urban and rural areas, (4) expediting intellectual capital accumulation, and (5) valuing sustainable development, the government has sought to create another economic miracle. In the face of societies becoming increasingly digitized and mobilized, the government has been pushing the Smart Taiwan Project among other various policies to emphasize the following imperatives: (a) adopting and expanding application services, (b) implementing energy conservation and carbon reduction, (c) fostering the arts and humanities, (d) nurturing diverse human capital, (e) developing a learning society that values lifelong learning, (f) raising the nation's overall intellectual capital, and (g) boosting the island's soft power. The key areas of promotion include (1) broadband convergence networks, (2) cultural creative industries, (3) high-quality e-government, (4) personalized daily life and industrial applications, (5) equal digital opportunities, and (6) human capital development.

In 2009, the government leveraged Taiwan's competitive advantage in ICT (i.e., communication, information, photoelectric, and semiconductor) to accelerate the promotion of industry innovation, the development of emerging industries, and the generation of employment opportunities. In the process, the government further promoted six emerging industries, which consisted of the biotechnology, tourism, green energy, healthcare, precision agriculture, and cultural creative industries. The status of all related performance indicators up until the first quarter of 2014 can be seen in • Table 10 below.

• Table 10 *Smart Taiwan Project* Performance Indicators and Implementation Status

Indicator	Unit	Target Value	Current Status	Current Status Explanation
High-Speed (30 Mbps and above) Convergence Network Coverage Ratio	%		95.4	2013 Q4 Data
High-Speed (50 Mbps and above) Convergence Network Coverage Ratio	%		92.8	2013 Q4 Data
Number of Cities and Counties with Smart Bus Services	Cities and Counties		20	Smart bus service coverage has been extended to all cities and counties across Taiwan.
Scope of Smart Traffic Control for Highways and Expressways			All highways plus 12 expressways	2011 Data
Innovative Technology Application Services for Daily Life	%			
Degree of Public Usage		65	60.8	2013Q4 Survey
Degree of Public Satisfaction		70	61.1	2013Q4 Survey
Nationwide Internet Penetration for the Public	%	80	76.3	October 2013 Survey

Source: Smart Taiwan Project Website; Compiled by III-FIND

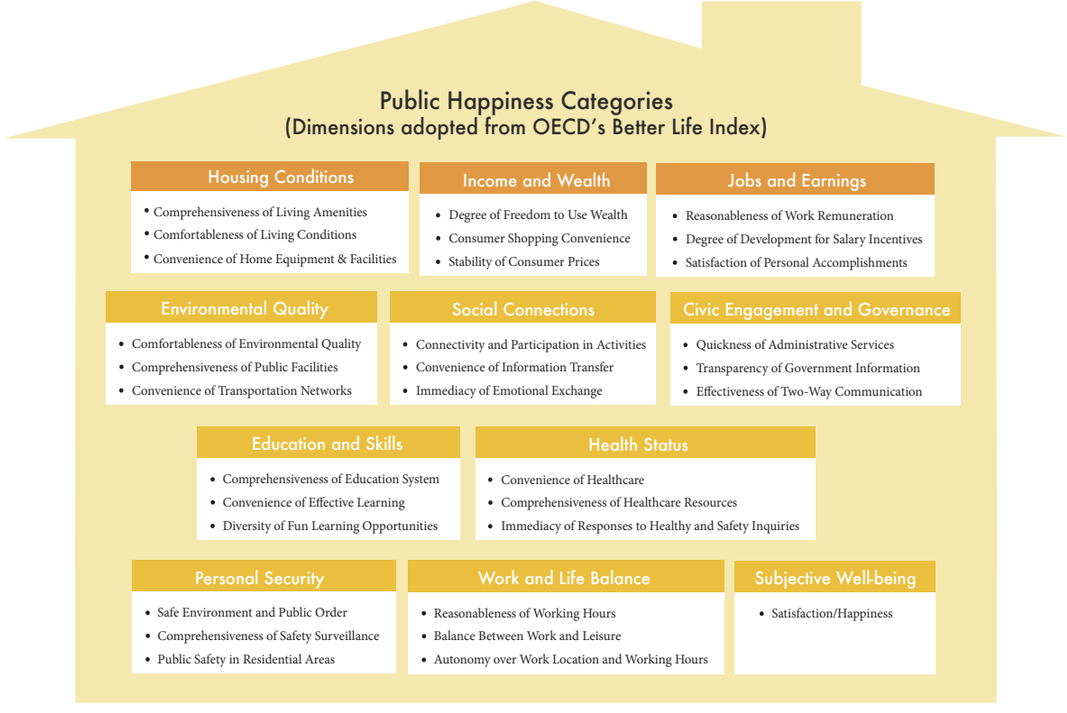
In light of public needs, the Executive Yuan prioritized key objectives for the content and scope of coverage for mobile broadband services, earmarking NT$15 trillion and inviting 11 relevant ministries through its Board of Science and Technology to jointly plan the *Acceleration of Mobile Broadband Service and Industry Development Initiative*. Using the three focal points of universal service, environment optimization, and industrial upgrade to implement a mobile broadband development environment, the government hopes to give birth to the first wave of new 4G innovative application services by the end of 2014.

2-3 Digital Quality of Life

By continuing to promote the *Smart Taiwan Project* as the main pillar of its *2012-2016 National ICT Development Initiative*, the Executive Yuan hopes to enable the public to experience the benefits of ICT. One of the performance indicators for the preceding initiative is to reach a penetration rate of 65% among the public for enjoying all kinds of innovative technology application services in their daily lives by 2016, and to attain a public satisfaction rate of 70%. For this reason, the Board of Science and Technology of the Executive Yuan carries out the *Digital Quality-of-Life (D-QoL) Survey* once every year in order to understand the public's usage and satisfaction concerning application services related to the *Smart Taiwan Project*.

From emphasizing economic development to stressing public happiness, the international community mainly hopes to be able to understand whether the quality of life for the public is becoming better. The *Better Life Index (BLI)* constructed by OECD uses living conditions and quality of life as starting points to cover 11 areas of life and to convey the state of the general public's well-being. Whereas living conditions consist of income and wealth, jobs and earnings, and housing conditions, quality of life encompasses the following eight areas of life: health status, work and life balance, education and skills, social connections, civic engagement and governance, environmental quality, personal security, and subjective well-being. In light of the *BLI* framework, the Directorate General of Budget, Accounting and Statistics (DGBAS) of the Executive Yuan instituted the *Gross National Happiness Index* in 2011 to understand the needs of the general public and to measure the progress of the aforementioned conditions in residents across the island. In the wake of further science and technology development, rapid formation of information societies, and closer integration between lifestyles and information societies, the public's well-being within information societies has indeed become a noteworthy topic.

In the future, the Board of Science and Technology of the Executive Yuan will use the OECD's *BLI* as a reference in the establishment of the Taiwan-specific *ICT-Enabled Better Life Index*. Using this index, the government plans to examine whether the public's quality of life is improving as well as measure the public's satisfaction with current digital quality of life. This understanding will enable the government to gauge the degree of influence that each dimension of digital services has on digital life happiness while also serving as an important reference for promoting digital service development. The content of the *ICT Enabled Better Life Index* is shown below in • Figure 4.



Source: III-FIND

• Figure 4 ICT *Enabled Better Life* Index Categories

Chapter 3 DEVELOPMENTAL TRENDS IN DOMESTIC AND INTERNATIONAL ICT POLICIES

Important Issues and Trends in ICT Policies Worldwide

This six key policy issues and future trends gleaned from the ICT policies of foreign countries that are applicable to Taiwan.

Future Direction of Taiwan's Smart Lifestyle

3-1 International ICT Policy Trends

The rapid evolution of ICT has triggered great societal, economic, and environmental changes and no country can stay aloof from these developments. In order to stay abreast of the next growth trend in international ICT (what's next), this section analyzes the importance of worldwide ICT policies, summarizes ICT policy trends, and then offers a vision for the future direction for ICT developments and transformation.

3-1-1 ICT Policies Worldwide

The government of Taiwan recently collected a list of the latest 2012-2014 ICT prospective policies from countries that compete and collaborate with Taiwan, such as the United Kingdom, the United States, Japan, South Korea, Singapore, Hong Kong, and China.[13, 14, 15] These policies are detailed in • Table 11 below.

• Table 11 Worldwide ICT Policies 2012-2014

Country	Policies	
UK	• Connection Vouchers Scheme • Open Data White Paper • Broadband Policy • Broadband Scorecard	• White Space • Government Cloud Strategy • Net Neutrality
US	• Gigabit City Challenge • Big Data Research and Development Initiative • Wireless Innovation and Infrastructure Initiative • Net Neutrality	• White space • High-Speed Broadband • Federal Cloud Computing Strategy
Japan	• Declaration to be the World's Most Advanced IT Nation	• Mechanisms for Promoting the Development of Innovative ICT Cities
South Korea	• Information & Communication Technology master plan for Korea • Giga Internet Strategy • Creative 5G Mobile Strategy • The Establishment of Three New Growths' IT Convergence Ecosystem	• Internet of Things master plan for Korea • ICT R&D medium-long-term strategies • Comprehensive Action Plans to realize the creative economy • Idea All.net
China	• 12th Five-Year Plan for Communications Sector • 12th Five-Year Plan for the Internet of Things	• 12th Five-Year Plan for the Internet Sector • 12th Five-Year Plan for the Digital Television and Digital Home Industry
Singapore	• Infocomm Media Master Plan	
Hong Kong	• Digital 21	

Source: III-FIND

3-1-2 Focal Points in Worldwide ICT Policy Initiatives

Through documentary research and in accordance with the ICT ecosystem classifications of contents, platform, network, and device (CPND), the government has sorted out key items currently being promoted overseas that are to be slated for ICT policies. Details are shown in • Table 12.

• Table 12 Major ICT Policies Worldwide 2012-2014

Country	Contents/Data	Platform	Network	Device/End User
UK	• Open Data	• G-Cloud • Super-Connected Cities	• Broadband Quality • Broadband Universal Coverage • White Space	• White Space End-User Devices
US	• Big Data	• Gigabit City • G-Cloud • Workforce Virtualization	• High-Speed Broadband • Net Neutrality • 4G Universalization • Super Wi-Fi	• OTT End-User Devices
Japan	• UHD（4K/8K） • Big Data • Open Data	• ICT Innovative Cities • Smart Work	• Next Generation Network • 4G Universalization	• 3D Printing Machines • Smart TV • Digital Billboards
South Korea	• Hologram • UHD/3D • Big Data	• IoT Platform • m-Cloud • ICT D.I.Y	• Giga Internet • 5G Mobile • Giga Wi-Fi	• 3D Printing Machines • Smart TV • Tele-Screen
China	• 3D/UHD	• IoT（Smart Cities）	• Broadband Penetration • Triple Play • 5G Mobile	• 3D/Smart TV
Singapore	• Digital Harbour	• Logistics Industry IoT Platform • Computational Thinking	• HetNet	• Medical Sensing Devices
Hong Kong	• Open Data to the Public	• Smart City Infrastructure • Innovation and Collaboration Platforms	• Campus Wireless Networks	• Electronic Public Accounts • Electronic Checks

Source: III-FIND

The main focus of these countries' promotion of ICT policies before 2020 is classified and sorted as follows:

- **Contents**: The areas the countries are promoting in their prospective ICT polices include ultra-high-definition (UHD) and ultra hologram full pixel content, open data, and problem-solving information applications.
- **Platforms**: The platforms that the countries are promoting in their prospective ICT polices are geared towards making government cloud services mobile, using smart cities to incorporate and implement ICT applications, and collecting and implementing creative O2O (Online to Offline) fields.
- **Networks**: The networks that the countries are promoting in their prospective ICT polices consist of the rapid development of high-speed mobile broadband (e.g., the universalization of 4G and development of 5G), network neutrality, broadband quality, and network convergence universalization to achieve smart Internet.
- **End-User Devices**: The devices that the countries are promoting in their prospective ICT polices encompass 3D printers for printing innovative creations, sensing technologies used in personal wearable devices, smart network televisions as the center of household digital convergence, and UHD and 3D televisions.

3-1-3 Important Issues and Trends in ICT Policies Worldwide

The following is a summary of the six key policy issues and future trends gleaned from the ICT policies of foreign countries that are applicable to Taiwan:

- Seamless Mobility via High-Quality Broadband Networks: With the rapid penetration of LTE 4G broadband, utilization of Super WiFi for white space under the digital television broadcasting conversion, and enhancement of second-generation Giga WiFi, mobile networks no longer only compete on the basis of Internet access speed. Instead, the issue that ICT policies must address is how to use various kinds of mobile network technologies to realize a seamless mobile network environment.
- Basic Net Neutrality of Digital Convergence: The rapid expansion of the Internet, the intensity of information exchange and transmission, and the popularization and development of various types of application services have brought up the issue of network resource allocation and utilization. Under digital content convergence, digital videos are streamed freely between different networks. In the future, every country must resolve the net neutrality issue between content providers and telecommunication companies.
- Implementation of Smart Networks by Giga Smart Cites: When Internet speed reaches the Giga level and during the promotion of various smart network applications, governments face the issue of whether to provide universal coverage or whether to conduct location promotion. Internationally, countries are using cities as agents for location promotion and prioritizing the implementation of smart networks for research universities or cities with technology parks in order to keep pace with innovation.
- ICT and Public Creativity (ICT+Creativity): In recent years, governments of countries worldwide have endeavored to collect and share the public's ideas through ICT platforms. In addition, they also have utilized 3D printing machines and other equipment to enable individuals (or entrepreneurial teams) to make their own creations a reality. Through such efforts, governments hope to create a basic infrastructure for innovation and entrepreneurship, which in turn also enhances innovations centered on people's lives.
- Cloud-Enabled Work-Life Balance (Smart Work, Work Smart): The pairing of cloud services with smartphones, tablets, and other handheld mobile devices has introduced a large quantity of "bring your own device" (BYOD) applications into the public sectors and within enterprises. BYOD and flexible cloud applications on the job have brought about a beneficial work-life balance for individuals.
- UHD/3D Smart TV as the Household Hub for Both Image and Information: Televisions have developed and transformed from first-generation black-and-white televisions to second-generation color televisions. In recent years, such development has made large strides with third-generation digital televisions. Next-generation televisions must have ultra high-quality image capabilities such as UHD resolutions and 3D displays, be able to connect to the Internet with high speed, and provide rich content. Furthermore, through services such as Smart UHD/3D TVs and connections to healthcare, interactive learning, location-based environment, and traffic information (e.g., weather, air quality, etc.), the public can enjoy a smart lifestyle.

3-1-4 ICT Movement Towards Hyperconnectivity

The concept of hyperconnectivity first appeared in a 2005 article entitled "Local Virtuality in an Organization: Implications for Community of Practice." Hyperconnectivity is best explained as "the availability of people for communication anywhere and anytime."

In 2007, Time Magazine published a commentary piece titled "The Hyperconnected" stating that as mobile Internet and mobile devices become increasingly advanced and ubiquitous, people will be even more closely connected through all kinds of social networks. A year later in 2008, Gartner proposed that "the hyperconnected enterprise" is the next wave of business trends. In 2011, Akamai illustrated how the increase in networking devices brought about the "hyperconnected world of devices." In 2012 and 2013, in light of global network readiness development, the WEF raised issues related to "living in a hyperconnected world" and "growth and jobs in a hyperconnected world."

From the above descriptions of living in a hyperconnected world along with worldwide ICT policy trends, it is evident that in recent years, following the rapid development of the Internet and networking devices, the Internet has created various possibilities for connectivity. Not only has it expanded person-to-person connection, it has also brought about the connection between humans and machines, as well as machine-to-machine connections. Such evolution demonstrates that hyperconnectivity has become the ICT paradigm.

With the rapid development of mobile devices, big data, and social networks, hyperconnectivity has made such large strides that the degree of connectivity between daily items and individuals has been substantially increased. A hyperconnected society is different from previous digitized, mobile, and ubiquitous trends in which emphasis was placed on information technology. Using the individual as the starting point, hyperconnectivity focuses on quick and easy communication anytime, anywhere, with any device on any network. The development of hyperconnectivity can bring about a profound change in the entire society functions. Thus, the relationships and communications between people, between customers and businesses, and between the public and the government have all been redefined. In the future, hyperconnected societies will use ICT as the foundation to link individuals and their creative ideas together to create a new wave of national development while transferring information societies into innovation societies.

From the ICT policy trends mentioned above, three principles are concluded: (1) ICT infrastructure must provide a hyperconnected environment; (2) end-user devices and application services must go from smart to smarter; and (3) the last mile for the promotion of ICT is to utilize both readiness and usage as the building blocks to resolve social problems and to create economic value.

3-2 Current Status of ICT Policies in Taiwan

Under a competitive environment emphasizing globalization, digitization, and sustainability, the critical issue for Taiwan is to continually enhance its overall competitiveness which will in turn guide the domestic enterprises to go international and bolster demands of domestic industries. In recent years, ICT applications have been acknowledged worldwide as the key to tackle societal development issues, such as withstanding global economic crisis, driving industry transformation, and enhancing national competitiveness.

3-2-1 4G Mobile Broadband

In October 2013, Taiwan completed the release of its 4G mobile broadband licensing. At the end of May 2014, 4G services successively went into operation, which marked a new milestone of the island's high-speed mobile broadband services. Therefore, Taiwan officially entered 4G era in which both the citizen's quality of life and the country's overall competitiveness were enhanced through the construction of a friendly mobile broadband environment.

