



資訊國力年鑑

TAIWAN E-COMPETITIVENESS ANNUAL REPORT

2015 ▶ 2016





TAIWAN E-COMPETITIVENESS ANNUAL REPORT 2015 ▶ 2016

Yau-Hwang Kuo, Chief Editor
Executive Secretary, Office of Science and Technology,
Executive Yuan

Office of Science and
Technology,
Executive Yuan
December 2016

Foreword

Over the past 30 years, Taiwan has been widely recognized in manufacturing efficiency, established economic miracles through driving efficient economic to the most, and become one of the critical supply chains in global ICT industry. However, Taiwan's success in ICT industry formed a rigid mindset of efficiency and supply-oriented, which has hindered further industry developments in terms of talent cultivation, regulations, and new business models. In order to address emerging digital technology in the fast pace, it is necessary for Taiwan to utilize existing advantage, and further build a solid infrastructure with innovative legal settings, digital talents with multiple disciplines, and capability of developing advance digital technology, so as to transform mindset from supply-oriented to be innovative and demand-oriented, in order to address opportunity in the digital economic, and create another success and paradigm shift.

In response to President Tsai Ing-wen's advocacy for "Digital Nation, Smart Island," Executive Yuan initiated the *Digital Nation and Innovative Economic Development Plan 2017-2025* in November 2016, with the effort of transcending bottleneck of current industrial development, enhancing digital infrastructure, developing the digital economy, realizing a fair and active internet society, and creating a service-based digital government, we hope to build sustainable and smart living environment, so that citizens can enjoy more prosperity, better well-being and higher quality of life. By doing so, this plan targets at 2025 to contribute digital economic scale reaching \$6.5 trillion NT dollars, 80% penetration rate for use of digital lifestyle services, broadband service with bandwidth guarantee 25Mbps and up to 2Gbps, and help to promote Taiwan's e-competitiveness within top 10 ranking worldwide.

E-Competitiveness, simply put, is the readiness of a country's ICT infrastructure and ICT impact on social and economic development. The *Taiwan e-Competitiveness Annual Report 2015-2016* not only presents the competitiveness of government effort on ICT infrastructure, but also highlights Taiwan's determination and ambition on ICT-related policies to further provide better quality of life as well as flourish a digital economy.

This report is printed in both Chinese and English not only to accommodate an international audience, but also to offer local readers and enterprises an understanding of the direction of the next phase of the *Digital Nation and Innovative Economic Development Plan 2017-2025*. More importantly, it demonstrates Taiwan government's determination to increase the quality of life of citizens and the comprehensive development of businesses. With the publication of this report and interaction with international professionals, we hope to share the achievements of Taiwan's ICT industry and developments to the world.



Minister without Portfolio, Executive Yuan

December 2016

Foreword

The *Digital Nation and Innovative Economic Development Plan 2017-2025* (abbreviated DIGI+2025) will be officially launched in 2017, in order to create a sound digital economy, a fair and active internet society, and an open governance digital government are two issues needed to be addressed. The first one, also named digital inclusion, refers to the utilization of digital technology to provide every citizens an equal opportunity to interact and participate with the community through more diversified channels; the other one refers to open governance, which is to enhance the capabilities of government agencies to leverage digital technology, and to align with the concept of open data and open source, so as to respond to the public demand completely and timely.

In more specifically, I hope the public sector can work together with the private sector more closely in the areas of machine learning and cyber physical system (CPS), so that talents in related domains can be brought in and cultivated. Also, policy making process can be more open and transparent, so that people are encouraged to be involved and participation. In terms of digital right protection and digital industry promotion, it can be fulfilled with a solid governance mechanism. These works are what I am trying to do as a minister without portfolio for digital government. Before taking this job, I have positioned myself as the "servant of the public servant", which is to utilize digital technology and systems to support the government to address issues, and encourage interaction and collaboration among the government, civic technology, and public communities.

The *Taiwan e-Competitiveness Annual Report 2015-2016* serves as a medium of exchange of important information between the government and the people. This year's edition includes 8 major international ratings such as the Networked Readiness Index (NRI), the Global Entrepreneurship and Development Index (GEDI), the International e-Government Rankings Survey, the Doing Business, and the Open Data Index, providing a bird's eye view of Taiwan's performance in ICT. It also includes an introduction of Taiwan ICT Infrastructure along with the satisfaction survey of Taiwan's digital quality of life. This annual report concludes with the Executive Yuan's vision of DIGI+2025.

At last, the *Taiwan e-Competitiveness Annual Report 2015-2016* is highly recommended to those who wish to know about Taiwan's ICT capabilities and the latest ICT policies. Hope everyone of us can collaborate together to promote Taiwan's Development Plan of "Digital Nation, Innovative Economic", and to reach the vision of "Digital Nation, Smart Island".



Minister without Portfolio, Executive Yuan

December 2016

Editor's Preface

E-Competitiveness is an important indicator of ICT infrastructure viability and national competitiveness. It includes benefits derived from the ICT industry regarding economic development and is representative of government, social, industrial, and personal digital creativity. E-Competitiveness can also be understood as a key driver in a nation's overall competitiveness and the quality of life of its citizens. In 2003, the Office of Science and Technology, Executive Yuan created a system by which to measure and appraise Taiwan's e-competitiveness. Using information gleaned from international ICT indexes, including the World Economic Forum (WEF) Networked Readiness Index (NRI), Global Competitiveness Index (GCI), the International Institute for Management Development (IMD) World Competitiveness Yearbook and other leading indexes, the office continues to observe and evaluate the effectiveness of Taiwan's ICT policies and Taiwan's performances.

In the 2016 WEF GITR, Taiwan was ranked 19th overall and fourth in the Asia in NRI. Although Taiwan's well-developed infrastructure was ranked second, "political and regulatory environment" and "business and innovation environment" took only 29th space, and economic impacts and social impacts took 20th. These rankings are not only a drag on Taiwan's overall ranking, but—more importantly—clearly show where the emphasis of future domestic policy should lay.

The theme of the WEF Global Information Technology Report 2016 was "Innovating in the Digital Economy". "Digital economy" is economy contributed by ICT forces, while "digital" refers not only to technology, but ideas that can successfully promote innovation at the industrial or individual level. Therefore, it holds that strengthening ICT applications to drive new business models and services will in turn be reflected by further development and progress in society and the economy.

In the 2015 WEF GCI, Taiwan was ranked 15th out of 140 countries and 11th in innovation. As for the IMD World Competitiveness Ranking, due to a recent slowdown in GDP growth, Taiwan's rank in related categories all showed a decline, with Taiwan's overall rank slipping to 14th overall out of 61 countries. The results of these two reports clearly show the vital importance that ICT applications and innovation have on economic growth and a country's international competitiveness. In line with these findings, in 2016, the BOST released the *Digital Nation and Innovative Economic Development Plan 2017-2025 (DIGI+2025)* with the goals of promoting ICT related policy, building a friendly regulatory environment, and fostering cross-discipline personnel. As a roadmap it works to establish soft power on digital economy, encourage cooperation among different industries, utilize digital innovation to accelerate industrial restructuring, and stimulate GDP growth and the development of an innovation driven economy.

The DIGI+2025 also looks to strengthen partnerships between government, social, and business entities, as well as improve the efficacy of smart governance and civil society to build a fair and active internet society. As part of the plan, the government will continue to work towards Gbps UWB and IoT networks, while also encouraging a spirit of regional joint governance and balanced development in the construction of smart

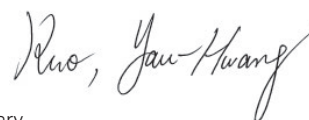
cities and rural areas and in the dissemination of innovative applications. Doing so, Taiwan can become a model of national digital development.

These digital nation developmental measures have as their main policy the transformation of Taiwan into a "Smart Island". They look to elevate standards of living and offer the world a model for the development and spread of smart applications. Such policies will also translate into higher rankings for Taiwan in various ICT indexes, including the International e-Government Rankings Survey, Doing Business, the Global Entrepreneurship and Development Index, the Open Data Index, and the Global Manufacturing Competitiveness Index and hopefully cement Taiwan's place among the top ten nations over the next decade or so.

Added to this year's *Taiwan e-Competitiveness Annual Report 2015-2016* was the category of "Digital Quality of Life Satisfaction Survey". This survey is in line with OECD's Better Life Index, and the research and the finding were presented in 2016 Interdisciplinary Social Sciences Conference and echoed by international research institutes. They point to the problem in which policy investment has been weighed heavily from an economic point of view to the neglect of other quality of life factors. We believe that this survey can go a long way to addressing this shortcoming by offering new analysis on the social impact of ICT applications. We would like to thank everyone that participated in this survey, including the research team of the Institute for Information Industry. Such endeavors will not only encourage further interaction and recognition among international organizations, but also offer concrete and objective data and assessment protocols regarding the acceptance and effectiveness of tech policy planning among populations at large.

As for the future of ICT policy in Taiwan, it will continue to build upon the solid foundations of the past, while creating an environment beneficial for the growth of digital innovation and application in the future. The creation of a friendly regulatory environment, the fostering cross-discipline digital talent, and the development of advanced digital technology will all serve as the foundation for this new digital nation from which a digital economy, digital government, internet society, and smart urban and rural areas can grow and connect with international innovative ecosystems.

This is already the 13th year for the Taiwan e-Competitiveness Annual Report. In the years to come, we will continue to witness and document Taiwan's gradual transformation into a "Digital Nation and Smart Island". This report will also help the people of Taiwan and the international community better understand Taiwan's ICT readiness and overall strengths while we all contribute to the growth and development Taiwan.