The Board of Science and Technology of the Executive Yuan has specifically partnered with relevant ministries to jointly put forth a plan for the *2015-2017 High-Speed Mobile Broadband Services and Industry Development Initiative*. In terms of service coverage, the public will be able to use 4G handheld devices to enjoy high-speed and convenient mobile video services, including seamless communication and video services on Taiwan's High Speed Railway (HSR), the National Palace Virtual Museum, HD micro-films, real-time interactive animation videos, and on-the-go learning programs. Each local government will also work to integrate its own uniqueness into innovative applications— smart business districts, smart tourist parks, hi-tech interactive parks, smart transportation services, smart community health services, smart mobile commerce centers— to create an internationally renowned broadband smart city.

In terms of environment optimization, the government hopes to expand signal coverage to at least 50% of the population in rural areas inhabited by aboriginal tribes. Besides, the government also plans to look into the needs of senior citizens and disadvantaged groups in order to develop related technology products and applications, transforming the 4G broadband network into affordable daily assistances. At the same time, the government looks to not only strengthen and expedite base station constructions in public areas as union stations but also build disaster defense mobile systems in potential disaster regions to boost the efficiency of disaster prevention and relief efforts. The government also plans to establish another disaster information broadcasting platform, the Cell Broadcasting System (CBS), for the sending out real-time alerts and warnings to residents in high-risk areas during earthquakes, storms, landslides, and other natural disasters.

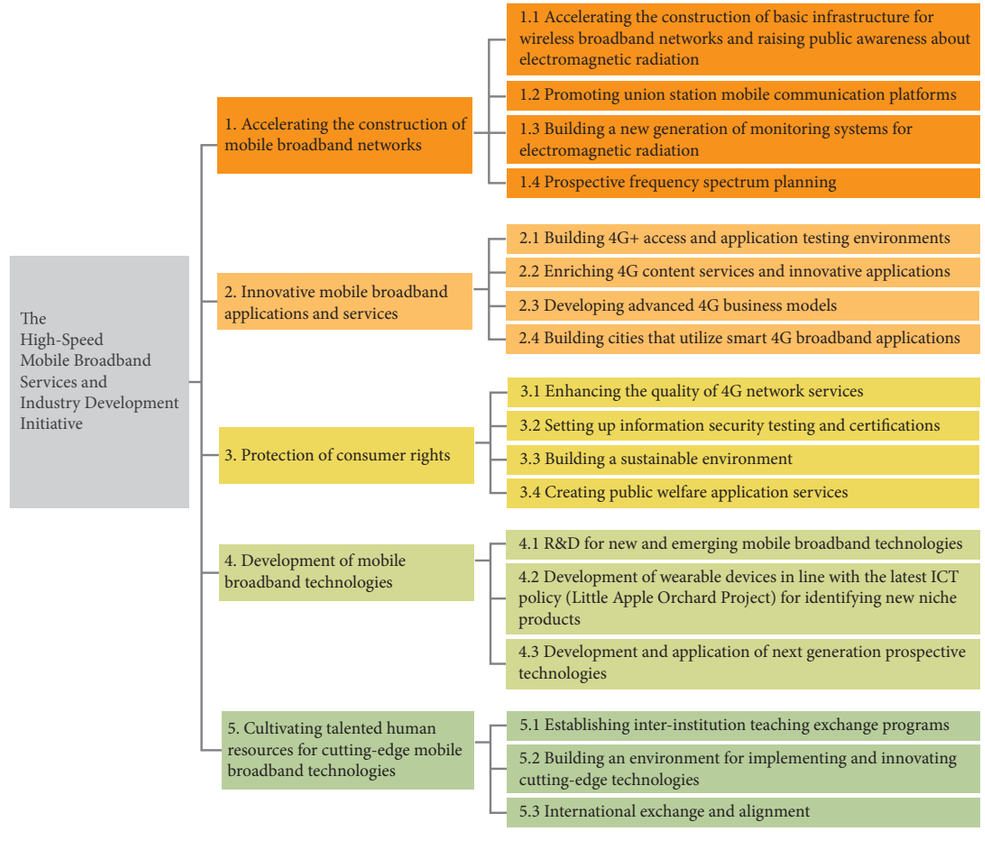
As for industry upgrade, enterprises will be benefited from 4G by expanding domestic and international business opportunities. Other businesses such as equipment manufacturers and product developers can all grasp key technology trends as well as value creation spaces through the adoption of 4G/5G network and strategies built on it.

The performance indicators for the initiative include:

- Reaching 90% 4G coverage;
- Reaching 10 million 4G users;
- Establishing a field of heterogeneous networks for B4G innovative application certification and equipment testing;
- Developing rich and innovative digital content services, fostering talent for content creation, building MIT brand/content for international trading and communicating;
- Creating an advanced 4G business model along with the world's first 4G hi-tech interactive business district;
- Building cities that utilize smart broadband applications and creating a new lifestyle of convenience for the public through science and technology; and
- Developing independent key technologies, creating the next generation of mobile broadband communications technologies, and fostering talented human resources for cutting-edge mobile broadband technologies.

In total, these efforts are estimated to generate NT$70 billion worth of business opportunities every year in Taiwan. Furthermore, in 2017, the number of standard basic patents owned by Taiwan companies is projected to account for 4% of all global patents, thus lowering the annual cost of patent licensing fees for domestic manufacturers by NT$40 billion.

Details and strategies regarding the *High-Speed Mobile Broadband Services and Industry Development Initiative* can be seen in • Figure 5.



Source: The Board of Science and Technology of the Executive Yuan

• Figure 5 *High-Speed Mobile Broadband Services and Industry Development Initiative* Details and Strategies

3-2-2 Digital Convergence

In response to industrial and regulatory changes brought about by digital convergence, the government passed the *2010-2015 Digital Convergence Policy Initiative* in 2010. Adapting to rapid environmental changes, in May 2012, the government approved amendments to the *Digital Convergence Policy Initiative,* hoping to attain its vision of creating a high-quality digital convergence lifestyle, forging a digital convergence industry, and enhancing the competitiveness of the island for the next generation. The seven major pillars for promoting the *Digital Convergence Policy Initiative* are explained in detail as below:

- **Establishing Comprehensive High-Speed Broadband Networks:** In order to provide residents with high-quality network services, Taiwan is developing new convergence services, integrating wireless networks and wired networks, and completing the progressive rollout of broadband convergence networks across the island. The construction of fiber optic networks will bolster the installation of wireless broadband access networks and offer high-speed broadband services; promote the effective utilization of frequency spectrums, telecommunication numbers, network resources, network addresses, and other key resources; and enhance broadband penetration, as well as bridge the digital divide, all of which will enable residents to enjoy various kinds of innovative application services at any place, any time.
- **Accelerating the Digitization of Televisions:** In order to provide the public with diverse audiovisual services and high-quality program content, the government is advancing HDTV development, accelerating the digitization of both cable and wireless TVs, and promoting the development of multicultural convergence to encourage the production of high-definition programs, help expedite the digitization process for televisions, supply residents with a diverse selection of audiovisual programs, and facilitate the integration of convergence services.
- **Establishing New Video Services:** The rise of smart network televisions has broken down the barriers between televisions and computers. By simultaneously combining the functionalities of televisions and computers, these electronic devices not only offer video services, but also provide access to the Internet, web service platform applications, and other related functionalities that were previously only accessible through computers. Through promotional measures that streamline new video service management, integrate new access points and channels, and create robust video content management, the public is able to obtain multiple services via a single delivery platform. Furthermore, these advancements will also create an environment conducive to the development of new video services and enhance the development of digital content in Taiwan.
- **Enriching Television Program Content:** At the end of June 2012, Taiwan shut down analog wireless television signals, successfully converting to wireless digital signals across the island. Upon entering the first year in the era of high-definition digital TVs, there arose a need for the government to increase the amount of diverse, high-quality digital media content through promotional measures that integrated resources to revitalize television and movies, construct a digital media center, and create a mechanism for tracking new media viewership. In turn, these efforts enhanced the quality of digital media and content, fostered the development of outstanding human capital, and ultimately expanded such efforts into international markets.
- **Promoting Telecommunications Convergence Services:** In response to the rising popularity of smartphones and third-generation mobile communications, as well as the substantial increase in consumer demand for value-added mobile application services, the government implemented measures to promote value-added mobile application services and improve the developmental environment for creating innovative mobile application services. These actions have enabled the industry to create innovative convergence application services, strengthen value-added mobile application services, standardize cross-industry integration, and protect consumer rights to ultimately create a fast, convenient, and safe environment for mobile telecommunications application services.
- **Advancing the Communications Industry:** In order to strengthen the development of digital convergence human capital and related technologies, the government has implemented various measures to boost investment in the convergence industry, enhance industry sales and personnel training, protect local culture and consumer rights, promote technology standardization and international collaboration, and encourage the development of smart network televisions. These actions have resulted in the effective integration of the communications industry's upstream and downstream supply chain, bringing Taiwan closer to the development of a 'one-time production, multi-process, multi-platform delivery, multi-function service' that combines the protection of local culture and consumer rights.
- **Fine-tuning the Digital Convergence Regulatory Environment:** With the gradual integration of the telecommunications and broadcasting industries, original regulatory framework can no longer meet the needs brought about by such industry transformation. By establishing the basic principles for a convergence regulatory framework, adjusting telecommunications regulatory norms, revising broadcasting regulatory norms, improving convergence content management, completing legislation to promote the digital media content industry, and bridging the digital divide with universal convergence services, the government has oriented the previously vertical regulatory framework towards a more horizontal regulatory framework (which includes transfer networks, platforms, content applications, etc.), thereby eliminating cross-industry competitive barriers and fine-tuning existing convergence regulations.

3-2-3 e-Commerce

The environment for B2B e-commerce development in Taiwan is already very mature. Over the past few years, the government has focused on promoting online shopping and web innovation. In particular, the government has not only assisted individuals, as well as small and medium enterprises (SMEs) in running auction sales or opening shops online, but has also internationalized large platforms and linked traditional enterprises with e-commerce innovations. In addition, providing assistance to web 2.0 startups so they can flourish internationally and obtain capital injection has also been an important link in the task of promoting e-commerce. With the three goals of building a basic environment, spurring innovation incubators and business promotions, and internationalizing large-scale promotions, the Department of Commerce of the Ministry of Economic Affairs has advanced e-commerce, covering all related tasks through the *Innovative Cloud-Based e-Commerce Application and Basic Environment Establishment Initiative, Innovative Online Community Service Development Initiative,* and *Chinese-Language e-Commerce Technologization and Internationalization Initiative.*

Since 2000, various enterprises in Taiwan have consulted PayPal's model for providing third-party payment services for e-commerce transactions. Currently, third-party payment service providers in Taiwan can provide transfer and collection transfer services under current financial supervision regulations. Furthermore, after obtaining qualifications from credit card companies, these third-party payment service providers can supply credit card payment processing services to small-scale online stores that are unable to meet the qualifications required by credit card companies. In terms of prepaid stored-value services, it is necessary for service providers to comply with the current and relevant law (Business Regulations Governing Entities Issuing Electronic Tickets), which governs non-financial institutions providing multi-purpose stored-value products.

The maximum monetary value stored for each ticket is NT$10,000, and funds cannot be transferred between tickets (since person-to-person e-commerce transactions are not supported). Moreover, monetary value stored in prepaid services cannot be withdrawn or transferred due to restrictions.

In the future, within four months after the implementation of regulations pertaining to third-party payment service providers, current banks with collection and transfer payment services will be required to propose a business restructuring plan in order to obtain a license to become an authorized electronic payment service provider. Both banks and non-financial institutions can apply for and obtain this license. However, non-financial institutions must provide collection and transfer payment services and be licensed by the Financial Supervisory Commission within six months after the implementation of the aforementioned regulations in order to handle prepaid stored-value and bank account transfer services, provided that these organizations do not apply for prepaid stored-value or bank account transfer service separately. In addition, non-financial institutions must have a minimum capitalization of NT$300 million and total prepaid stored-value of all currencies cannot exceed NT$30,000. While substanceless transactions have been opened to the public, service providers must deposit all funds from collections, payments, and prepaid stored-value services into one specific bank and apply for a trust. When the users of third-party payment services provided by banks and non-financial institutions would like to withdraw a certain amount of cash from their account, that amount will be transferred to a specific bank account, and verification of their real names must be completed. Limits regarding single and same-day transfers will all be delineated in the sub-regulations.

3-2-4 Cloud Computing and Big Data

In 2012, the Executive Yuan looked at application needs within the domestic market and competition in industrial technology among international markets. Based on its findings, the Executive Yuan decided to promote its cloud computing application and industrial development measures via the following five areas: (1) encouraging the public to take advantage of applications, (2) building infrastructure for software systems, (3) harnessing green energy efficiency, (4) establishing cloud computing infrastructures, and (5) setting up the capabilities for developing innovative applications. By creating cloud computing applications that were beneficial to the public, the government hoped to educate the public and make cloud computing and related technologies universal and accessible. All in all, these initiatives not only facilitated the transformation and upgrade of Taiwan's ICT industry, but also helped the island realize the benefits of cloud computing infrastructure in the form of green energy savings and manufacturing cost reductions.

The current strategies and initiatives for advancing cloud computing in Taiwan are centered on building government cloud services to spur development within the ICT industry. At the same time, with a primary focus on promoting applications and a secondary focus on building platforms and infrastructure, the government has adopted a "software first, hardware second" policy to encourage both government agencies and private enterprises to leverage existing tools and technologies to develop cloud computing and construct testing platforms for application development. By matching supply and demand for building cloud computing applications on the one hand and the refinement of local cloud computing solutions on the other, the government aims to ultimately apply the results of local research efforts to various government cloud computing applications.

Currently, government-driven cloud services in Taiwan cover a variety of fields including food, health, environment, agriculture, transportation, mapping services, disaster prevention and relief, education, and culture. These pilot cloud services will be completed in succession by 2016 and will be open for public and business use.

Thanks to cloud computing technology, the preceding types of data covered by government-driven cloud services can all be recorded and preserved over the long-term. Over time, through the constant accumulation of data, the database will contain enormously large quantities of data and become a highly valuable resource for individuals, businesses, and the government. The big data phenomenon will first impact the commercial sector and then the political, social, and cultural sectors. With big data, hypermarkets can easily speculate and determine household composition and dietary habits of regular customers; telecommunications companies can easily project their customers' daily whereabouts through mobile phone based registrations; and the government can easily pinpoint key areas of social welfare services for senior citizens through sales data for specific medical products. As shown in the previous examples, the business motives for using big data can be extended to serve political and social purposes. The implication of big data is clear: Whoever uncovers and provides new business services as a result of collecting and mining big data will reap first-mover advantages to come out ahead of the competition and create a new wave of growth and innovation. For this reason, big data is no longer just restricted to the information technology industry—it is now a major trend that every government agency and business industry must understand and utilize to its advantage.

Cloud computing and big data go hand-in-hand. In the future, the government plans to use cloud computing applications and industrial development measures to educate the public on cloud computing in order to advance the idea of cloud computing, make cloud computing technologies universally available, and harness the green energy savings and manufacturing cost reductions associated with cloud computing infrastructure within three years. In addition, the process of transforming and upgrading the ICT industry into a cloud computing industry will turn Taiwan into a technologically independent island that will be able to provide cloud computing systems, software applications, system integrations, and service operations. In the long-run, by developing the island into a model of the heavy usage of cloud services by government agencies, businesses, and residents, the government hopes to not only universalize, but also export cloud computing applications.

3-2-5 Open Data

The public policy issues of creating government transparency and increasing public participation have become hot topics in countries around the world. Releasing government data in Taiwan contributes to the flow of information across government agencies, enhances public administration effectiveness and efficiency, raises the quality of the decision-making process within all levels of government and between different government agencies, satisfies the needs of the public and private sectors, and empowers the public to oversee the government and hold it accountable. As they enter the age of cloud computing and mobile services, many countries face the issue of limited government resources. Thus, it is vital for the government at this stage to leverage the public's unlimited creativity, coordinate the use of open data, promote value-added applications of open data, and develop convenient interagency services for the public in order to establish itself as an electronic government (e-gov).

The government has outlined three steps and four strategies to achieve the task of building an open government database platform. The three steps consist of (1) opening data for public and business use, (2) offering services generally for free and only charging fees for special cases, and (3) using heavy automation and the systematic release and exchange of data. The four key strategies entail (1) being proactive in opening data to the public and prioritizing public welfare; (2) formulating standards for open data; (3) promoting a common platform (data.gov.tw); and (4) offering demonstrations and related services to the public. Data that provides convenience and enhances the quality of life for the Taiwanese people is given priority in the open database. These include food and dining, health and medicine, entertainment and recreation, housing, transportation, employment, culture, economic development, and other information related to improving quality of life.

According to the government's official open database platform website (data.gov.tw), there are already over 2,000 datasets available for download as of September 10, 2014. (See • Table 13 below for details on the classifications of data provided.)

Table 13 Data Type of Taiwan's Open Data Platform (data.gov.tw)

Main Category	Quantity	Service Category	Quantity	Data Type	Quantity
-Census Statistics	827	-Public Information	1,394	-Raw Data	2,493
-Maps	143	-Leisure and Travel	254	-System Interfacing Programs	49
-Quality of Life	190	-Safety and Quality of Life	308	-Other	12
-Tourism	181	-Transportation and Communication	179	-Mobile Applications	2
-Arts and Cultural Activities	145	-Studying and Learning	103		
-Disaster Prevention and Relief	45	-Jobs and Careers	97		
		-Investment & Financial Management	63		
		-Medical Treatment	121		
		-Elections and Voting	20		
		-Entrepreneurship	12		
		-Reproductive Healthcare	14		
		-Elderly Nursing Homes	17		
		-Buying Homes and Moving	9		
		-Birth and Adoption	3		
		-Life Etiquette	2		
		-Military Service	5		

Source: data.gov.tw; Compiled by III-FIND

3-3 Future Direction of Taiwan's Smart Lifestyle

The strength of a nation's e-competitiveness is reflected in its government, industries, and the degree of popularity and familiarity with IT applications among the general public. The various kinds of convenience brought about by the assimilation of information technologies into everyday life enables citizens to feel the impact of policies and information technologies, as well as the progress of a nation's overall development. Smart lifestyle is a new realm created by the utilization of information technologies and digital environments. It provides convenient and fast services that enhance the quality of life of the public. It pursues lifestyles of health and sustainability (LOHAS), social consciousness, and bolsters the economy with low-carbon lifestyles, as well as environmentally friendly coexistence and prosperity.

In general, smart lifestyle is a set of lifestyle values, choices, and practices. In its pursuit of a quality of life characterized by convenience, health and sustainability, and social concerns, a smart lifestyle is compatible with the principles of economic development and environmental protection. Undoubtedly, ICT plays an integral role in realizing the success of future smart lifestyles. In the next section, Taiwan's promotion of smart lifestyles is examined from the angles of safe agriculture, healthcare, crime and disaster prevention, transportation and tourism, lifelong learning, and creative lifestyles of health and sustainability (LOHAS).

3-3-1 Safe Agriculture

Food is, without a doubt, an integral part of daily life. The food industry is certainly one of the most basic and essential industries that govern people's livelihood. But even more importantly, it has a strong correlation with public health. Since the food industry supply chain is both diverse and complex, information transparency is a very critical issue. For this reason, supply chain transparency deals with the two main issues of food traceability and food history. Food traceability refers to the ability to track any food through all stages of production, processing, distribution, and sales. It enables all related information regarding the movement of any food to be traced one step backward (upstream) and one step forward (downstream) in the supply chain. Food history, on the other hand, refers to the practice of recording all information related to any food before the sales stage. Such information includes a food's raw materials, soil, breeding or cultivation, post-harvest handling, processing, manufacturing, distribution, and transportation.

In order to attain complete food traceability with various types of food products and lengthy supply chains, the future direction for promoting safe agriculture in Taiwan is as follows:

- **Promoting Good Trace Practice (GTP):** In order to guide domestic industries in the process of implementing food traceability, the government plans to establish GTP standards and regulations in the future. Since this measure targets domestic food traceability standards, it will not only include information, technology, management, and service but also provide detailed guidelines for domestic industries to reference. At the same time, the government will also promote related policies and programs.
- **Establishing Food Traceability Through Demonstration Systems:** In the future, the government looks to further leverage the bargaining power of downstream distributors to consolidate the agricultural sector in order to establish a supply chain with complete food traceability. To illustrate this, it is useful to take the food cloud established in 2013 as an example. Through a special initiative, the Industry Policy Division of the Industrial Development Bureau of the Ministry of Economic Affairs not only screened and selected a representative sample of businesses within the four major areas of fresh produce supermarkets, chain restaurants, school cafeterias, and meat-processing plants to serve as demonstration systems, but also assisted these downstream suppliers in establishing their own private cloud systems. Working in concert with the preceding efforts, the Council of Agriculture advanced and strengthened the food history information system for related upstream suppliers. Furthermore, the food cloud initiative helped intermediary businesses between the agricultural suppliers and downstream distributors establish traceability systems and adopt informationization. Through interagency cooperation, the government hopes to help industries establish complete systems that provide full food traceability for both upstream and downstream businesses in the supply chain.
- **Strengthening Platforms and Combining Related Food Traceability Platforms:** The use of cloud computing technologies in strengthening food traceability systems is extremely paramount. Therefore, food traceability systems must consider a series of forward and backward information flows, along with the establishment of standard processes for relevant operations. Moreover, because the operating procedures and information application frameworks used within each platform or each demonstration system vary, the task of communicating and standardizing information that is shared across these platforms or demonstration systems will be even more critical in the future.

In September 2014, the Executive Yuan announced the establishment of the "food cloud." In the future, the entire food industry in Taiwan will make use of electronic invoices. Beginning on October 31, 2014, cooking oil will be the first food product placed under management and supervision. Thereafter, eight categories of food products (e.g., fresh seafood, meat products, etc.) will follow suit on February 5, 2015; sugars, starches, and other staple cereal products will be included in July 2015; and other food products will be placed under management in different phases according to their respective risk levels beginning at the end of 2015.

The establishment of the food cloud makes the process of tracking food traceability electronic. This means that the flow and history of any food can be known within a few minutes. Furthermore, the construction of this massive database also serves as a powerful tool for the Food and Drug Administration of the Ministry of Health and Welfare. In the future, the agency can aggregate and analyze large amounts of data and take immediate action based on warning signs gleaned from the data, instead of issuing product recalls only after the outbreak of food safety incidents.

The Executive Yuan has also proposed the concept of a "food safety iron triangle" where the government, businesses, and the public work together as a triumvirate to ensure food safety. While the government is in charge of overseeing the business practices of enterprises, the public must be bold and report issues and misconduct. Only the implementation of this key concept will make it possible to uproot unethical and unscrupulous businesses from Taiwan.

3-3-2 Healthcare

As Taiwan gradually becomes an aging society, the demand for healthcare resources will inevitably continue to rise. In order to help residents access relevant resources more easily, the establishment of smart healthcare has become an urgent priority. Through the integration of smart information technologies, Taiwan's public healthcare system, which already enjoys great international prestige and recognition, will allow residents to experience higher medical service standards.

In September 2013, the Executive Yuan carried out the "healthcare cloud" initiative, which focused on the following key tasks: medical treatment, healthcare, health protection, and disease prevention.

- **Medical Treatment Cloud:** From sick or injured patients going to medical institutions, to the end of their diagnosis and treatment, the entire medical treatment process is within the purview of the medical cloud service. During this process, individual medical records will show a complete record of previous diagnoses and treatments. The method of producing electronic medical records differs greatly from the method of producing paper records as done in the past. While paper medical records required healthcare professionals to provide signatures as proof of responsibility, electronic medical records provide medical personnel with an exclusive IC card to provide electronic signatures as proof of authorization to access medical records. Moreover, the use of IC cards to provide digital signatures further enhances information security.
- **Healthcare Cloud:** The construction of the healthcare cloud is divided into two phases: the first phase implements case management for patients diagnosed with chronic illnesses and the second phase gradually expands this service to the general

public through the use of telehealth networks in order to conduct healthcare promotion and disease prevention. This program will provide healthcare services in communities, homes, or other care settings for people who have chronic illnesses or for disadvantaged groups. Ultimately, through a public information technology resource platform, the government hopes to improve the quality of care services by resolving inefficiencies stemming from the numerous types of IT resources controlled by different levels of care units and by encouraging patients to upload their medical information onto the cloud database.

- Health Protection Cloud: The purpose of the health protection cloud is to encourage value-added service businesses to develop a variety of innovative applications through the establishment of open data and cloud platforms; to enhance the added value of end-user devices manufactured in Taiwan; to drive the vigorous development of the smart end-user device software industry; to enable the public to access health-related information any time, any place; to give the public more control over their personal health information; and to strengthen self-health awareness, as well as empower individuals to make decisions concerning their own health. With the public and private sectors working together, services and products that are beneficial to the public health will become increasingly available. At the same time, the integration of databases and the development of internal support systems for handheld communications carriers makes it possible for the Ministry of Health and Welfare to more effectively respond to issues that arise and better meet the needs of the people.
- Disease Prevention Cloud: The primary goal of establishing the disease prevention cloud is to increase the service capacity of disease prevention information networks. The Ministry of Health and Welfare's original intention for promoting the disease prevention cloud is to use existing disease prevention information networks as the foundation for conducting analyses on application service requirements, database structures, information content, and user needs. The main focus of the application is to simplify the process of notifying hospitals of epidemic outbreaks, to shorten the time for epidemic outbreak alerts, to lower the personnel and time costs for these notifications, and to establish comprehensive disease prevention notification procedures and platforms in order to strengthen disease prevention measures and improve the results of epidemic prevention.

3-3-3 Crime and Disaster Prevention

As people increasingly upgrade toward a smart lifestyle, basic security of life and property become even more important. When natural and man-made disasters occur on a more frequent basis, they will have serious effect on social stability. Thus, preventing disasters and crimes is key to not only ensuring and enhancing the quality of life for residents, but also securing and protecting their basic rights. Today, with the help of information technologies, significant improvements have already been made in both crime prevention and crisis management.

Leveraging Big Data for Criminal Investigations: Big data technologies have been a popular topic in the past few years. The National Police Agency (NPA) plans to utilize every item of information contained in its existing police and security databases and extract useful information through GIS mapping applications, video imaging analyses, and other technologies to expand information content and enhance system functionality. In turn, the agency hopes to improve criminal investigations and better detect and prevent crimes in the future.

Using Image Analysis Technologies to Shorten Crime Investigation Time: Video surveillance systems have become a key focus in law enforcement work. Due to the tremendous quantity of image data, a substantial amount of manpower is needed to search and locate case-relevant information. Furthermore, weather conditions can significantly increase the amount of time required for investigations by affecting the quality of surveillance images or causing blurry images. Image analysis software is used to help police officers in their investigation of major cases or special events by enhancing image quality and shortening the time it takes to access images. As a result, police officers can quickly glean the desired image information with the aid of image analysis software and significantly reduce the amount of time and labor required for loading and searching through relevant video footages.

Moreover, Taiwan possesses complex geographic conditions such as mountainous terrains with crisscrossing geologic faults. Due to these fragile geological conditions, encounters with typhoons, heavy rains, and earthquakes can easily bring about severe damage to the island. Moreover, because the population in Taiwan is currently concentrated across various regions of the island, people's lives and properties are often threatened during natural disaster occurrences. In the wake of climate changes in recent years, which have exacerbated and increased the frequency of natural disasters, the central and local governments in Taiwan have successively rolled out disaster warning and analysis information systems to closely monitor natural conditions in order to provide early warnings and rapid responses to disasters.

In recent years, as mobile devices, sensing equipment, social media, and other types of information technologies become ever more advanced and widespread, leveraging big data to create smart applications has become the crux of the next wave of technology. As such, responding to the advent of big data for disaster prevention and relief, turning past experiences and lessons into wisdom applicable to disaster prevention and relief, and producing deeper insights and perspectives, as well as providing more accurate decision-making analyses through forecasting models and data samples are all major challenges for future disaster prevention and relief information applications. Details regarding the future direction of government initiatives in this area are as follows:

- To cope with the massive quantity of big data for disaster prevention and relief, the government is involved in ongoing efforts to build a highly-integrated information platform to strengthen integration and sharing capabilities.
- In response to the diverse content and rapidly-changing characteristics of disaster prevention and relief information, the government continues to standardize the mechanisms using such information in order to rapidly meet the demand of subsequent value-added applications.
- In response to the decision-making needs of smart disaster prevention and relief, the government is leveraging all types of relevant big data to strengthen big data analysis modules such as those that focus on disaster risk analysis, feedback and lessons from previous experiences, and history of disasters.

3-3-4 Transportation and Tourism

Since transportation and tourism affect the lives of all people, they are therefore integral aspects of a smart lifestyle. Smooth and safe traffic conditions are fundamental prerequisites for raising the quality of tourism. At the same time, they also have a significant impact on the quality of residential life.

Subsequent smart traffic initiatives in Taiwan will replace the previous emphasis on system and functionality with a focus on integration and service. The goal of these initiatives is to integrate transportation services across different systems and regions through the use of cloud computing technologies. In regards to traffic information, traffic control, public transportation, and tourism, the government plans to promote the following four smart traffic cloud computing initiatives: (1) traffic information service cloud, (2) regional traffic control cloud, (3) public transportation service cloud, and (4) tourism service cloud.

- Transportation Information Service Cloud: The purpose of the transportation information service cloud is to first gather all of the real-time traffic information previously distributed by local authorities in a uniform format and then filter and process the data to enhance its quality and stability, after which it will be available for public and research use.
- Regional Traffic Control Cloud: Using the segment between Hsinchu and Zhubei Interchange of the Sun Yat-sen Freeway as a demonstration area, the government plans to integrate traffic information provided by the Hsinchu City Government, Hsinchu County, Hsinchu Science Park, and Taiwan Area National Freeway Bureau. Through the concept of optimizing whole road network systems, the government seeks to implement traffic control and direction in this demonstration area.
- Public Transportation Service Cloud: Using the municipality within each district as the hub, and through standard communication protocols to integrate public transportation information for adjacent regions, the government plans to offer the public a single gateway through which to check public transportation information for a particular region.

  The application of information technologies in tourism includes developing online itinerary planning services, interfacing traffic and travel information, establishing crowd warning prototype systems for tourist attractions, creating detailed audio tour guides that provide tourists with detailed descriptions of each attraction, and integrating positioning technologies to establish indoor and outdoor navigation services in order to promote the integration of location-based services (LBS) and mobile tourism applications and to provide value-added services through interdisciplinary integration. Through networks, research, innovation, and the integration of industrial technologies, Taiwan can utilize tourism information extensively to provide tourists with all the information they need before, during, and after their trips.

3-3-5 Lifelong Learning

Lifelong learning is an important ability that is indispensable to individuals in today's society. The target demographics for the government's lifelong learning initiatives include women, new residents, the elderly, and disadvantaged groups. The government's lifelong learning programs extend fields of learning to households, communities, workplaces, and other areas of life. Furthermore, the use of information technologies not only increases the public's interest in lifelong learning, but also improves learning results. The future direction of the government's lifelong learning promotion efforts is as follows:

- The government plans to utilize digital concern to promote lifelong learning:
  - In regards to residents living in remote villages and townships, the government plans to promote the integration and use of resources in colleges, civic groups, and other entities to accomplish the following tasks: (a) helping local communities with the Digital Opportunity Center (DOC) or primary and secondary schools take advantage of the DOC; (b) implementing regional talent incubators, business incubators, and cultural incubators; and (c) expediting the process of enhancing digital usage opportunities and information literacy in senior citizens, women, new residents, and other groups. Through these efforts, the government shall employ digital development to implement local action.

- The government plans to continue using the Internet to offer various kinds of classes and resources for digital learning to provide aborigines with diverse learning programs, and to enhance the information literacy of the aboriginal population. The government also plans to supply the general public with rich content through multiple channels in order to raise public awareness of aborigines and their language, history, arts and humanities, and culture. In doing so, the government hopes to not only impart this cultural knowledge to future generations, but also further harness the creative economic strength of aboriginal cultures and increase the industrial competitiveness of aboriginal societies.
- In regards to new residents, the government plans to promote its new resident information literacy education program, which uses information technologies to provide new residents with resources and assistance. Next, the government plans to set up a digital e-media center for new residents, deploy related audio and video playback devices, carry out first information technology workshops, and counsel new residents on how to find solutions or relevant expert opinions for their issues over the Internet. Finally, the government plans to establish a comprehensive website portal for new residents on iTaiwan in order to facilitate cultural exchange and to enable new residents to share and express their daily life experiences.

- **Enhancing the Competitiveness of the Labor Force:** The government plans to continue offering online classes on labor rights and maintaining and operating its national labor education e-network and vocational training online university. At the same time, the government also plans to organize online and offline hybrid learning activities and continue encouraging the labor force to pursue lifelong learning.
- **Expanding the Scope of Digital Learning and Training for Small and Medium Enterprises (SMEs):** The government plans to expand the scope of application services by integrating cloud-based digital learning service platforms and other types of cloud services (e.g., software application services).
- **Digital Learning for Civil Servants:** The government plans to gradually increase the amount of high-quality teaching materials and courses, enhance the quality of training programs for civil servants, and expand online education for civil servants. These efforts will enable civil servants to absorb new knowledge and internalize new concepts on a constant basis and help them to respond to changes and new challenges.
- **Online Courses for Arts and Culture:** The government provides learners with access to learning content anywhere, anytime by using mobile learning methods to present short lesson units with diverse content that are compatible for various mobile devices. The government also plans to continue using science and technology to promote the cultural rights and practices of its citizens, create an environment for the arts, and protect and establish the value of culture in order to foster and enhance the cultural strength of Taiwan, which, in turn, ultimately increases the competitiveness of its creative industry.
- **Advanced Online Training for Teachers:** The government plans to increase new course content and serve online courses across the island in order to benefit even more teachers and students and to continue amplifying and improving platform services. The government hopes that the digital learning platform will utilize the web 2.0 spirit of openness, interaction, sharing, and contribution to fully realize the benefits of digital learning.

3-3-6 Creative Lifestyles of Health and Sustainability (LOHAS)

Creative lifestyle of health and sustainability (LOHAS) is not just an important chapter in the development of the smart lifestyle. Rather, it is an integral part of the smart lifestyle. Additionally, this lifestyle also connotes that a new society which greatly values creativity must be developed on the foundation of a creative industry that is mature. In other words, the use of ICT to advance LOHAS policies represents Taiwan's future development in terms of e-competitiveness. E-competitiveness will not only strengthen the creative industry, but will also make it possible for the island to strive towards a low-carbon LOHAS economy while pursuing global sustainable development.

The relevant applications of creative LOHAS in the future are provided below:

- Developing smart cities and unique characteristics of urban and rural areas as its main focus, the central government plans to integrate agency resources and existing counseling and subsidy programs to encourage local governments (six metropolises and six rural areas) to draft proposals for local industrial development projects that use smart technologies to promote and enhance smart transportation, high-quality tourism, leisure agriculture, and cultural and creative parks.
- The government plans to create medical management service networks centered on the health of individuals and communities. In addition, the government plans to use electronic medical records, telecare, healthy communities, value-added information, and other integration applications to establish comprehensive healthcare models and experiences.
- Using personalized services via the smart transportation cloud as its keystone, the government plans to utilize the transportation cloud infrastructure to expand integration applications for local transportation and tourism. The government also seeks to encourage businesses in the tourism, leisure, and service industries to integrate

smart cars and electronics to develop services centered on consumers, thereby providing innovative and personalized services that give consumers fast, seamless, and convenient real-time content.