Executive Secretary
Office of Science and Technology, Executive Yuan

December 2016

CONTENTS

I Chapter 1. Taiwan's Performance in Global ICT Rankings

- 3 1-1 World Economic Forum's Networked Readiness Index
- 4 1-2 World Economic Forum's Global Competitiveness Index
- 5 1-3 IMD's World Competitiveness Yearbook
- 6 1-4 Waseda-IAC International e-Government Rankings Survey
- 7 1-5 World Bank's Doing Business
- 8 1-6 GEDI's Global Entrepreneurship & Development Index
- 10 1-7 Open Knowledge Foundation's Global Open Data Index
- 11 1-8 Deloitte's Global Manufacturing Competitiveness Index
- 12 1-9 Conclusion

14 Chapter 2. ICT Infrastructure in Taiwan: A Snapshot

- 16 2-1 ICT Infrastructure in Taiwan
- 17 2-1-1 Fixed Broadband
- 20 2-1-2 Mobile Internet
- 22 2-2 Digital Quality of Life Satisfaction
- 24 2-2-1 Quality of Life Among Taiwanese Citizens
- 25 2-2-2 ICT Service Usage Among Taiwanese Citizens

28 Chapter 3. Accomplishments of Taiwan's ICT Policies

- 30 3-1 Taiwan's ICT Infrastructure
- 33 3-2 Digital Convergence
- 34 3-3 Mobile Broadband
- 35 3-4 Equal Digital Opportunities
- 37 3-5 Cloud Computing
- 39 3-6 Big Data and Government Open Data

44 Chapter 4. A Look to the Future

- 46 4-1 International Trends in ICT Policies
- 49 4-2 Digital Nation and Innovative Economic Development Plan (DIGI+2025)

58 References

► List of Figures

- 8 Figure1-1 A Performance Comparison Among Taiwan, the US, and Australia in the GEDI GEI's 14 Pillars
- 9 Figure1-2 A Performance Comparison Between Taiwan, UK, Singapore, and Israel in the GEDI GEI's 14 Pillars
- 17 Figure2-1 Fixed Broadband Subscriptions in Taiwan, 2003-2015
- 17 Figure2-2 Fixed Broadband Subscriptions in Taiwan, 2015-2016
- 18 Figure2-3 DSTB and IPTV Subscriptions in Taiwan, 2015-2016
- 19 Figure2-4 A Comparison of Fixed Broadband Speeds in Taiwan, 2012-2015
- 20 Figure2-5 Mobile Broadband Subscriptions in Taiwan, 2015-2016
- 21 Figure2-6 Mobile Broadband End User Internet Speeds, 2012-2016
- 23 Figure2-7 ICT Service Applications—Fields and Categories
- 24 Figure2-8 Public Quality of Life Satisfaction Scores
- 24 Figure2-9 Quality of Life Satisfaction Scores Across Different Groups
- 25 Figure2-10 Effect of ICT Service Applications on Quality of Life Fields
- 26 Figure2-11 ICT Service Application Favorability Scores
- 27 Figure2-12 Service Usage and Satisfaction Scores Across Different Fields
- 38 Figure3-1 Taiwan's Cloud Computing Plan Promotional Strategy
- 39 Figure3-2 Taiwan's Big Data Goals and Open Data Guidelines
- 40 Figure3-3 Taiwan's Big Data Promotion Efforts
- 41 Figure3-4 Government Open Data Document Rank & Order
- 43 Figure3-5 OKFN 2015 Global Open Data Index Ranking
- 54 Figure4-1 Digital Nation and Innovative Economic Development Plan 2017-2025 Developmental Framework
- 55 Figure4-2 Digital Nation and Innovative Economic Development Plan 2017-2025 Development Goals

► List of Tables

| | | |
|----|----------|--|
| 2 | Table1-1 | Taiwan's ICT Global Rankings |
| 3 | Table1-2 | Taiwan's Networked Readiness Index Rankings, 2015-2016 |
| 4 | Table1-3 | Taiwan's Global Competitiveness Index Rankings, 2014-2015 & 2015-2016 |
| 5 | Table1-4 | Taiwan's World Competitiveness Yearbook Rankings, 2015-2016 |
| 6 | Table1-5 | Taiwan's e-Government Rankings, 2012-2016 |
| 6 | Table1-6 | Taiwan's Score & Rank in e-Government Rankings Survey 2016 |
| 7 | Table1-7 | Taiwan's Ease of Doing Business Index Rankings, 2015-2016 |
| 10 | Table1-8 | Taiwan's Global Open Data Index Rankings, 2013-2015 |
| 11 | Table1-9 | 2016 Global Manufacturing Competitiveness Index Top 10 Rankings and 2020 |
| 16 | Table2-1 | ICT Infrastructure in Taiwan |
| 31 | Table3-1 | 2012-2016 National Information and Communication Initiative Application Highlights |
| 32 | Table3-2 | Goals and Progress of 2012-2016 National Information and Communication Initiative |
| 46 | Table4-1 | Future ICT Policies Announced by Major Counties in the Last Three Years |
| 47 | Table4-2 | ICT Future Policy Focus Among Major Countries |



Chapter 1

Taiwan's Performance in Global ICT Rankings

2016

WEF

Networked
Readiness Index



Number of Participating
Countries/Economies

19th

Globally

4th

In Asia

2015
2016

WEF

Global
Competitiveness Index



Number of Participating
Countries/Economies

15th

Globally

4th

In Asia

2016

IMD

World Competitiveness
Yearbook



Number of Participating
Countries/Economies

14th

Globally

3th

In Asia

2016

Waseda-IAC

International e-Government
Rankings Survey



Number of Participating
Countries/Economies

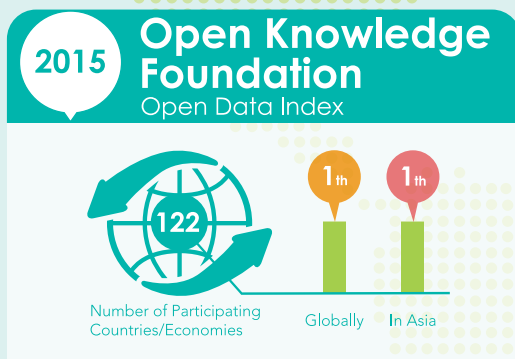
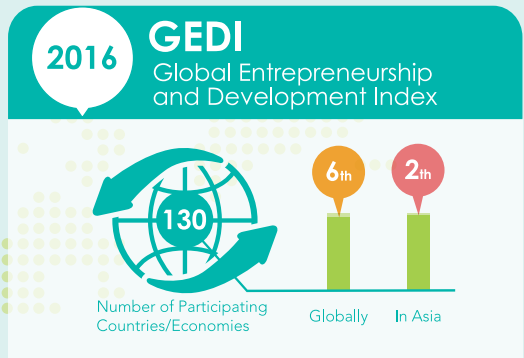
10th

Globally

4th

In Asia





Chapter 1. Taiwan's Performance in Global ICT Rankings

The strengths of a country's e-competitiveness can highlight the degree of implementation and application of information and communication technology (ICT) in the sectors of government, industry, and with individual users. It is also tightly linked with the direction of national policy, and can be an important tool in the measurement of an economy's overall competitiveness, as well as its future prospects.

This chapter will discuss the findings of the World Economic Forum (WEF)'s Networked Readiness Index (NRI) and Global Competitiveness Index (GCI), the International Institute for Management Development (IMD)'s World Competitiveness Yearbook, the World Bank's Doing Business report, Waseda-IAC's International e-Government Rankings Survey, and the Global Entrepreneurship and Development Institute (GEDI)'s Global Entrepreneurship and Development Index (GEDI). In addition, data from the Open Knowledge Foundation's Open Data Index and Deloitte's Global Manufacturing Competitiveness Index is also included in an effort to better understand the effects of open data, industry 4.0 and other recent technological trends on competitiveness. In the following pages, Taiwan's most recent performance among these international benchmarks will be analyzed and discussed. ▶ Table 1-1 shows, at a glance, Taiwan's ranking among each of the eight surveys.

Table 1-1 ▶ Taiwan's ICT Global Rankings

| Survey Year | Survey Organizer | Survey Report | Taiwan's Rank | | Number of Participating Countries/ Economies |
|-------------|------------------------------|--|---------------|----------|---|
| | | | Globally | In Asia* | |
| 2016 | WEF | Networked Readiness Index Impact Subindex | 19 | 4 | 139 |
| | | | 20 | 5 | |
| 2015-2016 | WEF | Global Competitiveness Index-Innovation Pillar | 15 11 | 4 | 144 |
| 2016 | IMD | World Competitiveness Yearbook-Technological Infrastructure sub-factor | 14 12 | 3 | 61 |
| 2016 | Waseda-IAC | International e-Government Rankings Survey | 10 | 4 | 65 |
| 2016 | World Bank | Doing Business | 11 | 4 | 189 |
| 2016 | GEDI | Global Entrepreneurship and Development Index | 6 2 | 2 | 130 |
| 2015 | Open Knowledge Foundation | Open Data Index | 1 | 1 | 122 |
| 2016 | Deloitte | Global Manufacturing Competitiveness Index | 7 | 4 | 40 |

*Does not include the countries of the Middle East.
Compiled by III-FIND.



1-1 World Economic Forum's Networked Readiness Index

The World Economic Forum (WEF)'s Networked Readiness Index (NRI) is the world's most prestigious index with regard to ICT readiness. The annual theme of Global Information Technology Report 2016 (GITR) is "Innovating in the Digital Economy". Among the WEF's 2016 index, Taiwan was ranked 19th overall and fourth in the Asia region.¹ Taiwan's overall score, at 5.5 points, was the same as last year.

As for the report's Impact subindex, Taiwan was ranked 20th, while coming in at 18th in the Economic impacts and 20th in the Social impacts, showing clearly how ICT development has made its presence felt both in the economy and society of Taiwan. Taiwan's rankings as reported in the previous two years of the NRI can be seen in [Table 1-2](#).

In its analysis of the performance of the top seven ranked countries, the annual WEF report notes that although the seven countries showed different strengths and weakness, the one area they shared in common were high scores in the Business usage resulting from their strong levels of business ICT application. Therefore, dealing with the question of how to spur the growth of Taiwan's businesses through ICT driven economic activity (for example, using technology-driven new business models) is a very important consideration in the future development of companies within the digital economy.

Table 1-2 [Table 1-2](#) Taiwan's Networked Readiness Index Rankings, 2015-2016

| Subindex/Pillar | 2016 | | 2015 | |
|--------------------------------------|------|-------|------|-------|
| | Rank | Score | Rank | Score |
| Environment subindex | 29 | 4.8 | 28 | 4.8 |
| Political and regulatory environment | 40 | 4.2 | 38 | 4.3 |
| Business and innovation environment | 14 | 5.3 | 12 | 5.3 |
| Readiness subindex | 2 | 6.4 | 2 | 6.4 |
| Infrastructure | 1 | 7.0 | 1 | 7.0 |
| Affordability | 12 | 6.5 | 13 | 6.5 |
| Skills | 23 | 5.8 | 23 | 5.8 |
| Usage subindex | 16 | 5.5 | 22 | 5.3 |
| Individual usage | 24 | 6.0 | 26 | 5.7 |
| Business usage | 12 | 5.5 | 17 | 5.1 |
| Government usage | 24 | 5.0 | 21 | 5.1 |
| Impact subindex | 20 | 5.2 | 15 | 5.3 |
| Economic impacts | 18 | 5.0 | 17 | 4.9 |
| Social impacts | 20 | 5.4 | 8 | 5.8 |

Source: WEF GITR, 2015-2016; Compiled by III-FIND.

¹ Does not include countries of the Middle East.