- The government plans to establish cross-sector lifelong digital learning environments by using innovative learning methods to transform lifestyles. In response to industrial demands in the age of smart lifestyles and creative economies, the government plans to facilitate the mapping of key talent. At the same time, the government also plans to utilize smart technologies and field demonstrations to implement interdisciplinary lifelong learning projects.
- Using digital experiences to revitalize creative parks as the focal point, the government plans to encourage partnerships between manufacturers and local governments that spearhead efforts to take advantage of digital media and smart technologies in metropolitan areas and cultural parks. By combining creative stories and sensational elements to create diverse public spaces featuring multimedia entertainment, such public-private partnerships will certainly revitalize the creative industry in Taiwan.
- The government plans to construct social networks centered on the theme of smart lifestyles or LOHAS creativity to provide exemplary models of smart lifestyle applications and an environment for expressing thoughts, as well as a platform for the younger generation to showcase and share the products of their creativity. Through the means of interactive web services, the government plans to advance the public's awareness and participation in issues and policies related to smart lifestyles.

Creative LOHAS is not only a cornerstone in promoting smart lifestyles. It also represents an indicator of quality lifestyles. Furthermore, it also influences the future characteristics of industries in Taiwan, creating additional value that arises from aesthetic, creative, culturally-sensitive, and innovative information applications while also diversifying employment opportunities. It will also gradually lower the island's energy dependence stemming from economic development, making it possible to simultaneously pursue life quality and environmental protection. Therefore, the application of innovation, creativity, and integration in boosting industrial development and achieving a high-quality information society is not only the most fundamental requirement for creative LOHAS, it is also the key to transforming Taiwan into a low-carbon creative LOHAS economy while strengthening its e-competitiveness.

Reference

1. B. Bilbao-Osorio, S. Dutta, and B. Lanvin. 2014. *The Global Information Technology Report 2014.* World Economic Forum. Available at: http://www.weforum.org/
2. K. Schwab. 2014. *The Global Competitiveness Report 2014-2015.* World Economic Forum. Available at: http://www.weforum.org/
3. IMD. 2014. IMD World Competitiveness Online. Available at: https://www.worldcompetitiveness.com/OnLine/App/Index.htm
4. Waseda University. 2014. "Waseda–IAC 10th International E-Government Ranking 2014." Available at: http://e-gov.waseda.ac.jp/pdf/2014_E-Gov_Press_Release.pdf
5. World Bank. 2014. 2014. *Doing Business 2014.* The World Bank and the International Finance Corporation. Available at: http://www.doingbusiness.org/~/media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Full-Report.pdf
6. Z. J. Ács, L. Szerb, and E. Autio. 2013. *Global Entrepreneurship & Development Index 2014.* The Global Entrepreneurship and Development Institute. Available at: http://thegedi.org/global-entrepreneurship-and-development-index/
7. NCC. 2014. "The Brief Statistics of Communications-2014." Available at: http://www.ncc.gov.tw/english/news_detail.aspx?site_content_sn=278&is_history=0&pages=0&sn_f=1295
8. NDC. 2013. "2013 Individual/Household Digital Opportunity Survey." Available at: http://www.ncc.gov.tw/chinese/files/14012/3220_31601_140124_1.pdf
9. C. C. Han. 2014a. "Survey on the Current Situation and Demand of Family Broadband 2013—Household." Available at: http://www.find.org.tw/find/home.aspx?page=many&id=376
10. C. C. Han. 2014b. "Survey on the Current Situation and Demand of Family Broadband 2013—Individual." Available at: http://www.find.org.tw/find/home.aspx?page=many&id=386
11. R. D. Yang. 2013. *2013 Taiwan's Internet and Mobile Environment.* Institute for Information Industry.
12. Telecom Technology Center (TTC). 2014. "Second Stage National Mobile Broadband Speed Test Summary Report 2013." NCC. Available at: http://www.ncc.gov.tw/chinese/files/14012/3220_31601_140124_1.pdf
13. III-FIND. 2012. "International Forward-Looking Information and Communications Technology Policies and Trends Report."
14. III-FIND. 2013. "E-Competitiveness and Policy Trends Report."
15. III-FIND. 2014. "International Ultra-High Speed Broadband Application Policies and Trends Report."

Appendix 1 ICT Infrastructure in Taiwan 2011-2014

Category	Indicator	2011	2012	2013	2014	Note	Source
Fixed Broadband	FTTx Subscriptions (10 thousand households)	230.2	263.3	289.5	298.2	Except for data from June 2014, all other data are year-end figures	NCC
	Cable TV Subscriptions (10 thousand households)	506.2	498.9	498.5	498.9	Except for data from June 2014, all other data are year-end figures	NCC
	Digital STB Penetration(%)	11.3	21.0	45.6	60	Except for data from June 2014, all other data are year-end figures	NCC
	IPTV Subscriptions (10 thousand households)	106.4	120.6	126.5	128.6	Except for data from June 2014, all other data are year-end figures	NCC
	Household Broadband Penetration (%)	81.8	83.2	84.8		Survey conducted annually from July through August	III-FIND
	Internet Penetration (%)	72.0	74.5	75.0		Survey conducted annually from July through August	III-FIND
Mobile Internet	Mobile Phone Penetration (%)	77.1	81.2	81.9		Survey conducted annually from February through March	III-FIND
	Smart Phone Penetration (%)	12.5	30.5	41.6		Survey conducted annually from February through March	III-FIND
	Mobile Internet Average Speed on Consumer End(Mbps) Download Upload		2.5 0.5	4.4 1.1		Survey conducted annually from August through October	NCC
	Mobile Internet Penetration (%)	21.3	31.9	37.3		Survey conducted annually from February through March	III-FIND

Compiled by III-FIND

Taiwan e-Competitiveness Annual Report 2013-2014
資訊國力年鑑

鐘嘉德　編
行政院科技會報執行秘書

行政院科技會報辦公室
中華民國103年10月

序

隨著科技的快速發展與應用，評量一個國家的國力已不再侷限於其軍事力、經濟力與人口統計等面向，而是將科技發展與創新能力涵括在內。其中，資通訊科技不僅是提升科技產業經營效率的工具，也是產業創新經營模式的利器，更是提升國家競爭力的重要關鍵。

觀察科技產業變動的趨勢，唯有符合人性的科技，才能符合民眾的需求，帶來感動，也帶來市場與獲利。因此政府積極透過創新科技的應用，讓民眾的生活更為便利，同時因應許多社會發展議題，例如普及行動寬頻建設，強化偏鄉數位機會中心功能，以縮短城鄉數位落差；另為提升我國資訊國力及民眾生活品質，政府已在 102 年釋出 4G 執照，並在 103 年 5 月底正式開台，且持續建構行動寬頻友善環境，發展豐富的創新應用服務，更積極推動下世代行動寬頻前瞻技術，期使民眾早日享受優質且價格合理的高速行動寬頻服務。此外，針對食品安全安心的議題，政府提供了雲端追溯追蹤工具與即用系統，中小型業者可對其產品進行溯源及流向管理，政府亦能有效掌握食品供應鏈上下游關係，快速因應處理有疑慮的產品，以保障國人的食品安全。

《資訊國力年鑑》一書，完整呈現國家資通訊基礎建設與相關應用的現況，讓政府得以觀察科技產業變動的趨勢，策訂未來發展方向。2013-2014 年的年鑑，除延續既有的國際評比外，更增加全球創新創業評比，以呈現台灣經濟發展創新驅動的能量；另外，今年也特別將數位生活品質納入初期規劃，期藉由此客觀而量化的方式，持續觀察資通訊科技對民眾生活品質的影響。

這些累積的指標資訊及數據分析，足以見證台灣藉由資通訊科技所營造的產業競爭力、追求生活品質的提升及邁向優質資訊化社會的重要歷程。希望本書的出版，能讓各界看見台灣資訊國力發展與國際社會共榮並進的重要軌跡。

行政院科技會報副召集人

2014 年 10 月

序

面對全球化與當前嚴峻的國際政經情勢，台灣如何在資通訊產業堅實基礎上，進一步運用跨領域整合與發展新興應用，已成為提升我國整體競爭力的重要關鍵。

我國資通訊建設在全國各界共同努力下，已有不錯的成效。台灣資訊國力廣受全球各界的肯定。2013-2014 年，台灣在世界經濟論壇 (WEF) 全球 144 個國家的評比中，網路整備度全球排名第 14 名，亞太地區排名第四。全球競爭力排名則第 12 名，亞太地區排名第四。台灣在 IMD 世界競爭力年報中，居 60 個國家評比第 13 名。

在基礎建設方面，全國寬頻固網帳號數 725.4 萬戶，其中光纖帳號占 41%。行動電話持有率 81.9%，其中智慧手機已超過 970 萬人口。有線電視數位化比例占 60%，多媒體內容傳輸服務已超過 128 萬訂戶。

除此之外，政府也積極推動開放資料 (Open Data) 與巨量資料 (Big Data) 相關應用。目前已開放 3,000 個以上資料集 (dataset) 上架，同時與英國、美國、韓國等簽署合作意願書或 MOU，後續將與產業共同研討交通、就醫用藥、電子商務、物流等主題式的政府資料開放需求。另正規劃透過學研界在巨量資料方面之研究創意與能量，對政府擁有之資料進行深度統計分析，期能在 2015 年產生對施政有參考價值之研究成果。

本年鑑對於政府目前推動之數位匯流、電子商務、雲端運算等資通訊政策，均有彙整說明，值得各界參考。許多整合性的生活應用概念如：健康樂活城、智慧城市等，近年逐漸受到民眾支持與認同，而資通訊科技將扮演更重要的應用支援角色。相信不久將來，全民將可共享更優質便利的生活空間和生活型態。

行政院國家資訊信發展推動小組總召集人

行政院資訊長

2014 年 10 月

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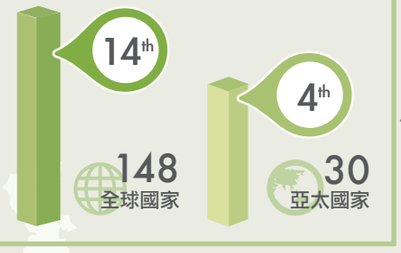
2014
TAIWAN'S PERFORMANCE IN ICT GLOBAL RANKINGS

第一章
我國在資通訊國際評比的表現

WEF Networked Readiness Index
世界經濟論壇網路整備度



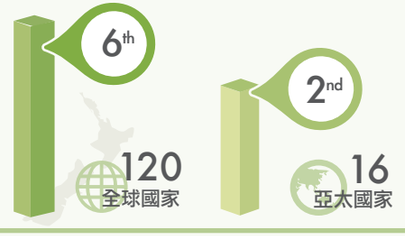
Waseda University e-Government
日本早稻田大學電子化政府

WEF Global Competitiveness Index
世界經濟論壇全球競爭力

World Bank Doing Business
世界銀行經商環境評比

IMD World Competitiveness
瑞士洛桑管理學院世界競爭力

GEDI Global Entrepreneurship & Development Index
全球創業發展學院全球創業發展



註：亞太區包括亞洲和大洋洲，但不包含中東地區

第一章　我國在資通訊國際評比的表現

一個國家資通訊實力的高低，與政策的推動方向息息相關，可體現於政府、產業、個人對於資訊化應用的落實和活用程度。世界經濟論壇（World Economic Forum, WEF）的網路整備度（Networked Readiness Index, NRI）評比是當今最具代表性的資訊國力國際評比。[1] 2012 年以前其以三構面（環境、整備、使用）進行評比，2012 年開始納入「影響」構面來評比資通訊發展對各國社會和經濟的影響力。評比架構的改變呼應 OECD 對 ICT 發展的論述，揭示資通訊在環境建構、整備完善、普及使用後，最重要的是要對民眾生活、企業經營、國家經濟產生影響。

資通訊科技的整備和運用是國家競爭力重要的一環，而目前最受關注的兩個國家競爭力評比 – WEF 的全球競爭力（Global Competitiveness Index, GCI）評比和瑞士洛桑管理學院（International Institute for Management Development, IMD）的世界競爭力評比自然是我們不能遺漏的觀測對象，兩者都將資通訊相關指標納入國家競爭力的評比項目中。[2, 3] 雖然兩者都有涵蓋資通訊的技術構面，但兩者在技術構面的組成、資料採用的時間、評比的國家數都有所不同。以技術構面組成來說，WEF GCI 的技術整備構面包含了 7 個指標，IMD 世界競爭力的技術基礎建設構面包含了 23 個指標，兩者重疊的指標僅 2 個。WEF GCI 的技術整備構面雖然涵蓋的指標數少，但在指標的選取上較能跟隨資通訊發展而改變。

WEF GCI 評比中，依 GDP 的高低將評比國家區分為不同經濟發展階段國家，在評量國家競爭力時給予不同經濟發展階段國家不同的指標權重。對於創新因素驅動的國家，評比時給予創新和企業成熟度兩支柱最高的權重。資通訊科技帶來許多創新的機會，可以改變民眾使用基本服務的方式、企業經營的模式、衍生新的商品或服務，因此，觀測創新的表現也可知道資訊科技的應用發展情形。

日本早稻田大學（Waseda University）的電子化政府評比是除了聯合國外最具代表性的電子化政府評比。[4] 早稻田大學在第 10 個年度的 2014 年電子化政府評比中，於原有的 7 個構面外新增了「政府資料開放（Open Data）」和「網路安全」2 個構面，以符合電子化政府的發展趨勢。

資通訊科技的發展帶來許多創新創業的機會。世界銀行（World Bank）的經商環境評比和全球創業發展學院（The Global Entrepreneurship and Development Institute, GEDI）的全球創業發展評比（Global Entrepreneurship and Development Index, GEDI）是創業方面評比的代表。[5, 6] 在不斷追求創新發展的已開發國家中，經商容易度和創業發展評比日趨受到重視。全球創業發展評比融合了 WEF 在評比國家競爭力時所使用的概念，認為不同經濟發展階段國家應重視的創業要素並不相同。創新驅動國家特別要看重在創業抱負構面的表現。

2014 年的評比結果，我國在 WEF NRI 排名第 14，而在資通訊科技產生的影響方面，我國排名第 7。我國在 WEF GCI 評比的技術整備構面排名第 30，創新構面排名第 10。我國在 IMD 世界競爭力評比的技術基礎建設構面排名第 4。在日本早稻田大學的電子化政府評比，我國排名第 18。在世界銀行的經商環境評比排名第 16。在全球創業發展學院的 GEDI 評比排名第 6，創業抱負構面排名第 2。我國在重要資通訊相關國際評比的排名請參見 • 表 1。

• 表 1　我國在重要資通訊相關國際評比的排名

評比	我國排名		評比國家數	
	全球	亞太 *	全球	亞太 *
2014 世界經濟論壇網路整備度評比	14	4	148	30
- 影響次指標	7	3		
2014 世界經濟論壇全球競爭力評比	14	4	144	30
- 技術整備支柱	30	6		
- 創新支柱	10	3		
2014 瑞士洛桑管理學院世界競爭力評比	13	4	60	13
- 技術基礎建設次因素	4	3		
2014 日本早稻田大學電子化政府評比	18	6	61	21
2014 世界銀行經商環境評比	16	7	189	43
2014 全球創業發展學院全球創業發展評比	6	2	120	16
- 創業抱負次指標	2	1		

■　註：亞太區包括亞洲和大洋洲，但不包含中東地區

資料來源：WEF、IMD、早稻田大學、世界銀行、GEDI；資料整理：資策會 FIND

1-1 世界經濟論壇網路整備度評比

WEF NRI 為全球最具代表性的國家資訊競爭力評比。我國在 2014 年度的 NRI 獲得全球第 14 名、亞洲第 4 名。WEF 在報告中提及臺灣在高科技製造業以及科技驅動經濟當中維持全球領先地位，且肯定我國在基礎建設以及負擔能力等方面的持續進步。

我國在影響構面排名全球第 7 名，在其下的資通訊科技對經濟的影響次構面排名全球第 12 名，在資通訊科技對社會的影響次構面排名全球第 6 名。資通訊科技的發展已對我國經濟以及社會產生影響。我國近 2 年在 WEF NRI 的表現請參見 • 表 2。

• 表 2 我國在 WEF 2013 及 2014 年網路整備度評比各構面的表現

構面	2014		2013	
	排名	分數	排名	分數
環境	25	4.94	24	4.97
政治法規環境	34	4.43	33	4.51
商業及創新環境	4	5.45	4	5.44
整備	7	6.17	17	5.80
基礎建設及數位內容	5	6.81	22	5.99
負擔能力	53	5.74	54	5.50
技能整備	14	5.96	7	5.91
使用	17	5.34	15	5.45
個人使用	28	5.44	20	5.66
企業使用	14	5.24	13	5.19
政府使用	16	5.36	12	5.49
影響	7	5.43	6	5.65
經濟影響	12	5.08	7	5.49
社會影響	6	5.79	6	5.82

資料來源：WEF 2013 及 2014 年全球資訊科技報告；資料整理：資策會 FIND

1-2 世界經濟論壇全球競爭力評比

WEF GCI 的評比架構涵蓋了提高各國生產力與競爭力的各項影響因素。3 大構面所占比重端視各國所處經濟發展階段而異。以臺灣所處的創新驅動階段來看，創新與成熟構面的權重占 30%，當中的創新次構面與企業成熟度次構面各占全體分數的 15%，為整個評比中占比最重的兩個次構面，可看出全球競爭力評比非常重視創新階段國家的創新能力。

我國在 2014 年度的 GCI 獲得全球第 14 名，多年來表現穩健，維持一定水準。我國於 GCI 內的創新相關指標表現優異，WEF 也指出創新力是我國競爭力的強項。我國在創新次構面的表現居全球第 10 名，是我國在 GCI 中表現最好的次構面。WEF 指出，創新能力、高效率的商品市場、世界級的基礎建設、穩固的高等教育，讓我國能在這幾年來維持穩定的表現，持續具有高度競爭力。我國近 2 年在 WEF GCI 的表現請參見 • 表 3。

• 表 3 我國在 WEF 2013 及 2014 年全球競爭力評比各構面的表現

構面	2014		2013	
	排名	分數	排名	分數
基本需求	14	5.75	16	5.70
體制	27	4.84	26	4.95
基礎建設	11	5.82	14	5.77
總體經濟穩定	23	5.83	32	5.60
健康與初等教育	13	6.49	11	6.49
效率提升	16	5.14	15	5.16
高等教育與訓練	12	5.63	11	5.65
商品市場效率	11	5.23	7	5.26
勞動市場效率	32	4.59	33	4.67
金融市場成熟度	18	4.91	17	4.95
技術整備	30	5.24	30	5.19
市場規模	17	5.23	17	5.24
創新與成熟	13	5.11	9	5.22
企業成熟度	17	5.12	15	5.20
創新	10	5.10	8	5.25

資料來源：WEF 2013 及 2014 年全球競爭力報告；資料整理：資策會 FIND

1-3 瑞士洛桑管理學院世界競爭力評比

IMD 世界競爭力年報（The World Competitiveness Yearbook, WCY）揭露的競爭力評比，堪稱是目前世界上最有名、評比涵蓋範圍最廣、評比指標數最多的國家競爭力評比。臺灣在 2014 年的排名因受政府效能與企業效能退步影響，整體名次滑落至第 13 名。

臺灣在技術基礎建設構面居全球第 4 名，較前一年進步 1 名，表現穩健。IMD 指出，我國在技術基礎建設構面內的優勢指標為：高科技出口、居民固網寬頻月租費；弱勢指標為：行動電話通話費、電信投資佔 GDP 的比例、每網路使用者之國外連線頻寬。從細部指標的進退步情形來看，我國在完善硬體環境之餘，仍應加強法規、籌資等軟性環境。我國近 2 年在 IMD 世界競爭力評比的表現請參見 • 表 4。

• 表 4 我國在 IMD 2013 及 2014 年世界競爭力評比各構面的排名

構面	2014 排名	2013 排名	構面	2014 排名	2013 排名
經濟表現	14	16	企業效能	17	10
國內經濟	21	24	生產力與效率	14	20
國際貿易	14	10	勞動市場	22	15
國際投資	31	30	金融	16	12
就業人口	21	24	管理實務	11	5
物價	11	26	態度與價值	19	6
政府效能	12	8	基礎建設	17	16
政府財務	17	13	基本基礎建設	18	19
財務政策	4	4	技術基礎建設	4	5
制度架構	20	16	科學基礎建設	9	13
商務法規	27	20	衛生與環境	31	30
社會架構	26	20	教育	22	21

資料來源：IMD 2013 及 2014 年世界競爭力年報；資料整理：資策會 FIND

1-4 日本早稻田大學電子化政府評比

日本早稻田大學調查和分析全球各國電子化政府的推動現況和績效，根據其評量指標計算政府電子化程度的分數。2014 年的評比結果，我國的整體表現居全球第 18 名、亞太區第 6 名、在 APEC 成員國中居第 8 名。我國近 5 年在早稻田大學電子化政府評比的表現請參見 • 表 5。

• 表 5 近 5 年我國在早稻田大學電子化政府評比的排名

	2014	2013	2012	2011	2010
我國排名	18	8	10	13	10

資料來源：早稻田大學 2014 年電子化政府評比；資料整理：資策會 FIND

我國在評比各構面的表現存有落差。9 大構面中，「國家入口」、「政府機關資訊主管 (Government CIO)」、「電子化政府推廣」和「開放政府資料」分別獲得第 11、第 12、第 8 和第 11 名（參見 • 表 6），其他 5 大構面則未進入前 13 名。臺灣雖然在電子化政府發展方面的推動有實績和成效，但距離電子化政府全面性均衡發展仍然有進步的空間。在具備一定程度的資通訊環境整備以及電子化政府發展架構之上，臺灣若能更進一步地從各方面提升電子化政府的發展，將可使民眾生活更加便利與完善。

• 表 6 我國在早稻田大學 2014 年電子化政府評比的排名

構面	排名
國家入口	11
政府機關資訊主管	12
電子化政府推廣	8
開放政府資料	11

資料來源：早稻田大學 2014 年電子化政府評比；資料整理：資策會 FIND

1-5 世界銀行經商容易度評比

世界銀行發布經商環境報告，針對各國有關企業營運從開辦到關閉的法規程序以量化方式進行評比，以瞭解受評國家在監管機制與法規上對商業發展的友善程度，提供各國調整法規或政策的參考建議。

在 2013 年 10 月發布的 2014 年報告中，臺灣的經商容易度在 189 個國家中排名位居第 16 名，與 2013 年表現相同，各構面的表現也十分穩健。在所有 10 個構面中，我國有半數的構面排名在 20 名以內。排名表現最為優異的是「申請建築許可」和「電力取得」2 個構面。排名表現最差的構面雖與去年同為「執行契約」構面，但該構面的排名相較去年已有進步。我國近 2 年在世界銀行經商容易度評比的表現請參見 • 表 7。

• 表 7 我國在世界銀行 2013 及 2014 年經商容易度評比各構面的排名

構面	2014 排名	2013 排名
開辦企業	17	16
申請建築許可	7	9
電力取得	7	6
財產登記	31	32
獲得信貸	73	70
投資人保護	34	32
繳納稅款	58	54
跨境貿易	18	23
執行契約	84	90
關閉企業	16	15

資料來源：世界銀行 2013 及 2014 年經商環境報告；資料整理：資策會 FIND

依據 2013 年中小企業白皮書的資料，臺灣的企業高達 98% 為中小企業。經商環境的改善將促使我國新創中小企業的發展更加蓬勃。

1-6 全球創業發展學院全球創業發展評比

GEDI 發布的 2014 GEDI 評比，臺灣居全球第 6 名，較前一年進步 5 名。3 大構面中，臺灣在創業者的抱負（Aspiration）構面表現最佳（居第 2 名），而在創業者的態度（Attitude）構面表現較差（居第 15 名）。在所有 15 個次構面中，臺灣表現最佳的 3 個次構面為產品創新（排名世界第 1）、高成長（排名世界第 1）、風險資本（排名世界第 3），且這 3 個次構面皆在創業者的抱負構面之下，而表現最差的 2 個次構面 - 性別、競爭皆在創業者的能力（Ability）構面之下。我國今年在 GEDI 全球創業發展評比的表現請參見 • 表 8。

• 表 8 我國在 GEDI 2014 年全球創業發展評比的表現

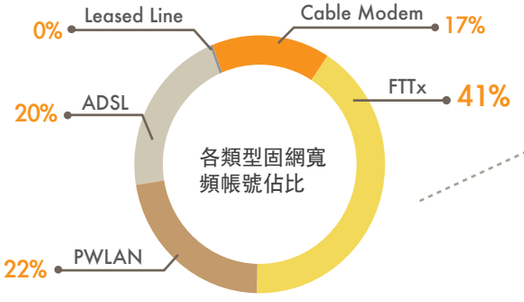
構面	2014	
	排名	分數
創業態度	15	61.7
機會認知	25	0.68
新創技能	50	0.49
風險接受	8	0.78
人際網絡	25	0.65
文化支持	27	0.61
創業能力	10	68.2
機會新創	5	0.95
性別	62	0.62
技術吸收	12	0.85
人力資本	13	0.85
競爭	55	0.43
創業抱負	2	78.6
產品創新	1	1
流程創新	17	0.78
高成長	1	1
國際化	37	0.64
風險資本	3	0.99

資料來源：GEDI 2014 年全球創業發展評比；資料整理：資策會 FIND

2013-2014
第二章 我國資通訊建設現況

ICT INFRASTRUCTURE IN TAIWAN : A SNAPSHOT

固定網路環境可從光纖帳號數、網路速率、數位匯流相關指標、家庭連網普及率來看。數位匯流相關指標包括：有線電視數位化比例、多媒體內容傳輸平台服務（IPTV）訂戶數。



2014年6月固網寬頻帳號數達725.4萬戶。

光纖帳號數298.2 萬戶，占固網寬頻帳號的41%

行動網路環境可從裝置的持有情形、網路速率、民眾行動上網普及率來看。

行動電話持有率 81.9%

智慧手機持有率 41.6%

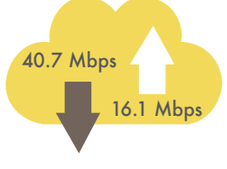
970.6萬 智慧手機人口

= 1 百萬人

固定網路 Fixed Broadband

ICT INFRA STRUCTURE

行動網路 Mobile Internet



Ookla網站網路指數

固網寬頻下載速率 全球10th

上傳速率 全球20th

家庭連網普及率 84.8%

行動上網速率 消費者端平均速率

下載 4.44 Mbps

上傳 1.13 Mbps

有線電視數位化比例 60%

多媒體內容傳輸平台服務(IPTV)

訂戶數至2014年6月達 128.6 萬戶

行動上網普及率 37.3%

870萬 行動上網人口

= 1 百萬人

第二章　我國資通訊建設現況

為讓更多的民眾享有資通訊科技帶來的好處，讓生活更便利，感受資通訊科技帶來的幸福，政府戮力提升網路基礎建設。在固網方面，行政院數位匯流方案中訂有 100M 光纖覆蓋率 100% 之推動目標，截至 2013 年 12 月底，非偏遠地區可接取 100Mbps 寬頻網路之家戶率為 89%，加計有線電視系統業者部分後則已達 97%。在行動網路方面，行政院於 2013 年 10 月完成 4G 行動寬頻業務釋照作業，今年 5 月底 4G 業者也陸續開台，開啟我國高速行動寬頻服務新的里程碑。在 4G 高速頻寬帶動下，預期會衍生更多更好的行動應用，吸引更多的民眾使用。未來行政院科技會報辦公室將以 OECD 美好生活指數（Better Life Index, BLI）為參考標的，建立具應用價值的數位生活幸福指數（ICT Enable Better Life Index），用以衡量民眾對數位生活品質滿意度，做為推動數位服務發展的重要參考依據。我國資通訊基礎建設指標發展情形整理如 • 表 9。

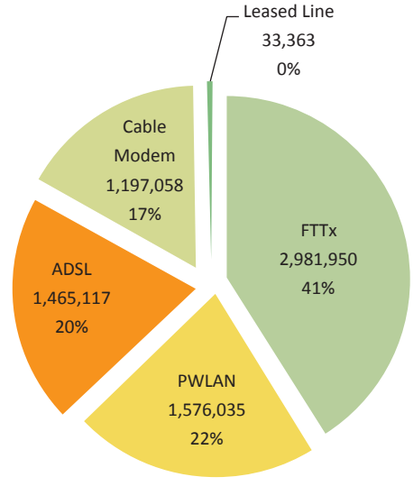
• 表 9　我國資通訊基礎建設指標現況

指標分類	指標名稱	數據	資料時間	資料來源機關
固網	光纖帳號數	298.2 萬戶	2014/06	通傳會
	有線廣播電視訂戶數	498.9 萬戶	2014/06	通傳會
	有線電視數位機上盒訂戶占比	60 %	2014/06	通傳會
	多媒體內容傳輸平台服務訂戶數	128.6 萬戶	2014/06	通傳會
	家庭連網普及率	84.8 %	2013/08	資策會 FIND
	民眾上網普及率	75.0 %	2013/08	資策會 FIND
行動	行動電話持有率	81.9 %	2013/03	資策會 FIND
	智慧手機持有率	41.6 %	2013/03	資策會 FIND
	行動網路消費者端平均速率 下載 上傳	 4.4 Mbps 1.1 Mbps	2013H2	通傳會
	民眾行動上網普及率	37.3 %	2013/03	資策會 FIND

資料整理：資策會 FIND

2-1 我國資通訊建設指標現況

固定網路環境可從光纖帳號數、網路速率、數位匯流相關指標、家庭連網普及率來看。我國固網寬頻用戶有四成採用光纖接取方式。根據國家通訊傳播委員會（簡稱通傳會，NCC）公布的資料，2014 年 6 月固網寬頻帳號數達 725.4 萬戶。其中，光纖帳號數達 298.2 萬戶，占固網寬頻帳號的 41%[7]（參見 • 圖 1）。



資料來源：通傳會；資料整理：資策會 FIND

• 圖 1　2014 年 6 月我國各類型固網寬頻接取帳號數及占比

光纖接取代表具有一定的速率，是國際常用的觀測指標之一，然而在採用光纖帳號數進行比較的背後，我們真正關心的重點是網路速率。我國固網寬頻下載速度居全球前 10 名。根據 Ookla 網站於 2014 年 7 月 29 日公布的網路指數（Net Index），我國固網寬頻下載速率達 40.7Mbps，居全球第 10 名；我國固網寬頻上傳速率達 16.1Mbps，居全球第 20 名；我國 ISP 承諾指數（實測下載速率與廣告宣稱速率比值的中間值）（99.36%）居全球第 4 名。

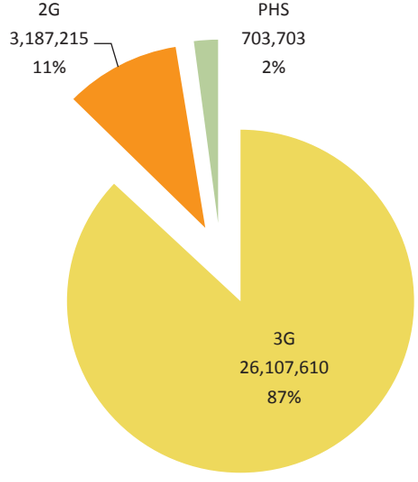
數位匯流相關指標包括：有線電視數位化比例、多媒體內容傳輸平台服務（IPTV）訂戶數。有線電視數位化可讓閱聽大眾享有優質、多元、多頻道的視訊與數位加值服務，因此，有線電視數位化的比例是數位匯流發展程度的重要評量指標。我國有線電視數位化比例已達六成，年底可望朝七成五邁進。根據通傳會的統計，2014 年 6 月有線廣播電視訂戶數達 498.9 萬戶，數位機上盒訂戶數達 299.4 萬戶，數位化比例達 60%。[8] 有線電視業者在數位化後，更有機會搶占原由電信業者主導的網路接取市場。

根據通傳會統計，2014 年 6 月有線電視業者提供的網路接取服務 Cable MODEM 上網，其用戶數僅達 119.7 萬戶，占固網寬頻帳號的 17%，顯示有線電視業者在網路接取市場仍有很大的努力空間。

根據通傳會統計，2013 年底時有 2 家業者提供 IPTV 服務，訂戶數達 126.5 萬戶。到 2014 年 6 月時，提供 IPTV 服務的業者減為一家，訂戶數略稱升為 128.6 萬戶。

我國家庭連網普及率達八成五。根據國家發展委員會(簡稱國發會)於 2013 年 7 月的調查，12 歲以上民眾的家庭電腦普及率為 88.5%，12 歲以上民眾的家庭連網普及率達 85.5%，12 歲以上民眾的上網普及率達 76.3%。[9] 另根據財團法人資訊工業策進會（簡稱資策會）於 2013 年 8 月的調查（不設限受訪者年齡），家庭電腦普及率為 88.4%，家庭連網普及率達 84.8%，民眾上網普及率達 75.0%，推估全國上網人口數達 1,752 萬。[10, 11]

行動網路環境可從裝置的持有情形、網路速率、民眾行動上網普及率來看。2014 年 6 月行動電話門號數達 2,999.9 萬戶，平均每百居民有 128.2 個門號。行動電話門號中，3G 門號占 87%（參見 • 圖 2）。

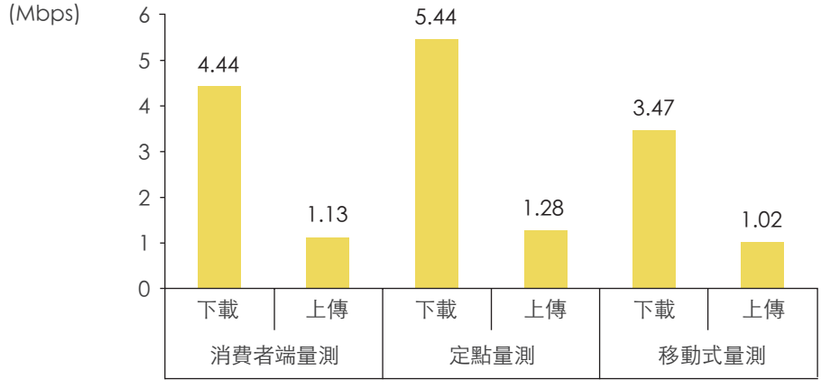


資料來源：通傳會；資料整理：資策會 FIND

• 圖 2 2014 年 6 月我國各類型行動通信業務用戶數及占比

在行動裝置的持有情形上，根據資策會 FIND 的調查，2013 年 3 月行動電話持有率達 81.9%，其中，50.8% 持有智慧手機。[12] 換言之，智慧手機持有率達 41.6%，智慧手機人口達 970.6 萬人。根據國發會的調查，2013 年 7 月 12 歲以上民眾的智慧手機持有率達 60.5%，12 歲以上使用智慧手機的人口超過 1,262.8 萬人。

在行動網路的速率上，根據通傳會委託財團法人電信技術中心（TTC）所進行 2013 年全國行動上網速率提供情形報告，2013 年 8-10 月消費者端量測結果，全國行動上網速率平均下載 4.4Mbps、上傳 1.1Mbps [13]（參見 • 圖 3）。另，根據 2014 年 7 月 29 日 Ookla 公布的網路指數，臺灣行動網路下載速率達 20.7Mbps，居全球第 4 名。