1-2 World Economic Forum's Global Competitiveness Index

The WEF's Global Competitiveness Index (GCI) details many of the factors responsible for the improvement of national productivity and competitiveness. The GCI 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 factors subindex accounts for altogether 30% of its total score with the of innovation pillar and business sophistication pillar each accounting for 15%, 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 2015, Taiwan was ranked 15th 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 is reflected in the fact that its highest ranking (10th) is found within the "innovation" pillar. However, 2015 also saw Taiwan fall in rankings in several indicators, a result of a drop in score in the areas of R&D capacity and the cultivation of talent. The report notes that the fostering of innovation and cultivation of talent are critical areas when it comes to raising competitiveness in a low growth environment. With this in mind, Taiwan's falling score in innovation and talent related indicators is an area that certainly needs to be addressed. ▶ Table 1-3 lists Taiwan's rankings in the WEF GCI report for 2014-2015 and 2015-2016.

Table 1-3 ▶ Taiwan's Global Competitiveness Index Rankings, 2014-2015 & 2015-2016

| Subindex/Pillar | 2015-2016 | | 2014-2015 | |
|--|-----------|-------|-----------|-------|
| | Rank | Score | Rank | Score |
| Basic requirement subindex | 14 | 5.8 | 14 | 5.7 |
| Institutions | 27 | 4.9 | 27 | 4.8 |
| Infrastructure | 12 | 5.9 | 11 | 5.8 |
| Macroeconomic environment | 13 | 6.2 | 23 | 5.8 |
| Health and primary education | 14 | 6.5 | 13 | 6.5 |
| Efficiency enhancers subindex | 15 | 5.2 | 16 | 5.1 |
| Higher education and training | 14 | 5.6 | 12 | 5.6 |
| Goods market efficiency | 13 | 5.2 | 11 | 5.2 |
| Labor market efficiency | 22 | 4.8 | 32 | 4.6 |
| Financial market development | 17 | 4.8 | 18 | 4.9 |
| Technological readiness | 28 | 5.5 | 30 | 5.2 |
| Market size | 20 | 5.2 | 17 | 5.2 |
| Innovation and sophistication subindex | 16 | 5.1 | 13 | 5.1 |
| Business sophistication | 21 | 5.0 | 17 | 5.1 |
| Innovation | 11 | 5.1 | 10 | 5.1 |

Source: WEF GCI, 2014-2015 & 2015-2016; Compiled by III-FIND.



1-3 IMD's World Competitiveness Yearbook

The International Institute for Management Development (IMD)'s World Competitiveness Yearbook has a reputation as being one of the broadest of the international indexes due to the impressive number of criteria used to calculate its findings. In the 2016 report, we find that Taiwan's low GDP growth rate has been a drag on several related indicators, all of which showed a drop in score and rankings from years previous. Overall, Taiwan's rank slipped to 14.

Taiwan was ranked 12th globally in technological infrastructure sub-factor, found under the infrastructure factor. According to the IMD's report, Taiwan's strengths within the technological infrastructure sub-factor were the areas of high-tech exports and penetration of broadband accounts, while areas that needed improvement were ICT service exports and costs of mobile phone monthly fee. Over the past two years, indicators relating to mobile communications have been added and adjusted, indicating the growing importance of mobile broadband development in the eyes of the IMD. Despite Taiwan's top-ranked performance in the area of high tech exports in the manufacturing industry, Taiwan's performance in ICT service exports, however, still lags behind in comparison, evidencing that Taiwan still has much to do when it comes to furthering its development of ICT services. Taiwan's rankings in the IMD's 2015 and 2016 World Competitiveness Yearbook are found below in [Table 1-4](#).

Table 1-4 [▶](#) Taiwan's World Competitiveness Yearbook Rankings, 2015-2016

| Factor/Sub-factor | 2016 Rank | 2015 Rank | Factor/Sub-factor | 2016 Rank | 2015 Rank |
|--------------------------|-----------|-----------|------------------------------|-----------|-----------|
| Economic Performance | 15 | 11 | Business Efficiency | 16 | 14 |
| Domestic Economy | 30 | 9 | Productivity & Efficiency | 15 | 15 |
| International Trade | 7 | 14 | Labor Market | 33 | 25 |
| International Investment | 33 | 29 | Finance | 19 | 17 |
| Employment | 16 | 18 | Management Practices | 13 | 10 |
| Prices | 23 | 15 | Attitudes and Values | 19 | 15 |
| Government Efficiency | 9 | 9 | Infrastructure | 19 | 18 |
| Public Finance | 12 | 13 | Basic Infrastructure | 28 | 25 |
| Fiscal Policy | 4 | 4 | Technological Infrastructure | 12 | 9 |
| Institutional Framework | 16 | 19 | Scientific Infrastructure | 10 | 9 |
| Business Legislation | 25 | 25 | Health and Environment | 32 | 29 |
| Social Framework | 21 | 22 | Education | 25 | 21 |

Source: IMD World Competitiveness Yearbook, 2015 & 2016; Compiled by III-FIND.

1-4 Waseda-IAC International e-Government Rankings Survey

Japan's Waseda University carries out an annual survey and analysis of the status and performance of e-government efforts around the world. In its 2016 rankings, Taiwan came in at number 10 globally, fourth in the Asia-Pacific region², and eighth among APEC members. Taiwan's overall ranking for the past five years is shown below in ▶ Table 1-5.

Table 1-5 ▶ Taiwan's e-Government Rankings, 2012-2016

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|-----------------------|------|------|------|------|------|
| Taiwan's Overall Rank | 10 | 8 | 18 | 17 | 10 |

Source: Waseda-IAC e-Government Rankings Survey, 2012-2016; Compiled by III-FIND.

As only the top 10 countries under each indicator were published in the 2016 report, only rankings for e-Government Promotion, Open Government, and Use of Emerging ICT—in which Taiwan was ranked eighth, eighth, and tenth respectively—are listed below. As Taiwan failed to break into the top 10 of the seven remaining indicators, no rankings are available for these areas (see ▶ Table 1-6).

Despite this, the 2016 report saw Taiwan leap from 18th to 10th place overall. Additionally, in the report, each country was placed in one of four quadrants in accordance to their degree of technological and governmental readiness. Taiwan was listed in Quadrant IV, the segment for those countries whose technological and governmental readiness are both above average.

The report showed Taiwan making the biggest gains in the Open Government indicator, proving that recent efforts in promoting e-government are being recognized. However, as the report also showed, Taiwan still has much work to do in the areas of e-Participation and Use of Emerging ICT.

Table 1-6 ▶ Taiwan's Score & Rank in e-Government Rankings Survey 2016

| Indicator | 2016 Score | 2016 Rank | Indicator | 2016 Score | 2016 Rank |
|-------------------------|------------|-----------|------------------------|------------|-----------|
| Network Preparedness | 5.3 | - | e-Government Promotion | 7.4 | 8 |
| Management Optimization | 8.8 | - | e-Participation | 7.5 | - |
| Online Services | 8.8 | - | Open Government | 9.0 | 8 |
| National Portal | 5.6 | - | Cyber Security | 7.6 | - |
| Government CIO | 7.7 | - | Use of Emerging ICT | 5.0 | 10 |

Source: Waseda-IAC e-Government Rankings Survey 2016; Compiled by III-FIND.

2 Does not include countries of the Middle East.



1-5 World Bank's Doing Business

The World Bank's Doing Business report is an in-depth quantitative analysis of the regulatory environments of 189 countries and the benefit these oversight mechanisms and legal regulations may or may not have on a country's business development. The report also offers proposals for the favorable adjustment of government policies and legal environments as future reference.

In the World Bank's 2016 report, released on October 2015, Taiwan's "Ease of Doing Business" ranking was 11th out of 189 countries, a leap of 19 places from the 2015 report. Due to adjustments in the ranking system, this year showed considerable volatility among the rankings. For example, Taiwan's rank in "Enforcing Contracts" rose from 93rd to 16th, an improvement of 77 places. Taiwan's overall rank in the 10 topics of the Doing Business report for 2015 and 2016 can be found below in [Table 1-7](#).

Table 1-7 [▶](#) Taiwan's Ease of Doing Business Index Rankings, 2015-2016

| Topics | 2016 Rank | 2015 Rank |
|-----------------------------------|-----------|-----------|
| Starting a business | 22 | 15 |
| Dealing with construction permits | 6 | 11 |
| Getting electricity | 2 | 2 |
| Registering property | 18 | 40 |
| Getting credit | 59 | 52 |
| Protecting minority investors | 25 | 30 |
| Paying taxes | 39 | 37 |
| Trading across borders | 65 | 32 |
| Enforcing contracts | 16 | 93 |
| Resolving insolvency | 21 | 18 |

Source: World Bank Doing Business, 2015-2016; Compiled by III-FIND.

1-6 GEDI's Global Entrepreneurship & Development Index

The Global Entrepreneurship and Development Institute (GED) Global Entrepreneurship Index (GEI) is an index ranking 132 economies worldwide, including the 21 economies of the Asia-Pacific region. In the 2016 edition, Taiwan was ranked sixth globally and second in the Asia-Pacific region.

Among the GEI's Attitude, Ability and Aspiration sub-indexes, it was in the Entrepreneurial Aspirations category where Taiwan shone the brightest by coming in at the world's number two spot. Among the GEI's 14 pillars, areas in which Taiwan performed well were: Risk Capital, Product Innovation, High Growth, and Process Innovation. On the other hand, Taiwan's performance in the pillars of Competition, Startup Skill, Internationalization, and Technology Absorption were less than satisfactory and require more effort and resources.

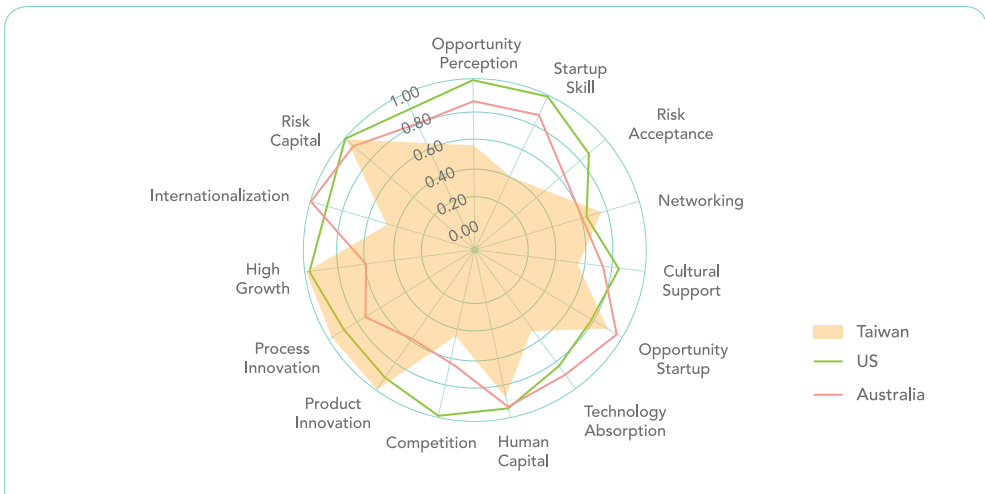


Figure 1-1 ▶ A Performance Comparison Among Taiwan, the US, and Australia in the GEDI GEI's 14 Pillars

Source: GEDI Global Entrepreneurship & Development Index 2016; Compiled by III-FIND.

Relative to the US, which holds the number one spot in this year's Global Entrepreneurship Index, Taiwan showed considerable strength in the pillars of Product Innovation and Process Innovation. Relative to Australia, which holds the number one spot among countries in the Asia-Pacific region, Taiwan showed considerable strength in the areas of Product Innovation, Process Innovation and High



Growth. Areas in which Taiwan needs improvement are the pillars of Internationalization, Startup Skill, Opportunity Perception, Competition, and Technology Absorption.

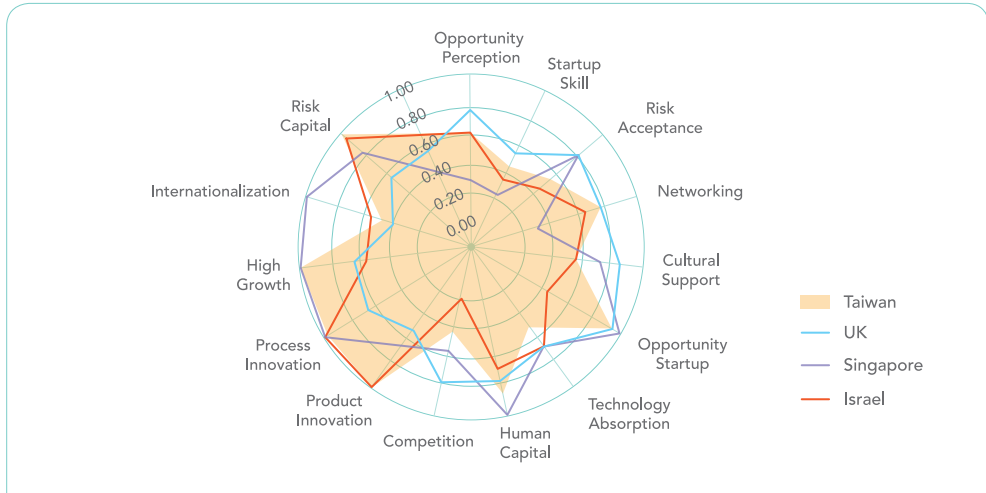


Figure 1-2 A Performance Comparison Between Taiwan, UK, Singapore, and Israel in the GEDI GEI's 14 Pillars

Source: GEDI Global Entrepreneurship & Development Index 2016; Compiled by III-FIND.

Relative to UK, Taiwan showed considerable strength in the pillars of Product Innovation, Process Innovation, High Growth, and Risk Capital; whereas the pillars of Competition and Cultural Support remain weak. Relative to Singapore, Taiwan showed success in the pillars of Opportunity Perception, Networking, and Product Innovation, while being weak in the pillar of Internationalization. Finally, relative to Israel, Taiwan shows considerable strength in the pillars of Opportunity Startup and High Growth.

1-7 Open Knowledge Foundation's Global Open Data Index

In response to the Internet of Everything (IoE), economies worldwide are ushering in new economic eras by leveraging value-added data to offer a host of knowledge service applications. Open data has become a key driver in the acceleration of industry innovation and growth, as well as helping cement "open government" as a new model of governance in countries across the globe. As upstream data suppliers, it is important that governments should consider how they can work to establish safe value-added applications that successfully meet and benefit the public's application service needs. In view of this, the Open Knowledge Foundation is committed to promoting open data and open governments. Since 2013, the foundation has published an annual report ranking governments by open data indicators. Its goal is to shed light on the degree of effort being made by governments in the promotion of open data.

The latest Global Open Data Index, published in December 2015, marks the foundation's third annual publication. In the 2013 report, Taiwan was ranked 36th, before climbing to 11th place in 2014. Taiwan now holds the world's number one spot in the 2015 report. In previous reports, Taiwan failed to break into the top 20 in over half of the report's indicators. In 2015, however, it ranked first among nine of the report's 13 indicators.

Table 1-8 ▶ Taiwan's Global Open Data Index Rankings, 2013-2015

| Category | 2013 Rank | 2014 Rank | 2015 Rank |
|----------------------|-----------|-----------|-----------|
| National Statistics | 44 | 60 | 1 |
| Procurement Tenders | - | - | 1 |
| National Map | 44 | 20 | 1 |
| Legislation | 10 | 12 | 1 |
| Pollutant Emissions | 49 | 6 | 1 |
| Election Results | 35 | 51 | 1 |
| Company Register | 50 | 5 | 1 |
| Government Budget | 19 | 22 | 1 |
| Water Quality | - | - | 1 |
| Weather Forecast | - | - | 7 |
| Government Spending | 20 | 15 | 8 |
| Location Datasets | 8 | 10 | 49 |
| Land Ownership | - | - | 53 |
| Transport Timetables | 52 | 1 | N/A |

Source: Open Knowledge Foundation Global Open Data Index, 2013-2015; Compiled by III-FIND.



1-8 Deloitte's Global Manufacturing Competitiveness Index

Deloitte, together with the US Council on Competitiveness, publishes the Global Manufacturing Competitiveness Index. The index was released in 2010, in 2013, and again in 2016. The report looks at the state of manufacturing competitiveness worldwide by offering current and projected country rankings.

This year's report shows that the development of the manufacturing industry will continue to affect broad swathes of the world economy by promoting infrastructure development, employment opportunities, and increasing national income. Unchanged from the 2010 and 2013 reports, China holds the number one spot as the most competitive manufacturing country in 2016. The US, however, continues to gain ground—going from third in 2013, to second in 2016. The report estimates that the US will capture the world's number one spot in 2020.

Taiwan slipped one place from sixth to seventh in the 2016 report. Furthermore, the report estimates that Taiwan will continue this downward trajectory to come in at ninth place in 2020. Manufacturing is a vital industry for Taiwan and in light of this projection, Taiwan should double its efforts to enhance breakthroughs in innovation and work to attract new talent.

Table 1-9  2016 Global Manufacturing Competitiveness Index Top 10 Rankings and 2020 Projected Rankings

| Country | 2016 Ranking | 2020 Projected Ranking | Country | 2016 Ranking | 2020 Projected Ranking |
|---------|--------------|------------------------|-----------|--------------|------------------------|
| China | 1 | 2 | UK | 6 | 8 |
| USA | 2 | 1 | Taiwan | 7 | 9 |
| Germany | 3 | 3 | Mexico | 8 | 7 |
| Japan | 4 | 4 | Canada | 9 | 10 |
| Korea | 5 | 6 | Singapore | 10 | 11 |

Source: Deloitte 2016 Global Manufacturing Competitiveness Index; Compiled by III-FIND.

1-9 Conclusion

Looking over Taiwan's performance in the above information readiness surveys, we see that Taiwan's prior experience in the ODM/OEM manufacturing industry has not only been the basis of Taiwan's economic development, but also a factor in its ICT competitiveness on the international stage. However, survey rankings over the last two years have shown that the manufacturing industry has space for improvement when it comes to promotion and renewal. In addition, innovation had become indispensable for keeping up with the rapid changes which the ICT field is undergoing worldwide. In this regard, the results of the 2016 World Economic Forum Networked Readiness Index are of particular importance. This year, Taiwan was ranked 19th in the world and—with regard to effect of ICT on economy and society—20th in the Impact subindex. These numbers show us that recent government efforts to promote ICT development for the benefit of public life, business interests, and the national economy are still far from complete.

This year's report also brings in new two international surveys with regard to information readiness. Looking at the data presented by the Open Knowledge Foundation's Global Open Data Index, a picture emerges regarding the success of local efforts in the push for open data. As holders of open data and resources closely related to public life, if governments take steps to assist the ICT field in carrying out value-added applications, thereby helping the public and businesses enjoy better governmental services, they will find themselves in a more active role in the driving of innovation.

Next, according to Deloitte's Global Manufacturing Competitiveness Index, we learn that the era of Industry 4.0 is fast approaching. The Deloitte report offers the impressions of several CEOs of companies based on the current leading countries of the index—US, Germany, and China—and their thoughts regarding the governmental policies contributing to the manufacturing sector's competitiveness and profitability. Among those policies, the CEOs noted, there was no shortage of efforts in using ICT to assist with the creation of a "smart" and digitized industry and propelling the industry towards R&D-focused high value goods and cutting edge manufacturing SOPs. The report's findings also clearly indicated that manufacturing will continue to impact global economic development and clearly showed a strong correlation between manufacturing competitiveness and innovation.

In this time of transition for both governments and industries, innovative thinking is more important than ever. In response, the Office of Science and Technology of the Executive Yuan has laid out its Digital Nation and Innovation Economic Development Plan 2017-2025 (DIGI+2025). Supporting measures of the plan that aims to transform Taiwan into a digital nation include: building upon the strength of Taiwan's digital innovation application infrastructure, strengthening innovation-friendly



regulatory environments, fostering cross-discipline digital talent, and developing advanced digital technology. The plan also highlights a break from the past. Instead of pursuing further development in hardware infrastructure, soft power is now seen as the foundation from which to build up Taiwan's developmental strength over the long-term. The goal is the construction of a digital ecosystem complete with an advanced digital economy and government, internet society and smart urban and rural areas. With regard to social and industrial circles, the goal is to encourage innovative thinking and drive innovative and sustainable development, thereby offering a better digital environment for Taiwan's citizens. This new digital environment, in turn, will be reflected in higher rankings for Taiwan in future e-competiveness. Ultimately this push towards a digital nation and innovative economy is to transform Taiwan into a smart island—one that enjoys a prosperous citizenry and flourishing economic base.

Chapter 2

ICT Infrastructure in Taiwan: A Snapshot

Fixed Broadband

Fixed broadband subscriptions in July 2016
stood at **5.688million**

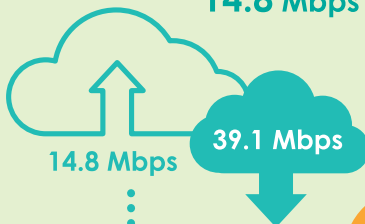
FTTx subscriptions stood at 3.477 million and accounted
for **61.1%** of total fixed broadband subscriptions

Average Broadband
Download Speed

39.1 Mbps

Upload Speed

14.8 Mbps



Household
Broadband
Penetration

82.0%

Internet Penetration

78.0%

Cable TV
Subscriptions

5.144million

Digital STB Penetration

92.9%

IPTV Subscriptions

1.317million



Mobile Internet

Smart Phone Penetration

71.5%



Mobile Internet Penetration

70.4%



Mobile Broadband Subscriptions

20.667million

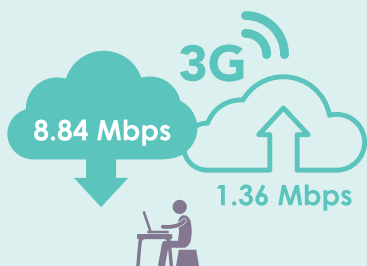


Wireless Broadband Subscriptions

20.772million



=million



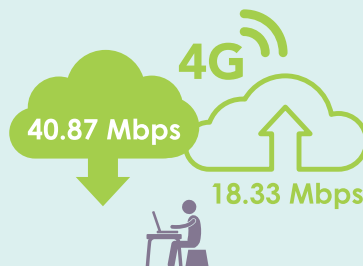
3G Mobile Internet Speeds
(On Consumer end)

Avg. Download Speed

8.84 Mbps

Avg. Upload Speed

1.36 Mbps



4G LTE Mobile Internet Speeds
(On Consumer end)

Avg. Download Speed

40.87 Mbps

Avg. Upload Speed



18.33 Mbps

Chapter 2. ICT Infrastructure in Taiwan: A Snapshot

2-1 ICT Infrastructure in Taiwan

Thanks to the efforts of the government, industry, and academia, Taiwan's ICT infrastructure is currently healthy and stable. For a more detailed look at the various ICT infrastructure indicators, please refer to ▶ Table 2-1.