資料來源：通傳會；資料整理：資策會 FIND

• 圖 3 2013H2 我國行動上網速率提供情形

在 4G/LTE 的服務進程上，2013 年 9 月 3 日通傳會舉行行動寬頻（4G）頻譜競標，共釋出 700MHz、900MHz、1800MHz 3 頻段總計達 135MHz 的頻譜資源，吸引 7 家公司參與 4G 頻譜拍賣。歷經 40 天、393 回合競標後，有中華電信、臺灣大哥大、遠傳電信、亞太電信、臺灣之星移動電信（頂新集團）與國基電子（鴻海集團）等六家公司得標。結標總金額高達 1,186.5 億元新台幣。最搶手的 1800MHz 頻段全部由現有的電信三雄（中華電信、臺灣大哥大、遠傳電信）取得。6 家公司中，臺灣之星移動及國基電子是首次跨入電信領域，亞太電信與臺灣之星移動取得的頻寬最少（各 10MHz）。2014 年 5、6 月間電信三雄陸續宣布 4G 開台提供服務。

我國民眾超過三分之一有行動上網。根據資策會 FIND 調查，我國民眾行動上網普及率在 2013 年 3 月時達 37.3%，推估行動上網人口達 870 萬。根據國發會調查，2013 年 7 月 12 歲以上民眾使用智慧手機上網的比例達 53.0%，推估 12 歲以上智慧手機 / 行動上網人口達 1,104 萬。若從上網帳號數來看，根據通傳會統計 3G 當月上網帳號數在 2013 年 3 月為 991.3 萬(平均每百居民 42.5 個)，到 2013 年 7 月成長至 1,089.0 萬（平均每百居民 46.6 個），到 2014 年 6 月成長至 1,363.5 萬（平均每百居民 58.3 個）。我國近年在資通訊基礎建設指標的表現請參見 ■ 附錄一。

2-2 資通訊政策影響分析

我國行政院於 2002 年通過國家資訊通信發展方案（2002-2006 年），以推動「數位台灣(e-Taiwan)計畫」為主軸，主要的策略思維在於建設資通訊基礎環境，希望在 2008 年達成「六年 600 萬戶寬頻到家，打造台灣成為亞洲最 e 化的國家之一」之目標。同時以「網路取代馬路」的施政理念，首度以公共建設經費來推動國家資通訊基礎建設與資通訊技術應用。

因應 2008 年金融危機引發全球經濟衰退，我國政府集中公共建設資源，優先推動「愛台十二建設 (2009-2016 年)」，藉由促進區域適性發展、建構產業創新環境、打造城鄉嶄新風貌、加速智慧資本累積，以及重視環境永續發展等五大基本理念，再創經濟新奇蹟。其中推動的「智慧台灣計畫」，就是希望在 e 化、M 化的基礎環境上，強調應用服務之導入與推廣，節能減碳之落實，人文藝術的培養，多元人才之培育，打造終身學習之學習型社會，提升國家整體智慧資本，厚植國家軟實力。主要推動工作包括「寬頻匯流網路」、「文化創意產業」、「優質網路政府」、「貼心生活與產業應用」、「公平數位機會」、「人才培育」等六個面向。

為加速推動產業創新，發展新興產業，創造就業機會，藉由台灣在 ICT（通訊、資訊、光電及半導體）的競爭優勢，我國政府進一步於 2009 年推動「六大新興產業」，包括生物科技、觀光旅遊、綠色能源、醫療照護、精緻農業、以及文化創意產業。截至 2014 年第一季，相關指標的發展情形參見 • 表 10。

• 表 10 智慧臺灣計畫績效指標執行情形

指標	單位	2016 年目標值	現況	現況說明
高速 (30Mbps 以上) 匯流網路涵蓋率	%		95.4	2013Q4 數據
高速 (50Mbps 以上) 匯流網路涵蓋率	%		92.8	2013Q4 數據
具聰明公車服務之縣市	縣市		20	已涵蓋全國縣市
高快速公路交管智慧化範圍			所有國道加上十二條快速道路	2011 年數據
創新科技化生活應用服務	%			
民眾使用度		65	60.8	2013Q4 調查
民眾滿意度		70	61.1	2013Q4 調查
全國民眾上網普及率	%	80	76.3	2013 年 10 月調查

資料來源：智慧臺灣計畫網站；資料整理：資策會 FIND

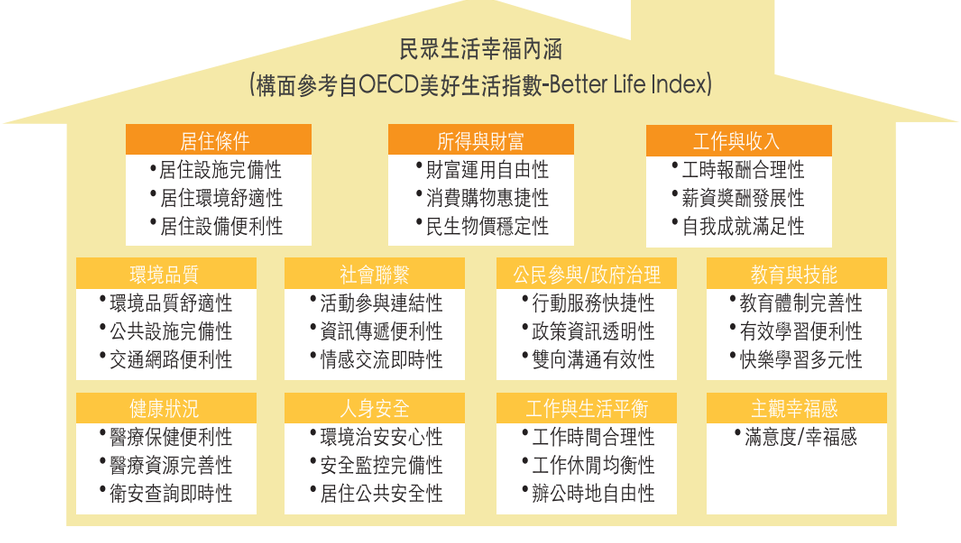
有鑑於行動寬頻的服務內容與覆蓋範圍為民眾有感的主要目標，我國行政院規畫以 150 億元的經費，由行政院科技會報辦公室邀集 11 個相關部會，共同規劃「加速行動寬頻服務及產業發展方案」，以「服務普及」、「環境優化」以及「產業升級」3 個主軸，落實優良的行動寬頻發展環境，希望 2014 年底就能催生第一波 4G 創新應用服務上架。

2-3 數位生活品質

我國行政院的「國家資通訊發展方案（2012-2016 年）」是以持續推動「智慧臺灣計畫」為主軸，期望使民眾感受到資通訊科技所帶來的好處。其中一項績效指標為 2016 年能達到 65% 民眾享用各類創新科技生活應用服務，且民眾滿意度達 70%。因此行政院科技會報辦公室每年進行 1 次民眾數位生活品質（Digital Quality of Life, D-QoL）調查，以瞭解我國民眾對於與智慧臺灣計畫相關之科技應用服務的使用及滿意狀況。

國際間從重視經濟發展到重視民眾幸福，主要是希望能夠觀察民眾的生活是否真的越來越好。OECD 建構的「美好生活指數（Better Life Index, BLI）」以物質生活條件及生活品質 2 個層面出發，囊括 11 個生活領域，以涵蓋一般民眾的生活福祉狀況。物質生活條件包含所得與財富、工作與收入，以及居住條件 3 個領域，生活品質包含健康狀況、工作與生活平衡、教育與技能、社會聯繫、公民參與及政府治理、環境品質、人身安全、主觀幸福感等 8 個領域。而 2011 年我國行政院主計處也依 BLI 架構，針對我國國情建立「國民幸福指數」，呈現臺灣民眾與社會需求及進步情形。但隨著資訊科技的發展，資訊社會快速形成，民眾食衣住行與資訊社會緊密結合，因此民眾在資訊社會的幸福感，實是值得關注的議題。

行政院科技會報辦公室未來將以 OECD BLI 為參考標的，建立一個具應用價值的數位生活幸福指數（ICT Enabled Better Life Index），透過數位生活角度觀察民眾生活品質是否越來越好，用以衡量民眾對數位生活品質滿意度，進而提供政府衡量各構面數位服務對民眾數位生活幸福的影響程度，做為推動數位服務發展的重要參考依據。民眾數位生活幸福指數內涵請參見 • 圖 4。



資料來源：資策會 FIND

• 圖 4 民眾數位生活幸福指數內涵

第三章 國內外資通訊政策發展動向

• 世界主要國家未來資通訊政策與趨勢 •

無縫隙行動寬頻網路

超寬頻智慧城市落實智慧聯網

數位匯流基礎網路中立性

資通訊科技連結民眾創意

雲端運算讓工作與生活平衡

UHD/3D Smart TV

主要國家
與我國有競合關係的國家，包括英國、美國、日本、南韓、新加坡、香港以及中國大陸。

DEVELOPMENTAL TRENDS IN DOMESTIC AND INTERNATIONAL ICT POLICIES

• 我國未來智慧生活推動方向 •

安全農業

健康照護

犯罪與災害防治

交通觀光

終身學習

創意樂活

3-1 國際資通訊政策趨勢

資通訊科技的快速進化，已引發社會、經濟與環境的巨變，沒有一個國家能夠置身事外。為掌握國際資通訊科技之下一階段發展趨勢（What's Next），本節透過主要國家重要資通訊政策的分析，歸納出資通訊政策發展趨勢，進而擷取出未來資通科技典轉移之方向。

3-1-1 主要國家資通訊政策

首先針對與我國有競合關係的主要國家，包括英國、美國、日本、南韓、新加坡、香港及中國大陸等，於 2012 至 2014 年所提出的最新資通訊前瞻政策進行蒐集羅列 [14, 15, 16]（整理如 • 表 11）。

• 表 11　2012-2014 年主要國家資通訊政策案例

國家	政策案例	
英國	•企業網路接取補助計畫 •資料開放白皮書 •寬頻政策 •寬頻品質	•空白頻段應用 •政府雲端策略 •網路中立性
美國	•Gigabit 城市挑戰計畫 •巨量資料研究與發展計畫 •無線創新與基礎建設計畫 •網路中立性	•空白頻段的應用 •高速寬頻建設 •聯邦政府雲端計畫
日本	•世界最先端 IT 國家創造宣言	•「ICT 創新城市發展」推動機制
南韓	•資通訊振興暨融合促進基本計畫 •Giga Internet 政策推動方向 •未來行動通訊產業發展戰略 •三大 IT 匯流生態建構方案	•IoT 基本計畫 •ICT R&D 中長期戰略 •創意經濟生態建構方案 •無限想像室
中國大陸	•通信業十二五發展規劃 •物聯網十二五發展規劃	•寬頻網路基礎建設十二五規劃 •數位電視與數位家庭產業十二五規劃
新加坡	•資通訊媒體發展藍圖	
香港	•數碼 21	

資料整理：資策會 FIND

3-1-2 主要國家資通訊政策推動重點

透過文件分析法（Documentary Research），依據 CPND（Contents 內容、Platform 平台、Network 網路、Device 終端）資通訊生態體系分類，整理出各主要國家的資通訊政策關鍵推動項目（參見 • 表 12）。

• 表 12　2012-2014 年主要國家資通訊政策項目分類

區域	Contents/Data	Platform	Network	Device/End User
英國	•Open Data	•G-Cloud •Super-Connected Cities	•寬頻品質 •寬頻全民普及 •White Space	•White Space 終端設備
美國	•Big Data	•Gigabit City •G-Cloud •Workforce Virtualization	•高速寬頻 •Net Neutrality •4G 普及 •Super Wi-Fi	•OTT 終端設備
日本	•UHD（4K/8K） •Big Data •Open Data	•ICT 創新城市 •Smart Work	•Next Generation Network •4G 普及	•3D 列印機 •Smart TV •數位看板
南韓	•Hologram •UHD/3D •Big Data	•IoT 平台 •m-Cloud •ICT D.I.Y	•Giga Internet •5G Mobile •Giga Wi-Fi	•3D 列印機 •Smart TV •Tele-Screen
中國大陸	•3D/UHD	•IoT（智慧城市）	•寬頻普及 •三網融合 •5G Mobile	•3D/Smart TV
新加坡	•Digital Harbour	•物流業 IoT 平台 •Computational Thinking	•異構網（HetNet）	•醫療感應器
香港	•開放公共資料	•智慧城市基礎設施 •創新及協作平台	•校園無線網路	•電子市民帳戶 •電子支票

資料整理：資策會 FIND

分類整理主要國家 2020 年前資通訊政策推動重點如下：

- 內容：超高畫質及超實體的全像素內容、開放與解決問題資料應用
- 平台：政府服務雲端行動化、智慧城市將扮演資通訊科技應用匯集與落實、創意匯集與實作 O2O（Online To Offline）場域
- 網路：高速行動寬頻快速發展（4G 普及與 5G 發展）、網路中立性與寬頻品質、網路匯流普及達到總明上網等
- 終端：3D 印表機印出人的創意、感測技術大量運用於個人穿載裝置、智慧連網電視成為家庭數位匯流中樞、電視機超高畫質立體化等

3-1-3 主要國家資通訊政策重要議題與趨勢

從主要國家資通訊政策項目中，歸納出 6 項未來重要政策議題與趨勢如下：

- **優質的無縫隙行動寬頻網路（Seamless Mobility）**

  LTE 等 4G 行動寬頻的快速普及、數位電視廣播轉換下 White Space 的 Super WiFi 應用，以及次世代 Giga WiFi 之升級等，行動連網不再只是比拼上網速率，而是如何利用不同的行動連網技術，實現一個不間斷的行動連網環境。

- **數位匯流的基礎網路中立性（Net Neutrality）**

  網路的急速擴張，資料的密集交換傳輸，各式應用服務的普及與發展，帶來網路資源分配以及使用的議題。數位內容匯流下，數位影音在不同網路間自由串流，各國未來必須克服內容與電信業者間的網路中立性議題。

- **超寬頻智慧城市（Giga Smart City）落實智慧聯網**

  當網路速率達到 Giga 等級及推動多元的智慧聯網應用時，即面臨「全面普及」抑或「局部推動」的問題。主要國家以城市為單位進行局部的推動，並優先選擇佈建研究型大學或高科技園區所在之城市，以與創新接軌。

- **資通訊科技連結民眾創意（ICT + Creativity）**

  近年主要國家政府試著透過資通訊平台匯集與分享民眾的好創意，並利用 3D 列印機等設備讓民眾（或創業團隊）動手把自己的創意實作出來，打造一個生活創新、創業的基礎建設，提升以民眾生活為中心的國家創新能量。

- **讓工作與生活平衡（Smart Work，Work Smart）的雲端運算**

  雲端運算服務與智慧型手機或平板等手持式行動裝置搭配，在公部門或企業內部將大量導入帶自己的行動裝置來上班（Bring Your Own Device, BYOD）的應用。BYOD 與彈性工作雲端應用將有利於個人工作與生活取得平衡。

- **兼顧影像與資訊的家庭互動樞紐 UHD/3D Smart TV**

  電視的發展經過了第一代的黑白電視及第二代的彩色電視，近年來已邁進第三代的數位電視。從各國資通訊政策的角度，下一代的電視必須要具有 UHD 的解析度與 3D 顯示等超優質的影像條件，並且可超高速連網與能提供豐富內容等兩大功能。另外，透過 Smart UHD/3D TV 與健康照護、互動學習、居家附近的環境（天氣與空氣品質）與交通資訊等應用聯結，享受智慧生活服務。

3-1-4 資通訊科技典範已邁進超聯結

超聯結（Hyperconnectivity）的概念首度出現於 2005 年「Local Virtuality in an Organization: Implications for Community of Practice」一文中，「The availability of people for communication anywhere and anytime（人們的溝通不受限於時空因素）」可作為超聯結的最佳詮釋。

2007 年 TIME 發表評論「The Hyperconnected」，描述隨著行動上網以及載具的普遍發展，人們將被各類社群網路緊密聯結；2008 年 Gartner 提出「高度聯結企業（Hyperconnected Enterprise）」是下一波商業模式的趨勢；2011 年 Akamai 描繪連網裝置增加所帶來的高度聯結世界（Hyperconnected World of Devices）；2012 及 2013 年 WEF 從全球網路整備發展的觀點，分別提出，「超聯結生活（Living in a Hyperconnected World）」及「超聯結世界的成長與就業（Growth and Jobs in a Hyperconnected World）」。

由上述主要國際機構所描述之超聯結生活及主要國家資通訊政策趨勢可知，近年來，隨著網路以及連網裝置的高度發展，網路造就了各種連結的可能性，不僅擴張人與人的連結，更帶來人與機器的連結，以及機器與機器的連結，此演變呼應資通訊科技典範已邁進超聯結。

隨著行動載具、巨量資料、社群網路的急速發展，超聯結的腳步大幅向前，各種物品、個體間的連結度大幅提高。超聯結社會不同於過去 E 化、M 化、U 化著重於環境面的資訊化，超聯結以人（Anyone）為出發點，著重如何於任何時間、任何地方、任何裝置及任何網路（Anytime、Anywhere、Anydevice、Anynetwork）便利的聯結與溝通。超聯結發展所帶來的是整個社會運作的深度變化。不管是人與人之間、客戶與企業間、或是民眾與政府間的關係和聯繫，都因此被重新定義。未來超聯結社會以資通訊科技為基礎，把每個人的好創意（Anyidea）連結在一起，創造出另一波國家發展動能，從資訊社會邁向創新社會。

從前述資通訊政策趨勢可歸納出三個重點：資通訊基礎建設必須打造一個超聯結的環境；終端裝置及應用服務必須要從 Smart 到 Smarter；資通訊科技推動的最後一哩（last mile）為利用「整備」與「使用」之基礎，解決社會問題及創造經濟價值。