Table 2-1 ▶ ICT Infrastructure in Taiwan

| Category | Indicators | Statistical Data | Data Release | Source |
|---|---|------------------|--------------|--------|
| Fixed Broadband  | Fixed Broadband Subscriptions | 5.688 Mil | 2016/07 | NCC |
| | FTTx Subscription Penetration | 61.1% | 2016/07 | NCC |
| | Cable TV Subscriptions | 5,144 Mil | 2016/06 | NCC |
| | Digital STB Penetration | 92.9% | 2016/06 | NCC |
| | IPTV Subscriptions | 1,317 Mil | 2016/06 | NCC |
| | Household Broadband Penetration | 82.0% | 2015/07-08 | NDC |
| | Average Broadband Download Speed | 39.1Mbps | 2015 | NCC |
| | Internet Penetration | 78.0% | 2015/07-08 | NDC |
| Mobile Internet  | Mobile Broadband Subscriptions | 20.667 Mil | 2016/07 | NCC |
| | Wireless Broadband Subscriptions | 20.772 Mil | 2016/05 | NCC |
| | 3G Mobile Internet Speeds (On Consumer end) | | 2016/01-03 | NCC |
| | Avg. Download Speed | 8.84Mbps | | |
| | Avg. Upload Speed | 1.36Mbps | | |
| | 4G LTE Mobile Internet Speeds (On Consumer end) | | 2016/01-03 | NCC |
| | Avg. Download Speed | 40.87Mbps | | |
| Avg. Upload Speed | 18.33Mbps | | | |
| Smart Phone Penetration | 71.5% | 2015/07-08 | NDC | |
| Mobile Internet Penetration | 70.4% | 2015/07-08 | NDC | |

Source: NCC, NDC; Compiled by III-FIND.



2-1-1 Fixed Broadband

According to the National Communications Commission (NCC), over the past few years, Taiwan's fixed broadband account subscriptions have been stable (see ► Figure 2-1). FTTx is on its way to replacing ADSL, with FTTx subscriptions surpassing ADSL in 2011. Cable modem subscriptions continue to grow at a slow, but steady pace and surpassed ADSL subscriptions in 2015.

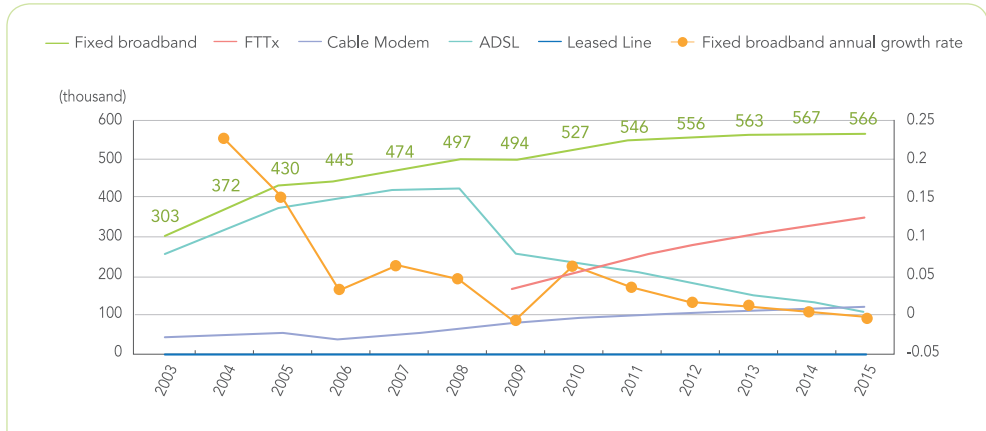


Figure 2-1 ► Fixed Broadband Subscriptions in Taiwan, 2003-2015

Source: NCC; Compiled by I3I-FIND.

Although Taiwan's fixed broadband subscriptions have generally been stable, over the past year, subscriptions numbers have seen some volatility (see ► Figure 2.2). Subscriber numbers reached a high in August 2015 with 5.678 million subscribers. This number dropped to a low of 5.656 million in November of that same year, before increasing once again to reach a new high of 5.688 million subscribers in June 2016, with all signs pointing to continued growth.

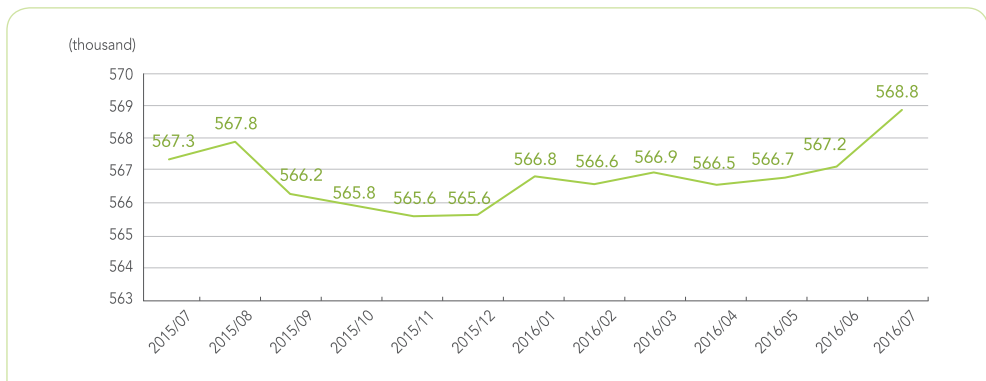


Figure 2-2 ► Fixed Broadband Subscriptions in Taiwan, 2015-2016

Source: NCC; Compiled by I3I-FIND.

FTTx subscriptions stood at 3.242 million in July 2015, rising to 3.477 million in July 2016. FTTx subscriptions accounted for 57.1% of total fixed broadband subscriptions in July 2015 and 61.1% in July 2016. ADSL accounts, on the other hand, dropped from 1.182 million to 929,000 over the same period of time.

Regarding FTTx installation and subscription rates, Chunghwa Telecom offers several plans³. The fastest being 1G/600M, followed by 500M/250M. Non-fixed rates for the two plans are unchanged from last year: NT\$3,599 and NT\$2,399 per month respectively. The 300M/100M plan costs NT\$1,699 per month, while the 100M/40M cost NT\$976—3% cheaper than last year. Chunghwa’s cheapest plan had its speeds increased from 6M/2M to 16M/3M and costs NT\$669 a month.

In June 2016, Taiwan had 5.14 million cable TV subscribers, or 60.52 subscribers for every 100 households. DSTB subscribers stood at 4.78 million with cable TV digitization (i.e. the proportion of DSTB subscribers to cable TV subscribers) reaching 92.87%, a YOY increase of eight percentage points (see ▶ Figure 2-3). The number of pay channel subscribers stood at 1.33 million, or 27.93% of DSTB subscriptions, while IPTV subscriptions stood at 1.32 million, showing that, although as a whole cable TV subscriptions continue to grow, pay channel and IPTV subscriptions remain flat.

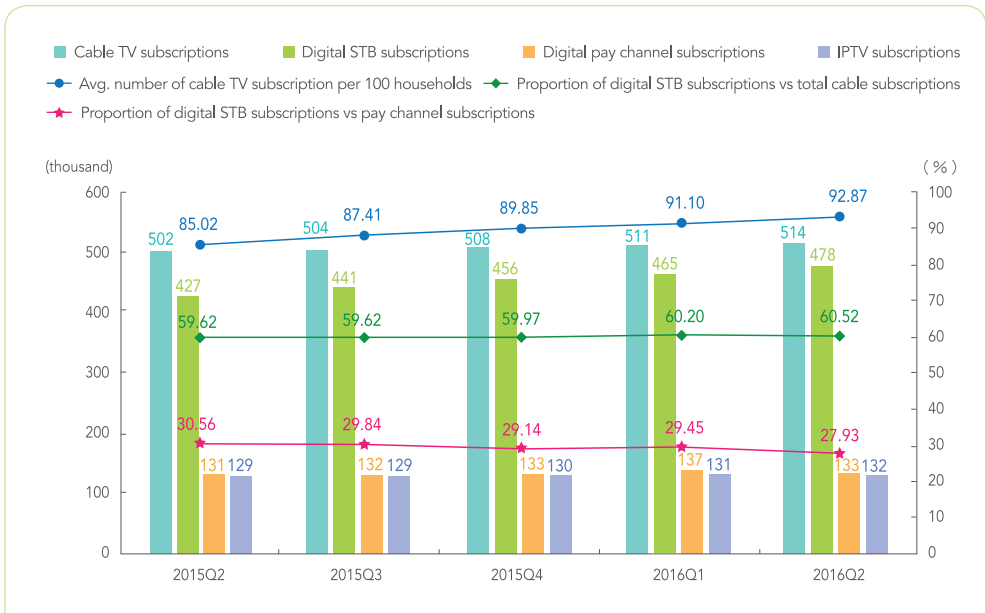



Figure 2-3 ▶ DSTB and IPTV Subscriptions in Taiwan, 2015-2016

Source: NCC; Compiled by III-FIND.

3 Chunghwa Telecom, "Newest promotions—Hinet", <http://broadband.hinet.net/fttx.do?s=1159>, (2016).



According to the 2015 Personal/Household Digital Divide Survey released by the National Development Council (NDC)⁴, which includes survey data from 7/20/2015 until 8/29/2015, for citizens 12 years and older, 85.3% of households had access to a computer, 82% had internet, and 78% had spent time online. Internet users 12 years and older stood at 16.38 million, with 90.2% of them having used wireless or mobile internet services in the past.

According to a NCC report released on March 2016 which tested fixed broadband internet speeds for 2015⁵, for the 22 cities and counties of Taiwan, the average download speed for households was 39.1Mbps, with the average upload speed coming in at 14.8Mbps (see  Figure 2-4). Regarding the consistency of speeds for households in Taiwan, the categories of 70/70 (i.e. 70% of users are able to reach advertised internet speeds 70% of the time) and 80/80 (i.e. 80% of users are able to reach advertised internet speeds 80% of the time), reached 94% and 87.9% respectively for download speeds. For upload speeds, the categories of 70/70 and 80/80 reached 95.7% and 93.5% respectively. The average download speed was 93.8% to 106.2% as fast as advertised, while the average upload speed was 93.3% to 123.6% as fast as advertised. These numbers show that Taiwan's fixed broadband providers are offering internet users a stable and fair internet experience. Regarding the numbers of the study, in order to limit variances arising from differing quality of internet hardware at the user's end, the study was carried out using a hardware test box installed in user's homes and thus was able to achieve a high level of accuracy.

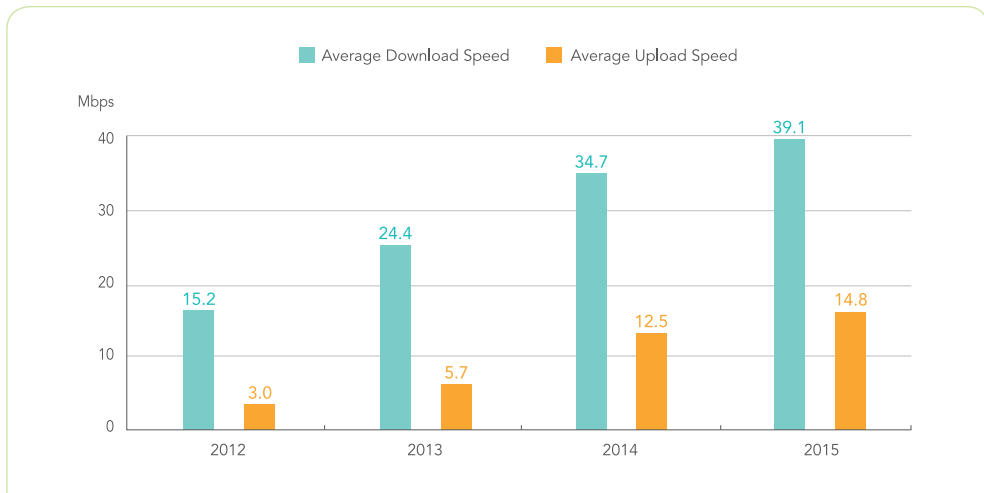


Figure 2-4  A Comparison of Fixed Broadband Speeds in Taiwan, 2012-2015

Source: NCC; Compiled by III-FIND.

4 National Development Council, "2015 Personal/Household Digital Divide Survey," <http://www.ndc.gov.tw/cp.aspx?n=55C8164714DFD9E9>, (2015).

5 National Communications Commission, "NCC Announces 2015 Fixed Broadband Internet Speed Results: Taiwan's Fixed Broadband Speeds Remain Stable," http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&sn_f=35352, (2016).

2-1-2 Mobile Internet

According to the figures of the NCC, the number of 4G mobile internet users in Taiwan surpassed 3G mobile internet users in September 2015 (see ▶ Figure 2-5). As Figure 2-5 clearly shows, in just a short period of time, 4G has been replaced by 3G as the mobile internet of choice. From July 2015 to July 2016, 3G mobile internet users showed a YOY drop of 47.8%, or 4.56 million subscribers. Over the same period of time, the number of 4G mobile internet users rose by 7.75 million, for a total of 15.68 million subscribers. From a mobile communications provider's point of view, from July 2015 to July 2016, 3G mobile phone users dropped from 19.96 million to 12.81 million, a YOY loss of 7.15 million users. Over the same period, 4G mobile phone services added 7.75 million new users. For the year, the number of 3G mobile phone subscribers to also open a 3G mobile internet account dropped from 47.9% to 39%, showing that the superior speeds offered by 4G are the major reason behind the upgrade to 4G from 3G. In total, as of July 2016, mobile broadband internet has 20.66 million users, or 87.9 people out of 100.

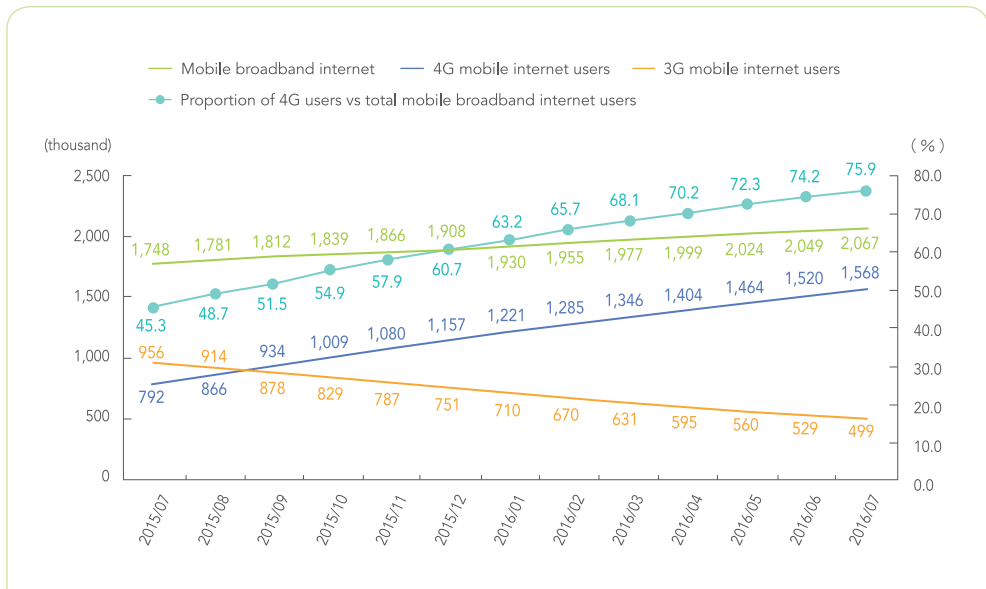



Figure 2-5 ▶ Mobile Broadband Subscriptions in Taiwan, 2015-2016

Source: NCC; Compiled by III-FIND.

The NCC recently changed its definition of PWLAN accounts from any previously registered, to only those which have been active over the past year. This translated into a large drop in the number of PWLAN users recorded. According to the NCC, in July 2016, Taiwan's PWLAN subscribers stood at 104,000. Including the number of mobile broadband internet users, in total, Taiwan's wireless broadband subscribers reached 20.77 million.



According to a May 2016 NCC report, for the first quarter of 2016 (a period from 1/21 to 3/31) in Taiwan's mobile internet speed tests⁶ 4G download and upload speeds clocked in at an average of 40.87Mbps and 18.33Mbps respectively. Average download and upload speeds for 3G clocked in at 8.84Mbps and 1.36Mbps respectively (see  Figure 2-6). These numbers show that the construction of 4G infrastructure has allowed Taiwan's mobile broadband users to enjoy much faster internet speeds and has made life more convenient for users.

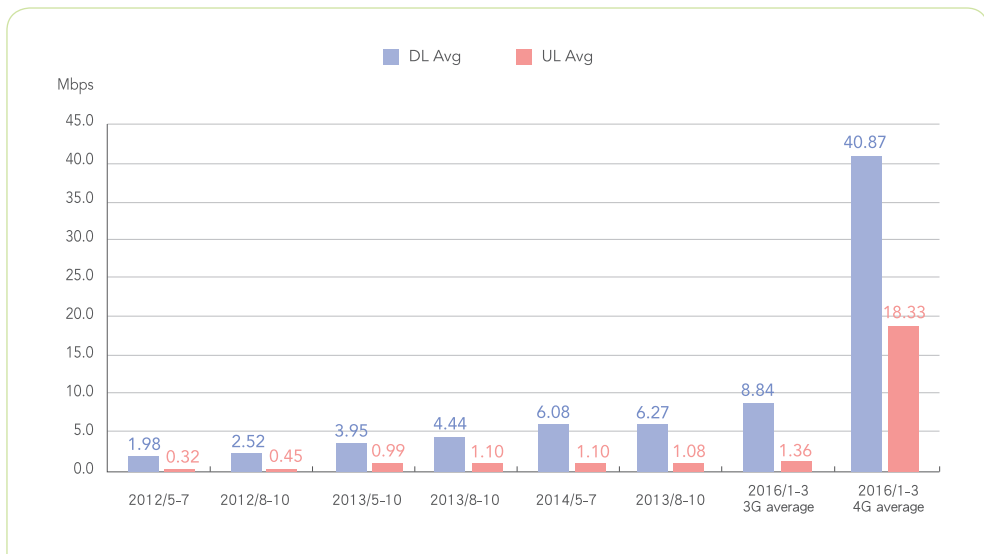


Figure 2-6  Mobile Broadband End User Internet Speeds, 2012-2016

Source: NCC; Compiled by III-FIND.

In the 2015 report, Personal/Household Digital Divide Survey, the NDC reported that for citizens ages 12 years and up, the number of those possessing a smart phone rose from 66.2% in 2014 to 71.5% the year following. For internet users 12 years and older, those possessing a smart phone rose from 84.9% in 2014 to 91.6% in 2015. Finally, among citizens 12 years and older, internet penetration rates were at 78%, while broadband penetration rates stood at 70.4%.

⁶ National Communications Commission, "Results of 4G Internet Speed Tests for First Quarter of 2016," http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&is_history=0&pages=1&sn_f=35671, (2016).

2-2 Digital Quality of Life Satisfaction

In addition to focusing on economic categories, international assessment of a country's development should include a measure of indicators in national well-being and social progress. Especially in this era of rapid development of the internet, the role of information and communication technology (ICT) in improving quality of life of citizens has become an important issue to consider. Therefore, the Institute for Information Industry (III), with the support of the Office of Science and Technology of the Executive Yuan, has for the first time developed a framework to measure digital life satisfaction. Collecting the opinion of experts and the public, the III has come up with 12 publicly relevant ICT service application fields on which this study and its results were based, these being: intelligent transportation and transport services, employment and entrepreneurial services, smart digital home services, environment quality monitoring and improvement, disaster prevention and community safety, food safety and traceability, digital medical and health promotion, instant messaging and online communities, online banking and internet shopping, e-government and interactive government, digital education and lifelong learning, and digital entertainment and tourism.

Each field is composed of 3 to 9 different service areas, some of which are defined as absent—i.e. Taiwan at present lacks this service, or this service is still in its infancy and lacks public awareness. Among the 12 ICT service application fields, the 2015 study found a total of 91 service applications, with 26 of them currently being defined as absent and 65 as available (see ▶ Figure 2-7).