3-2 我國資通訊政策現況

面對「全球化」、「數位化」及「永續化」的競爭環境，如何持續增進台灣整體競爭力，一方面帶領國內業者走向國際，另一方面提升內需產業的需求，已成為目前之關鍵議題。而資通訊科技相關應用，近年來已被世界各國視為對抗全球經濟危機、協助產業轉型、提升國家競爭力，有效解決社會發展議題之關鍵。

3-2-1 4G 行動寬頻

我國於 2013 年 10 月完成 4G 行動寬頻業務釋照作業，2014 年 5 月底 4G 業者也陸續開台，開啟我國高速行動寬頻服務新的里程碑。值此進入 4G 行動通訊時代，建構行動寬頻友善環境，對民眾生活品質及國力提升有重要的影響。

行政院科技會報辦公室特別會同相關部會規劃「加速行動寬頻服務及產業發展方案（2015 年 -2017 年）」。在服務普及方面，民眾將可運用 4G 手持裝置享用快速而便捷的行動影音服務，包括無縫高鐵通訊暨影音服務、故宮動態博物館、高畫質微電影、即時互動動畫影音、行動學習等。各縣市政府也會結合地方特色，發展智慧商圈、智慧觀光園區、高科技互動園區、智慧運輸服務、智慧社區健康服務、智慧行動商務等創新應用，以打造國際知名的智慧寬頻城市。

在環境優化方面，希望原住民偏鄉地區的部落人口訊號覆蓋能突破 50%，並針對資深公民與弱勢族群之需求，開發相關產品與應用，使其享受行動寬頻所帶來的好處與便利。同時強化與加速公共場所基地台的共站共構，並於高災害潛勢地區建置高抗災行動通訊平台，以強化防救災效率。另建置災害訊息廣播平台系統 (Cell Broadcasting System, CBS)，以在地震、風災、土石流等災害發生時，能針對災害警示區民眾發出即時警訊。

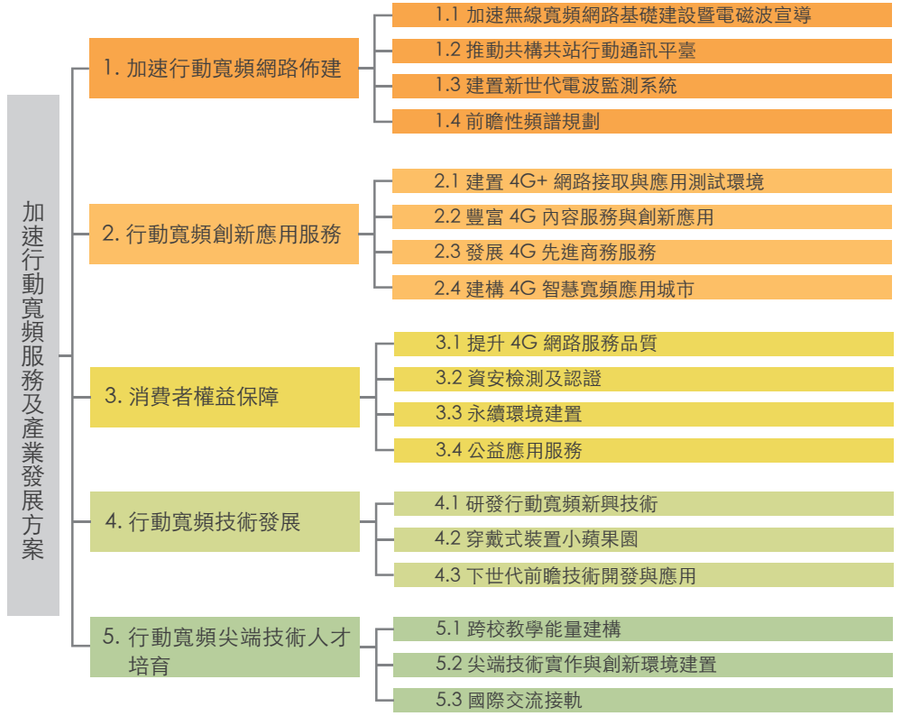
在產業升級方面，相關業者除了可以拓展其 4G 的國內外商機外，設備製造商、產品開發商，都可藉由 4G/5G 的研發布局，確實掌握關鍵技術及其價值創造的空間。

方案指標包括：

- 4G 人口覆蓋率達 90%。
- 4G 用戶數達 1,000 萬用戶。
- 建立 B4G 創新應用驗證與設備測試之異質網路場域。
- 建構豐富及創新之數位內容服務，培育內容創作人才，打造 MIT 品牌 / 內容並行銷海外。
- 建構 4G 先進商業模式，全球首座 4G 高科技互動商圈。
- 建構智慧寬頻應用城市，營造民眾便利科技新生活。
- 發展自主關鍵技術，開發下世代行動寬頻通訊技術，並培育行動寬頻尖端技術人才。

預估每年創造的商機約 700 億新台幣，2017 年標準基礎專利項目達全球 4%，降低國內廠商專利授權費用每年約 400 億新台幣。

「加速行動寬頻服務及產業發展方案」的推動主軸與策略請參見 • 圖 5。



資料來源：行政院科技會報辦公室

• 圖 5 「加速行動寬頻服務及產業發展方案」推動主軸與策略

3-2-2 數位匯流

為因應數位匯流所帶來產業及管制上的轉變，我國政府於 2010 年通過「數位匯流發展方案（2010-2015 年）」，並因應環境的快速變遷，於 2012 年 5 月核定「數位匯流發展方案（第二版）」，期能達到「創造優質數位匯流生活、打造數位匯流產業、提升國家次世代競爭力」的政策願景。

「數位匯流發展方案」的 7 大推動主軸說明如下：

■ **整備高速寬頻網路**

為提供民眾優質網路服務，發展新興匯流服務，整合無線網路及有線網路，完備我國匯流寬頻網路的布建。經由加速光纖網路建設、推動無線寬頻接取網路建置，提供高速寬頻服務；促進頻譜、電信號碼與網路資源暨網路位址等關鍵資源有效利用；推動寬頻普及服務，縮短數位落差等，使民眾在任何時間、地點享受各種創新應用服務。

■ **加速電視數位化進程**

為提供民眾多元視聽服務及高品質的節目內容，經由促進 HDTV 發展，加速有線電視數位化、加速無線電視數位化及促進匯流多元文化發展等推動策略，鼓勵高畫質節目的製作、加速電視數位化進程，可提供民眾多元之視聽選擇，並有利於匯流服務的融合。

■ **建構新興視訊服務**

智慧聯網電視的興起，已打破電視與電腦之藩籬，其同時兼具電視與電腦的功能，不僅提供視訊服務，亦可提供上網、網路服務平台應用等以往由電腦提供的相關功能。經由新興視訊服務管制合理化、新興接取與通路整合、健全視訊內容管理等推動措施，使民眾可由單一傳輸平台獲取多元服務，並營造新興視訊服務發展的有利環境，提升我國數位內容的發展。

■ **豐富電視節目內容**

我國於 2012 年 6 月底關閉類比無線電視訊號，成功完成數位無線視轉換計畫，在邁入高畫質數位電視元年時代，需挹注更多元及高品質的數位媒體內容，經由統合資源推動影視振興、建構數位媒體中心、建立新媒體收視調查機制等推動措施，提升我國數位媒體產製品質及內容，培養優秀人才，進而擴展國際市場。

■ **推動電信匯流服務**

因應智慧型手機及第三代行動通訊的普及，大幅提升消費者對行動加值應用服務之需求，經由推動行動加值應用服務、完善行動加值應用服務發展環境等推動措施，協助業者開創匯流創新應用服務，強化行動加值應用服務及跨業整合規範，保障消費者權利，營造安全便捷的行動通訊應用服務環境。

■ **促進通訊傳播產業升級**

為強化數位匯流人才及相關技術發展，經由促進匯流產業投資與發展、強化產業行銷與人才培育、保護文化及消費者權益、推動技術標準化與國際合作、鼓勵發展智慧聯網電視等措施，有效結合通訊傳播產業上、下游產業鏈，朝向「一次生產、多元加工、多平台傳輸、多功能服務」發展，並兼具文化保護與消費者權益。

■ **調和匯流法規環境**

隨著電信與廣電產業的逐漸融合，原有管制架構已無法符合產業變革所需，經由建立匯流管制架構基本原則、調整電信管制規範、調整廣電管制規範、健全匯流內容管理、完備法規促進數位媒體內容產業、平衡數位落差與匯流普及服務等推動措施，將原本以載具為規範劃分之垂直管制架構，朝向傳輸網路、平台、內容應用等水平管制架構做調整，排除跨業競爭障礙，調和匯流法規。

3-2-3 電子商務

我國 B2B 電子商務發展環境已甚為成熟，近年政府已將推動重心放在網路購物及網路創新，特別是協助個人及中小企業經營網路拍賣或是網路開店、大型平台國際化、傳統企業結合電子商務創新等。另外，協助 web2.0 新創企業在國際發光及獲得資金挹注也是電子商務推動工作的一環。經濟部商業司以 3 個面向（基礎環境建置、創新育成暨商務推動、國際化大型化推動）推動電子商務，並由「電子商務雲端創新應用與基礎環境建置計畫」、「網路社群創新型服務發展計畫」及「華文電子商務科技化與國際化計畫」3 個計畫來涵蓋所有的工作。

我國自 2000 年起，即有多家業者參考美國 PayPal 模式提供電子商務交易第三方支付服務。目前我國第三方支付服務業者已可依據現行金融監理法令提供轉帳和代收轉帳服務。第三方支付服務業者可在取得信用卡特約店資格後，為無法符合信用卡特約店資格之小型網路商店提供信用卡支付服務。在預付儲值服務方面，則必須依循我國對於非金融機構提供多用途儲值產品的現行管理法源 -「電子票證發行機構業務管理規則」，而有每張票證儲存金額上限一萬元新台幣、不得為票證間之資金移轉（無法實踐個人對個人電子商務支付交易）、無法將預儲金額提款轉出的限制。

未來第三方支付專法實施後，目前已經營代收轉付業務的銀行在 4 個月內提出業務調整計畫，即可完成備查取得電子支付機構的執照。銀行及非金融機構都能申請取得電子支付機構的執照。至於非金融機構，必須是有辦理代收轉付業務者，於法規公布後的 6 個月內取得金管會許可後，即可辦理儲值及帳戶轉帳，但不可以單獨申請儲值或轉帳業務；非金融機構資本額最低 3 億元新台幣、各幣別合計儲值上限 3 萬元新台幣。開放無實質交易基礎的轉帳，但業者所有代收代付或儲值資金必須全數進同一家銀行，且辦理信託；會員要提領帳戶內現金則須回到實體銀行帳戶，辦理實名認證，且單筆及同一天轉帳上限未來都會在子法中規定。

3-2-4 雲端與巨量資料

2012 年行政院參照國內市場各種應用需求與國際產業技術競爭等，從「推動民眾有感應用」、「奠定系統軟體基礎」、「發揮綠色節能效率」、「落實雲端基礎建設」、「建構創新應用之開發能量」等五個面向推動「雲端運算應用與產業發展方案」。期望透過民眾有感的政府雲端應用，促成雲端運算觀念與技術普及化，發揮雲端運算建設的綠色節能與成本節約效益，並協助資通訊產業轉型升級。

現階段雲端運算推動策略係以建置政府雲端服務來帶動我國資通訊產業發展，以推動應用為主，平台與基礎建設為輔。同時採取「先軟體後硬體」的原則，鼓勵政府與企業有效運用既有工具發展雲端運算，並建立一「應用開發測試平台」，媒合供給面與需求面，一方面降低雲端應用建置成本，亦可以試煉本土雲端解決方案，期讓本土研發成果落實到政府雲的各種應用上。

目前政府推動的雲端應用包含食品雲、健康雲、環境雲、農業雲、交通雲、圖資雲、防救災雲、教育雲、文化雲等，將陸續於 2016 年前建置完成，並透過政府資料開放提供給民眾與產業使用。

拜雲端運算技術之賜，這些資料都可以長期的記錄、保存，累積至最後終將成為一股為數龐大的巨量資料，對個人、企業、政府都蘊藏了高度的應用價值。巨量資料的衝擊首先會出現在商業行為上，其次就是政治、社會與文化。賣場業者要推測一個固定購物客戶的家庭組成與飲食習慣絕非難事；電信業者透過基地台的手機註冊紀錄推算客戶日常行蹤，也是輕而易舉；政府可以透過特定醫療用品的銷售資訊，鎖定年長者社會福利的重點區域。這裡面夾雜了商業動機，也可以擴展到政治與社會目的。誰先在巨量資料中挖掘出新的商業服務，就可以領先對手，創造新一波的成長動能。所以，巨量資料不是單單資訊業者的事，更是政府部門及各產業必須深入瞭解的大趨勢。

雲端運算與巨量資料是不可分割的連體嬰，未來「雲端運算應用與產業發展方案」將以 3 年為目標，透過推動民眾有感的政府雲端應用，促成雲端運算觀念與技術普及化，發揮雲端運算建設的綠色節能與成本節約效益。且資通訊產業轉型升級為雲端運算產業，讓我國成為具技術自主能力，可提供雲端系統、應用軟體、系統整合與服務營運之技術先進國家。最後期能普及雲端運算應用，發展臺灣成為政府、企業與個人高度使用雲端服務之先進雲端應用典範輸出國。

3-2-5 資料開放

政府施政透明、提升民眾參與公共政策議題是世界各國政府推動的趨勢，經由政府資料的開放，可促使跨機關資料流通，提升施政效能和各級政府間或各部會間之決策品質，滿足民眾和產業需求，強化民眾監督政府的力量。配合雲端運算及行動服務時代來臨，在政府資源有限下，善用民間無限之創意，整合運用政府資料開放，推動政府資料開放加值應用，發展跨機關便民服務，更是現階段電子化政府的重要主軸。

我國政府規畫以 3 步驟（「資料開放民眾與企業運用」、「以免費為原則、收費為例外」、「資料大量自動化而有系統的釋放與交換」）與 4 焦點策略（「主動開放，民生優先」、「制定開放資料規範」、「推動共用平台（data.gov.tw）」、「示範宣導及服務推廣」）來推動政府資料開放的工作。資料開放的類型以便利及提升民眾生活品質為優先，例如食、醫、住、行、育樂、就業、文化、經濟發展和生活品質等。

根據政府資料開放平台（data.gov.tw）揭露的資訊，截至 2014 年 9 月 10 日，開放平台提供下載的資料集達 2 千多個，資料分類統計參見 • 表 13。

• 表 13 我國政府資料開放平台提供的資料集分類統計

主題分類	數量	服務分類	數量	資料類型	數量
政府統計	827	公共資訊	1,394	原始資料	2,493
生活地圖	143	休閒旅遊	254	系統介接程式	49
生活品質	190	生活安全及品質	308	其他	12
觀光旅遊	181	交通及通訊	179	行動化應用軟體	2
藝文活動	145	求學及進修	103		
災害防救	45	求職及就業	97		
		投資理財	63		
		就醫	121		
		選舉及投票	20		
		開創事業	12		
		生育保健	14		
		老年安養	17		
		購屋及遷徙	9		
		出生及收養	3		
		生命禮儀	2		
		服兵役	5		

資料來源：政府資料開放平台；資料整理：資策會 FIND

3-3 我國未來智慧生活推動方向

資訊國力是否紮實，體現於政府、產業，乃至於社會大眾對資訊科技應用的普及性與熟悉度。將資訊科技融入日常生活中所帶來的各種便利，最能夠讓民眾感受到政策與資訊科技的影響力，以及國家整體發展的明顯進步。「智慧生活」是運用資通訊科技暨數位環境所營造的生活新境界。它提供便捷的服務增進大眾的生活品質；它追求健康樂活和人文關懷的社會價值；它以低碳生活理念促進經濟與環境共榮。

從廣義來說，「智慧生活」是一種生活價值觀的選擇及實踐。它不僅追求便捷的生活品質、健康樂活和人文關懷的社會價值，並以兼容經濟發展與環境保護的原則，用最佳化的手段來實現它。無疑地，資通訊科技扮演實現未來「智慧生活」的成功關鍵因素。以下從安全農業、健康照護、犯罪與災害防治、交通觀光、終身學習、創意樂活來看我國未來智慧生活的推動。

3-3-1 安全農業

所謂「民以食為天」，食品工業是民生基礎工業，也是民生必需工業，更與國民健康有極大的關聯性。食品產業供應鏈的對象多元且複雜，資訊是否透通就是相當關鍵的課題。食品產業供應鏈資訊透通包括「食品追溯」與「食品履歷」兩部份。食品追溯指食品與相關資訊在生產、加工、流通、銷售的每一階段中，都可以向上游或下游追溯（trace or trace back）與追蹤（track or trace forward）查詢。食品履歷則是與食品有關的資訊，從原料、資材、土壤、養殖或種植、收穫後處理、加工、製造、流通、運輸、銷售前的每一階段的記錄。

由於食品的種類繁多，且供應鏈冗長，為擴大推廣並達到完整追溯，未來推動方向如下：

- **推動追溯規範與指引（Good Trace Practice, GTP）**

  為使國內產業在進行追溯時有所依循，故未來將規劃制訂食品追溯之 GTP 標準規範，針對國內食品追溯相關標準，包含訊息、技術、管理、服務等項目，提供詳細之建置指引，以為國內業界之參考，同時進行相關之推動工作。

- **由示範體系帶動，建立上下游追溯**

  未來將透過下游通路商的力量，結合農產端，建立完整之供應鏈追溯。以 2013 年度的食品雲為例，從經濟部業界科專計畫中篩選出超商鮮食、連鎖餐飲、學校團膳、肉品加工 4 大類示範體系，由科專計畫輔助下游業者建立體系的私有雲，農委會配合推動及強化體系上游供應端的履歷資訊，由食品雲計畫協助農產端及下游通路端中間的業者，建立追溯制度及資訊化導入。期望透過政府多方的合作，協助業者建立體系完整的上下供應鏈追蹤追溯。