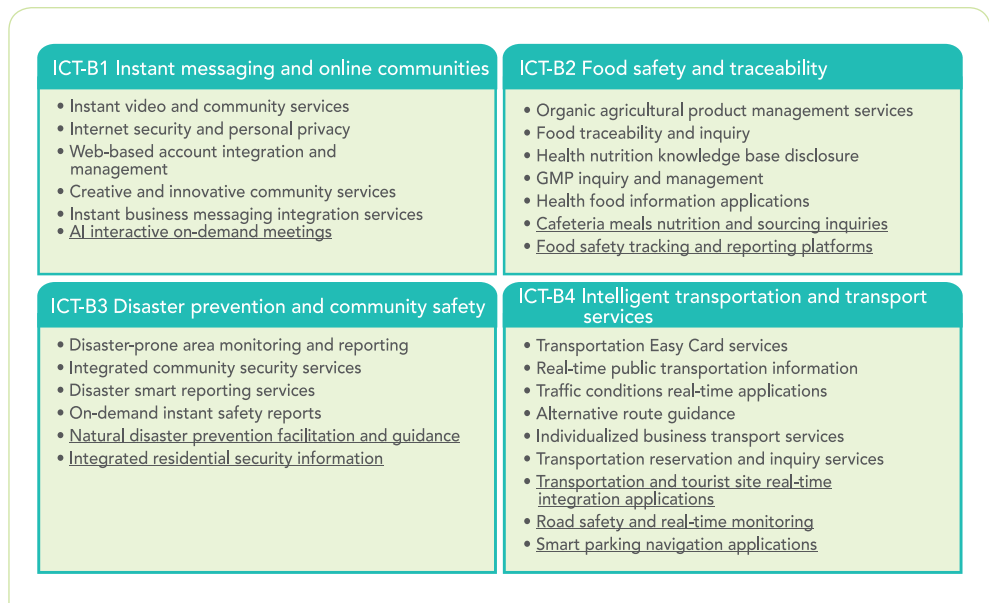




Figure 2-7  ICT Service Applications—Fields and Categories

Source: III-FIND.

2-2-1 Quality of Life Among Taiwanese Citizens

This study carried out its first yearly survey from August 3, 2015 to August 27, 2015. The survey's target group was composed of Taiwanese citizens 15 years or older drawn from each of Taiwan's cities and counties. Altogether, 1,603 valid samples were collected. Results showed that the score for overall quality of life for Taiwanese in 2015 stood at 62.8 points. Satisfaction levels were highest in the field of "health status" (70.1), followed by "social connections" (68.8) and "housing conditions" (67.8) (see ▶ Figure 2-8).



Figure 2-8 ▶ Citizens Quality of Life Satisfaction Scores

Source: III-FIND.

Age-wise, enrolled students between the ages of 15-24 showed higher levels of satisfaction compared with other age groups. Education-wise, we see that higher levels of satisfaction were commensurate with higher education levels, with satisfaction scores highest among those studying at the graduate level and above. As well, those with access to the internet showed higher levels of satisfaction than those without, and, finally, we see a positive correlation of higher incomes to higher levels of satisfaction (see ▶ Figure 2-9).

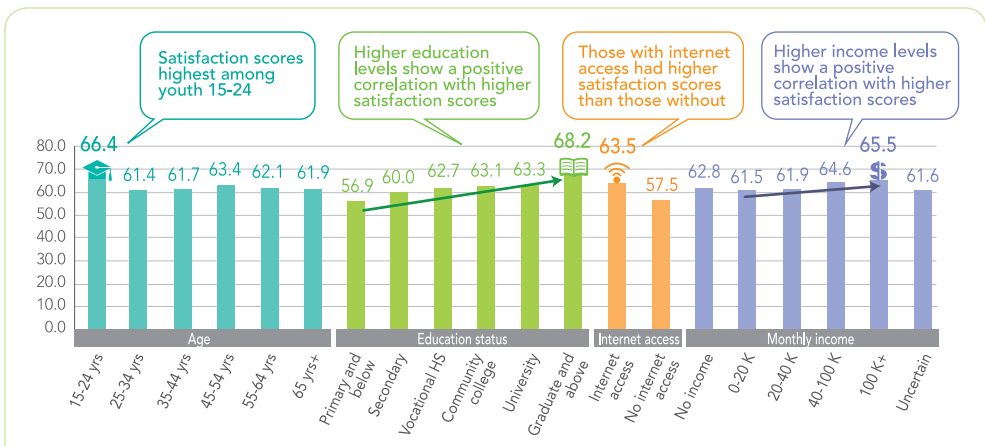


Figure 2-9 ▶ Quality of Life Satisfaction Scores Across Different Groups

Source: III-FIND.



2-2-2 ICT Service Usage Among Taiwanese Citizens

As the 2015 study shows, ICT service applications have a definitive effect on quality of life, with higher ICT satisfaction levels correlating to higher quality of life scores. As Taiwan has already been transformed into an information society, continued investment in the promotion of ICT services is an extremely effective way to improve the public's overall quality of life.

The three ICT service application areas that have the biggest correlation with quality of life which are: instant messaging and online communities (1st), food safety and traceability (2nd), and disaster prevention and community safety (3rd). That these three fields have been shown to have the largest effect on quality of life shows the great importance that citizens attach to safety-related issues, which include both personal safety and internet security (see ▶ Figure 2-10).

| ICT Service Application Fields | Quality of Life Fields | Jobs and earnings | Education and skills | Health status | Income and wealth | Environmental quality | Personal security | Housing conditions | Work and life balance | Civic engagement and governance | Social connections | Influence ranking |
|--|------------------------|-------------------|----------------------|---------------|-------------------|-----------------------|-------------------|--------------------|-----------------------|---------------------------------|--------------------|-------------------|
| ICT-B1-Instant messaging and online communities | | | * | * | * | * | * | * | | * | * | 1 |
| ICT-B2-Food safety and traceability | | * | | * | * | | | | * | * | | 2 |
| ICT-B3-Disaster prevention and community safety | | | | | | ** | ** | * | | | | 3 |
| ICT-B4-Intelligent transportation and transport services | | | | * | * | | * | * | | | * | 4 |
| ICT-B5-Smart digital home services | | | | | | | | | ** | * | * | 5 |
| ICT-B6-Digital education and lifelong learning | | | ** | * | | | | | * | | | 6 |
| ICT-B7-Employment and entrepreneurial services | | * | | | * | | | | | * | | 7 |
| ICT-B8-Digital medical and health promotion | | | | ** | | | | ** | | | | 8 |
| ICT-B9-Digital entertainment and tourism | | | | * | | | * | | | | * | 9 |
| ICT-B10-E-government and interactive government | | * | | | | | | | | ** | | 10 |
| ICT-B11-Environment quality monitoring and improvement | | | | | | * | | | | * | | 11 |
| ICT-B12-Online banking and internet shopping | | * | * | | | | | | | | | 12 |

★ Represents area of influence; more stars (★) means higher resiliency and greater influence on the quality of life in that area.

Figure 2-10 ▶ Effect of ICT Service Applications on Quality of Life Fields

Source: III-FIND.

In order to better understand how Taiwanese regard different ICT fields, after a description of a field's relevant services and environment, participants—regardless if they had experience with the field in question—were asked to rate their favorability, with 0 being the lowest score that could be given and 100 the highest. Looking at the favorability scores of the different fields, intelligent transportation and transport services received the highest score at 72.1. Next came digital medical and health promotion at 68.7, followed by digital entertainment and tourism (65.8), online banking and internet shopping (62.6) and smart digital home services (62.3). For a complete list please refer to ▶ Figure 2-11.

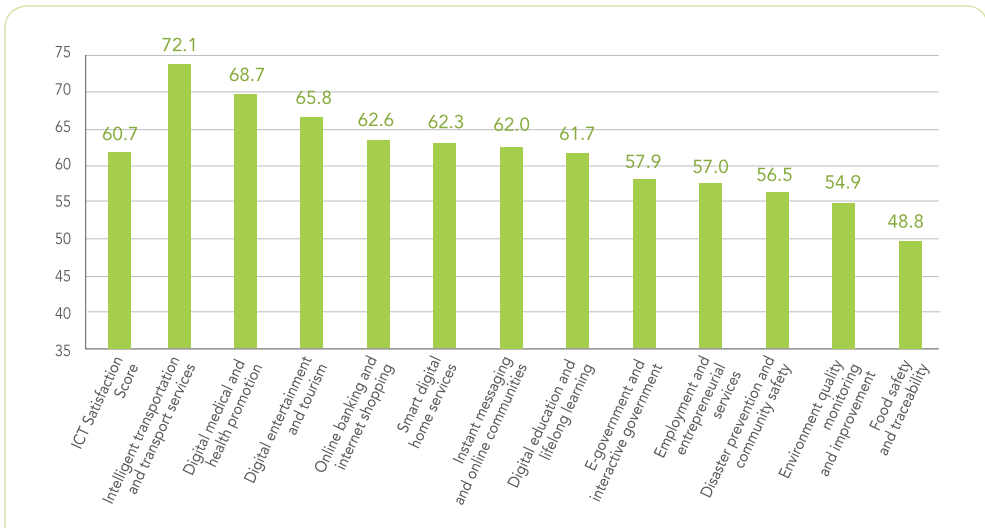


Figure 2-11 ▶ ICT Service Application Favorability Scores

Source: III-FIND.

Regarding the rate of usage, the field of intelligent transportation and transport services had the highest usage rate at 90.9%, followed by instant messaging and online communities (77.8%), online banking and internet shopping (76.5%), digital medical and health promotion (76.3%), and digital entertainment and tourism (73.6%). Of the 12 ICT fields, the top three fields in terms of satisfaction levels—intelligent transportation and transport services, digital medical and health promotion, and digital entertainment and tourism—all had satisfaction levels of 60 points or more. Through qualitatively-based interviews, we know that respondents look forward to future improvements in the integration of ICT services within the area of transportation and transport, for example, combining travel (attractions, accessibility, etc.) with traffic information (public transport, road conditions, parking options, etc.). We believe that further steps in this direction would lead to even higher satisfaction scores (see ▶ Figure 2-12).