- **強化平台及整合相關追溯平台**

  雲端技術應用於食品追溯系統，對強化食品追溯十分重要，因此食品追溯制度仍須考慮前後端資訊流之串連及相關作業標準流程的建立。然而，各平台或是各示範體系之間所使用的作業程序與資訊應用架構不盡相同，彼此之間如何溝通，如何統一必要共享之資訊，便成為關鍵且嚴峻的任務。

行政院於 2014 年 9 月宣布推動「食品雲」，未來所有食品業者一律使用電子發票，2014 年 10 月 31 日起食用油率先納管。生鮮、肉製品等八大類食品於 2015 年 2 月 5 日實施；醣類、澱粉等大宗穀類食品於 2015 年 7 月實施；其他食品依風險高低，2015 年底起分階段實施。

「食品雲」建置後可讓食品的追溯追蹤電子化，在幾分鐘內就可得知流向。此一巨量資料庫的建立，也提供衛生福利部食品藥物管理署有力工具，未來能針對數據累積和分析，一旦有值得注意的警訊可即時處理，無須等到食品安全事件爆發才下架。

行政院同時提出「安全鐵三角」概念，意指政府、企業和民眾必須合作。政府管好企業商業行為，民眾勇於檢舉，落實正確概念，才能讓黑心或無良廠商在台灣沒有立足之地。

3-3-2 健康照護

高齡化社會逐漸成型，民眾對於醫療照護資源的需求也必然陸續增加，若要協助民眾更便利的瞭解和取得相關資源，智慧醫療的推動刻不容緩。臺灣已推行的民眾健康照護制度，在國際社會享有極高的評價，藉由與資訊科技的智慧化整合，將可讓民眾享有的醫療服務水準更上一層樓。

行政院於 2013 年 9 月推動健康雲計畫，重點工作包括醫療、照護、保健及防疫等主軸。

- **醫療雲**

  從民眾生病或受傷前往醫療機構就診到診斷治療結束的整段過程，都在醫療雲的範疇內。在這段過程中，個人的病歷資料最能呈現診療的完整紀錄。電子病歷的製作方式與過往的紙本病歷有很大的不同。以往製作紙本病歷時，醫療人員要親自簽章以示負責，但在使用電子病歷後，改為以每個醫事人員專屬的醫事人員憑證 IC 卡做電子簽章，以註明病歷之作者。透過醫事人員憑證 IC 卡作為電子病歷數位簽章，進一步提升資訊安全。

- **照護雲**

  照護雲將區分為二階段進行，第一階段針對慢性病確診民眾進行個案管理，第二階段透過擴展遠距健康照護網絡，逐步納入一般民眾，進行健康促進與疾病預防。針對慢性病及弱勢族群等，透過社區、居家等照護機構來提供健康照護的服務。因不同等級照護單位所掌握的資訊科技資源多寡也不同，希望藉由共用資訊科技資源平台，讓病患透過科技儀器，把資料上傳到遠端資料庫，以有效推廣高品質的照護服務。

- **保健雲**

  保健雲的目標是希望透過資料開放與雲端平台之建置，鼓勵加值服務業者開發各式創新應用軟體，提升臺灣製造終端裝置附加價值，亦帶動智慧型簡易終端軟體業蓬勃發展，讓民眾可以隨時取得健康相關資料，提高個人健康資訊掌控能力，強化自我健康意識與自主權。藉由公私部門協力，提供更多有利於民眾健康促進之服務與產品。同時，透過資料庫之整合建置，以及手持通訊載具之內部支援系統開發，提升衛生福利部國民健康署業務處理效能，增進為民服務效率。

■ 防疫雲

提升防疫資訊網的服務量能是建立防疫雲的首要目標。衛生福利部推動防疫雲的初衷是以現有防疫資訊網為基礎，進行應用服務需求分析、資料庫結構分析、資料內容分析以及使用者需求分析。主要應用內容在於簡化醫院端疫病通報流程及縮短疫情通報作業時間，降低通報人員及時間成本，建立一套完善的防疫通報程序及平台來強化防疫措施，以更有效的疫情管控機制來提高防疫工作績效。

3-3-3 犯罪與災害防治

民眾生活朝向智慧化升級，但基本的生命財產安全保障更加重要，如果天災與人禍頻傳，對於社會安定將有嚴重負面影響。災害與犯罪的防治是確保民眾生活品質提升、基本權益獲得保障的重要工作，如今在資訊科技的協助下，無論是預防或應變處理都已有更好的成效。

利用「巨量資料」協助犯罪偵查

巨量資料技術為近年來熱門議題，警政署將利用現有警政治安資料庫所含各項資料，透過 GIS 圖資應用與視訊影像分析等技術，從資料中萃取出各項有用之資訊，以擴充資料內容與提升系統功能，期能有助於犯罪偵查，進而提升案件偵防能量。

運用「影像分析技術」縮短犯罪偵查時間

監視錄影系統已成為警察治安工作重點，由於影像資料量龐大，需大量人力進行搜尋，如遇監視影像受環境天候影響，影像模糊不清，將影響案件偵辦時程。為協助員警偵辦重大案件或特殊事件，可運用影像分析軟體輔助「縮短調閱時間」及「提升畫面品質」，快速篩選出欲找尋之影像資訊，大幅減少影片蒐查之時間及員警調閱人力之負荷。

另一方面，由於臺灣地形地貌複雜多山且斷層交錯，脆弱地質遭逢颱風、大雨或地震時，極容易遭到破壞。如今全台各地區人口遍布，災害發生時對民眾生命財產威脅巨大。隨著氣候變遷災害發生次數增多且影響加劇，中央與地方政府已陸續布建災害預警與分析的資訊系統工具，期望發揮平時監測預警，災時迅速因應的功能。

近年來隨著行動裝置、感測儀器及社群媒體等各類資訊科技的日新月異，如何將巨量資料進行智慧化運用已成為下一波科技浪潮。因此，如何因應防災巨量資料時代來臨，透過預測模型、資料實例及經驗回饋與學習轉化成防災智慧，帶來更深入的洞察視野、做出更精準的決策分析，為未來防救災資訊運用之重大挑戰。未來推動方向如下：

- 因應防救災巨量資料的「大」的特性，持續建構高整合性之防救災資訊整合雲端平台，強化整合共享能力。
- 因應防救災資料內容多樣且變化快速特性，持續標準化災害資料運用機制，快速供應需求端後續加值分析運用。
- 因應智慧化防災決策需要，運用各類防救災巨量資料，強化巨量資料分析模組如災害風險分析、經驗回饋與學習，以及歷史災害知識庫等。

3-3-4 交通觀光

交通和觀光是智慧生活中主要與「行」有關的民生議題，在智慧生活的願景中也占有相當重要的地位。順暢安全的交通狀況，是提高觀光品質的必要條件，對於民眾生活品質影響重大。

我國智慧交通的後續推動方向，將以強調「整合」與「服務」的整合式運輸服務取代強調「系統」與「功能」的智慧型運輸服務，並透過雲端技術達成跨系統與跨區域整合的目標。針對交通資訊服務、交通控制、公共運輸，以及觀光等領域，規劃推動交通資訊服務雲、區域交控雲、公共運輸服務雲、觀光旅遊服務雲等 4 項智慧交通雲端計畫。

■ 交通資訊服務雲

將原先散布於各地方主管機關的即時交通資訊，經過統一的格式與標準介面蒐集後，再加以過濾與處理以提高資料品質和穩定度，提供給所需民眾或研究單位使用。

■ 區域交控雲

以國道 1 號新竹與竹北交流道附近為示範區域，整合新竹市政府、新竹縣政府、新竹科學園區以及高速公路局跨區域之交通資訊，透過整體路網系統最佳化之概念，進行交通控制與疏導作業。

■ 公共運輸服務雲

以各生活圈區域中的直轄市為核心，透過標準的通訊協定整合鄰近地區的公車資訊，以提供該區域公共運輸資訊單一查詢管道。

觀光資訊科技應用包括開發遊程規劃網路服務、介接交通旅遊資訊、建立景點擁擠警示雛形系統、建立觀光語音導覽深度解說、結合定位技術建立室內及戶外導覽服務、LBS 與行動觀光整合推動與跨領域整合加值服務。

透過網路化及研發創新與跨領域科技整合之產業技術，將觀光資訊更為廣泛應用，以提供遊客旅遊前、旅遊中、旅遊後 3 種不同旅遊階段所需的觀光資訊。

3-3-5 終身學習

終身學習能力為現代社會中個人不可或缺的重要能力之一。政府推動終身學習的對象涵蓋婦女、新住民、高齡者等弱勢族群；學習的場域延伸到家庭、社區、職場等生活領域。而資訊科技的應用可提升民眾終身學習的興趣與效果。未來推動方向如下：

■ 以數位關懷推動民眾的終身學習

- 在偏遠鄉鎮民眾方面，推動整合與充分利用大專校院、民間團體等單位之資源，協助數位機會中心（DOC）所在地之社區或中小學學校應用 DOC，執行該區域之「人才育成」、「商務育成」、「文化育成」等工作，加速中高齡民眾、婦女、新住民等族群之數位應用機會的提升和資訊素養提升，以數位發展實施地方關懷。

- 在原住民方面，持續透過網路提供數位學習各類型的課程資源，提供原住民多元學習課程，增進原住民民眾資訊素養；以豐富的內容、多元的管道提供社會大眾與原住民族認識原住民族語言、歷史、藝術人文等特有文化，傳承並進一步發揮文化創意經濟力量，提升原住民族產業競爭力。
- 在新住民方面，推動「新住民資訊素養教育計畫」，以資訊科技，提供新住民資源及協助，以體現政府之數位關懷；設立「新住民數位 e 媒中心」，配置相關影音播放設備，實施第一次的資訊教育講習，也輔導新住民於網路找到解決方案或找到相關之專家輔導；建置新住民綜合網站 - 愛臺網，促進文化交流心得、日常生活點滴發表等。

■ 提升勞動者競爭力

持續提供各類勞動權益線上課程，維運「全民勞教 e 網」與「職業訓練網路大學」，以及規劃辦理線上及實體混成學習活動，持續推動與鼓勵勞工終身學習。

■ 增進中小企業數位學習培訓範圍

進行雲端的數位學習服務平台與各類型的雲端服務（如應用軟體服務）深度整合，擴展應用服務的範疇。

■ 公務人員數位學習

逐年增加優質的數位教材與課程，提升公務人員培訓的課程品質，並推廣公務人員的線上學習，使公務人員持續不斷吸收新知、內化新觀念，以因應環境的快速變遷與挑戰。

■ 藝文網路學習

以行動學習的方式呈現較短的單元、各行動載具相容且更多樣的內容模式，提供學習者隨處可學習的內容。持續以科技促進公民文化權的落實、創造美學的環境、維護與建立文化價值，以培養、提升我國文化國力，以及提升創意產業的競爭力。

■ 教師線上學習進修

持續新增課程內容和服務全國性的線上開課作業，預期嘉惠更多教師與學習者，也將持續擴增和改善平台的服務。期望數位學習平台的服務以 Web2.0 的開放、互動、分享與貢獻精神，充分發揮數位學習的效益。

3-3-6 創意樂活

創意樂活不僅是發展智慧生活的重要一章，它讓民眾邁向健康樂活的境界，更是智慧生活所追求的主要價值之一。除此之外，創意樂活也意涵著一個崇尚創意的新社會必然是由成熟創意產業為基礎所發展出來的。也就是說，運用資通訊科技增進創意樂活的政策，代表著臺灣資訊國力未來發展的動態能量－它將強化創意產業、邁向低碳樂活經濟，追求全球永續發展的主流價值。

未來創意樂活的相關應用如下：

- 發展以「智慧城市暨城鄉特色」為主軸，結合部會資源及既有輔導補助機制，鼓勵地方政府（六都 / 六鄉）提案，運用智慧科技，推動智慧交通、優質觀光、休閒農業、文創園區活化等地方產業發展計畫。
- 建構以「個人健康暨健康社區」為主軸的醫療管理服務網絡。以電子病歷、遠距照護、健康社區及資料加值等整合應用，建構全方位健康照護之模式經驗。
- 以「貼心服務智慧交通雲」為主軸，運用交通雲基礎建設，擴散與地方交通觀光之整合應用。鼓勵旅遊休閒服務業結合智慧車載電子，發展以消費者為核心，提供無縫便捷即時內容之貼心創新服務。
- 建構以「創新學習模式改造生活風格」為主題之跨產業終身數位學習環境；因應「智慧生活暨創意經濟」時代之產業需求，規劃關鍵人才地圖。並運用智慧科技及示範場域，落實跨領域終身學習工程。
- 以「數位體驗活絡創意園區」為主軸，鼓勵廠商配合地方政府，在都會區或文化園區，運用數位媒體暨智慧科技，結合創意故事及感動元素，創造娛樂多媒體之多元化市集，並藉此活化臺灣創意產業。
- 建構以「智慧生活或樂活創意」為主題的社群網站，提供全球智慧生活應用典範案例、應用情境發想、青年創意分享等之園地。藉由網站的互動服務，增進民眾對智慧生活相關議題的了解和政策參與。

創意樂活不但是智慧生活推動的主軸之一，它也代表美好生活的情境指標。不僅如此，它將影響臺灣未來的產業特質，創造更多由美學創意、文化感動及資訊創新應用所產生的價值，和更多元化的就業機會。它也將逐步降低因經濟發展所需對能源的依賴，讓追求生活品質與環境保護能相容並存。因此，如何以創新、創意、整合的概念，促進產業發展及優質資訊化社會，是創意樂活最基本的訴求，也是臺灣邁向低碳樂活經濟、強化資訊國力的關鍵。

參考文獻

1. B. Bilbao-Osorio, S. Dutta, and B. Lanvin. 2014. *The Global Information Technology Report 2014.* World Economic Forum. Available at: http://www.weforum.org/
2. K. Schwab. 2014. *The Global Competitiveness Report 2014-2015.* World Economic Forum. Available at: http://www.weforum.org/
3. IMD. 2014. IMD World Competitiveness Online. Available at: https://www.worldcompetitiveness.com/OnLine/App/Index.htm
4. Waseda University. 2014. "Waseda–IAC 10th International E-Government Ranking 2014." Available at: http://e-gov.waseda.ac.jp/pdf/2014_E-Gov_Press_Release.pdf
5. World Bank. 2014. 2014. *Doing Business 2014.* The World Bank and the International Finance Corporation. Available at: http://www.doingbusiness.org/~/media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Full-Report.pdf
6. Z. J. Ács, L. Szerb, and E. Autio. 2013. *Global Entrepreneurship & Development Index 2014.* The Global Entrepreneurship and Development Institute. Available at: http://thegedi.org/global-entrepreneurship-and-development-index/
7. 通傳會，2014a，寬頻上網帳號數，http://www.ncc.gov.tw/chinese/news.aspx?site_content_sn=2035&is_history=0
8. 通傳會，2014b，通訊傳播事業概況總覽，http://www.ncc.gov.tw/chinese/news.aspx?site_content_sn=1966&is_history=0
9. 國發會，2013，102 年個人家戶數位機會調查報告，http://www.ncc.gov.tw/chinese/files/14012/3220_31601_140124_1.pdf
10. 韓京呈，2014a，2013 年我國家庭寬頻現況與需求調查 - 家戶篇，http://www.find.org.tw/find/home.aspx?page=many&id=376
11. 韓京呈，2014b，2013 年我國家庭寬頻現況與需求調查 - 個人篇，http://www.find.org.tw/find/home.aspx?page=many&id=386
12. R. D. Yang，2013，*2013 台灣數位生活服務與應用*，財團法人資訊工業策進會。
13. 財團法人電信技術中心，2014，2013 年第二階段量測全國行動上網速率提供情行摘要報告，通傳會，http://www.ncc.gov.tw/chinese/files/14012/3220_31601_140124_1.pdf
14. 資策會 FIND，2012，國際資通訊科技前瞻政策暨趨勢研究報告。
15. 資策會 FIND，2013，資訊國力指標暨政策趨勢研究報告。
16. 資策會 FIND，2014，國際超高速網路應用政策與指標研究報告。

附錄一　臺灣資通訊基礎建設指標近年表現

指標分類	指標名稱	2011	2012	2013	2014	資料說明	資料來源
固網	光纖帳號數 (萬戶)	230.2	263.3	289.5	298.2	除 2014 年為 6 月數據外，餘為該年底數據	通傳會
	有線廣播電視訂戶數 (萬戶)	506.2	498.9	498.5	498.9	除 2014 年為 6 月數據外，餘為該年底數據	通傳會
	有線電視數位機上盒訂戶占比 (%)	11.3	21.0	45.6	60	除 2014 年為 6 月數據外，餘為該年底數據	通傳會
	多媒體內容傳輸平台服務訂戶數 (萬戶)	106.4	120.6	126.5	128.6	除 2014 年為 6 月數據外，餘為該年底數據	通傳會
	家庭連網普及率 (%)	81.8	83.2	84.8		每年 7-8 月調查	資策會 FIND
	民眾上網普及率 (%)	72.0	74.5	75.0		每年 7-8 月調查	資策會 FIND
行動	行動電話持有率 (%)	77.1	81.2	81.9		每年 2-3 月調查	資策會 FIND
	智慧手機持有率 (%)	12.5	30.5	41.6		每年 2-3 月調查	資策會 FIND
	行動網路消費者端平均速率 (Mbps) 下載 上傳		2.5 0.5	4.4 1.1		每年 8-10 月調查	通傳會
	民眾行動上網普及率 (%)	21.3	31.9	37.3		每年 2-3 月調查	資策會 FIND

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