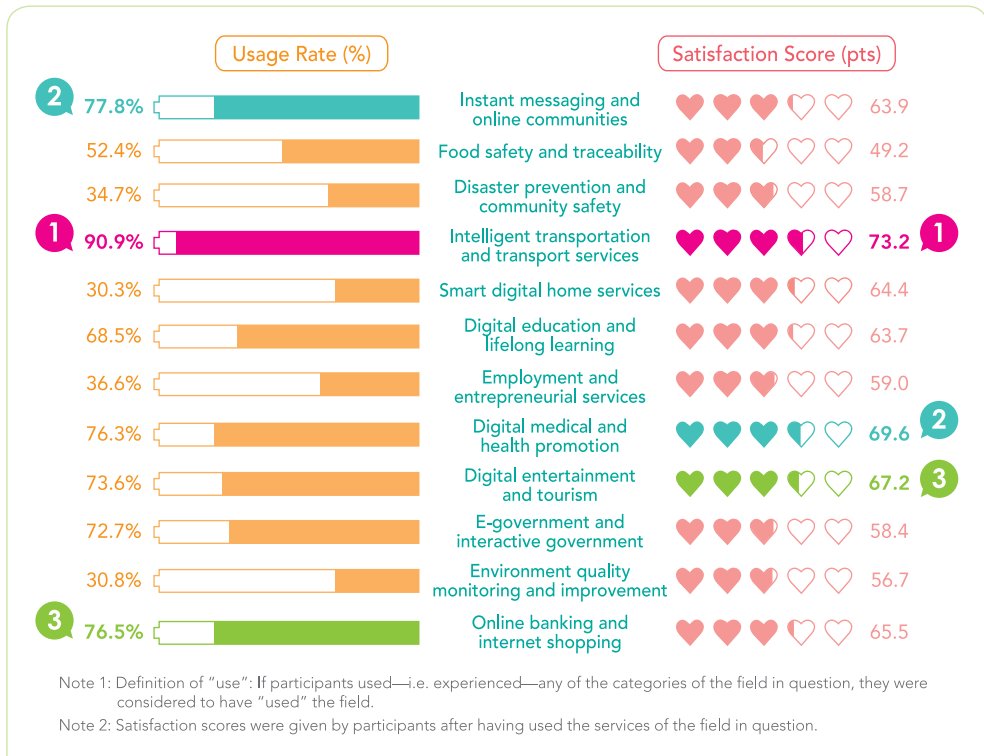


Figure 2-12 ▶ Service Usage and Satisfaction Scores Across Different Fields

Source: III-FIND.

This study has found that ICT service applications have a great impact on the quality of life of citizens, while also detailing which fields are particularly relevant. The results of this study can hopefully serve as a reference for the Office of Science and Technology at the Executive Yuan during the forwarding of related ICT policies and cases such as the drafting of Smart City policy options.

Amid the rapid evolution of ICT service applications, we should conduct a long-term observation of the development of ICT service applications in order to accumulate relevant, up-to-date data. This long-term data, when coupled with the scientific and rigorous investigation, will be an extremely valuable lode of information that can be referred to when planning or implementing future ICT related policies.



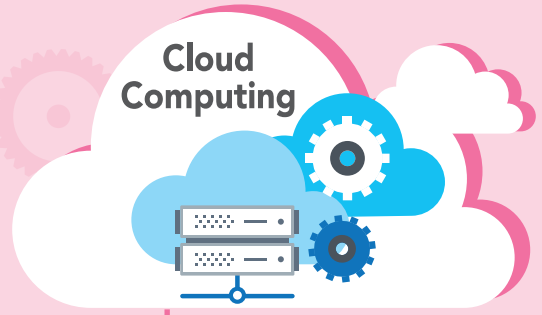
Chapter 3

Accomplishments of Taiwan's ICT Policies

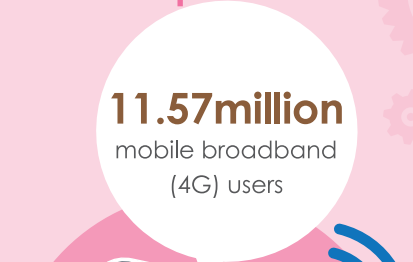


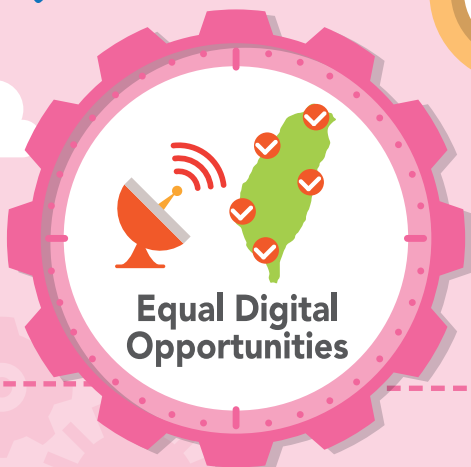
100Mbps high-speed broadband available in **98%** of households

17.92million wireless broadband internet subscribers



72% satisfaction rating in users of innovative services





Equal Digital Opportunities



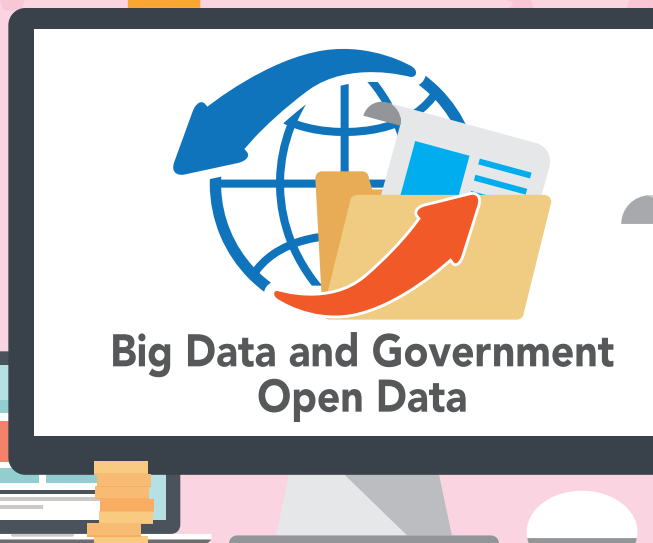
Internet penetration rate of **74.5%** in rural areas



Internet penetration rate of **58.9%** in remote rural areas reaches



Taiwan Leads in Open Data



Big Data and Government Open Data

Satisfaction rate of **77%** on on-line government services



Chapter 3. Accomplishments of Taiwan's ICT Policies

3-1 Taiwan's ICT Infrastructure

The 2012-2016 National Information and Communication Initiative (NICI) was developed in accordance with national developmental needs and global trends in ICT development, the suggestions of the National Information and Communication Initiative civil advisory committee, and the careful discussion and planning of scholars and experts in relevant fields. The focus of the initiative is on transforming Taiwan into a "smart" nation—one that enjoys a safe, convenient, healthy, and culturally-driven internet society.

Policy-wise, the initiative upholds energy saving & carbon reduction goals and the promotion of ICT related applications to help solve issues of social development, to spur the development of IT enabled services, enhance ICT applications, and foster life-long learning concepts. Such steps will help residents better understand the benefits of ICT, as well as work to transform Taiwan into a model for the information societies of world. The initiative also assists local businesses by increasing domestic consumption, opening up new international markets, and upgrading the ability of businesses to meet these greater opportunities. The five central provisions of the initiative are as follows:

- (1) Convergence Network Construction: Construct a wireless broadband and digital convergence network; promotion of IoT; completion of a high-quality yet inexpensive broadband network.
- (2) Government Services Innovation: Use ICT to integrate and innovate government services; encouraging resident participation and improving social mutual trust.
- (3) Application Services: Promote services and applications in the areas of food, health care, housing, and transportation that meet the needs and expectations of residents and also energy saving & carbon reduction goals.
- (4) Smart Life Industries: Accelerate the promotion of industries such as disaster prevention, smart healthcare, smart transportation, smart grids, and smart logistics; offer research incentives to local governments and companies to spur investment in value-added applications and the creation of new business models.
- (5) Digital Care Penetration: Benefit the disadvantaged groups with digital opportunities; create a caring and inclusive information society.

The initiative's targeted domains and application highlights can be found below in ▶ Table 3-1.



Table 3-1 2012-2016 National Information and Communication Initiative Application Highlights

| Domain | ICT Application Highlights |
|----------------|---|
| Infrastructure | 1. Speeding up construction of broadband infrastructure to foster further development of the ICT industry 14,903 km of broadband cable being laid, equivalent to 15 times of cir-cumference of Taiwan. |
| | 2. Offering citizens a diverse and first-rate HD viewing environment Enhancing the overall quality of domestic TV program production with 4,744 hours of HD TV programs broadcasted. |
| | 3. Setting iTaiwan free wireless service 8,800 free wireless hot spots island wide being accessed over 133.94 million times. |
| | 4. World leading government open data <ul style="list-style-type: none"> · Government open data platform disclosing over 13,375 documents. · Taiwan was ranked first in the Open Knowledge Foundation's 2015 Global Open Data Index. |
| Services | 1. Assisting government efforts in helping disadvantaged groups apply for critical services Integrating with central government's database to offer quick and easy local registration without repetition. Mobile system used by local offic-ers or social workers to help families apply for emergency assistance or other services, while reducing application time to 1-2 weeks. |
| | 2. Establishing a user-focused government service web platform Digital Life Dashboard accumulating 910,000 members, connecting 250 messaging services from various government agencies, and over 2.17 million message service being subscribed. |
| | 3. Integrating and reengineering tax information and tax payment QR Code Paying taxes online QR Code within 225 seconds —including online in-formation check and data input—39.2% faster than traditional web tax services. |
| | 4. Constructing smart traffic management and information service systems <ul style="list-style-type: none"> · Real time traffic information platforms: Reducing delay times at intersections by 10-15% on average. · Smart Buses: 14 cities and counties having constructed city bus dynamic information systems, reducing wait times for passengers by 5 minutes or more. · Smart Traffic Control System: 18 cities and counties having constructed standardized traffic control centers. The restructuring and renewal of traffic markers having been carried out at 3,476 intersections. |
| | 5. Construction of M-Police (police mobile device and systems) and com-munity e-safety and protection mechanisms <ul style="list-style-type: none"> · Over 11,020 M-Police devices helping improved criminal capture, stolen vehicle retrieval and missing person return rates. · 142,568 security cameras installed to build a social safety network for a safe and quality living environment. |
| | 6. Photovoltaic systems in public buildings as stand alone, renewable energy sources <ul style="list-style-type: none"> · 561 photovoltaic systems istalled in public buildings having produced 9.92 million kWh of electricity, serving as a model of renewable energy and universal education, while helping to revitalize the economy and en-vironmental protection efforts. |

| Domain | ICT Application Highlights |
|--------------|--|
| Digital Care | <p>1. Mobile Classroom: Innovation in digital learning services</p> <ul style="list-style-type: none"> · Mobile learning van having made a total of 838 trips around Taiwan, offering access to computers and resources according to student curriculum needs. Offering training to new citizens to reduce learning and digital divides. · 3D printing mobile testvan having made 500 trips to high schools around Taiwan promoting Fab Lab 3D printing technology and hands-on implementation to help students find concrete channels for their creative expression. |
| | <p>2. Enhancing digital literacy in rural areas with Digital Opportunity Centers (DOC), digital learning partners, and information volunteer teams</p> <ul style="list-style-type: none"> · Digital Opportunity Center (DOC): Currently funding 507 Digital Opportunity Centers holding information application personnel training with 8,995 classes given and 142,620 people participated. · Digital Learning Partners: 5,573 university students from 94 universities tutoring 4,234 middle and elementary school students from 344 middle or elementary schools. · Information volunteer teams: 370 volunteer teams having visited 781 rural schools and DOCs to help with information application services. A total of 6,768 visits (or 376,256 hours) having been spent assisting 52,256 people. |

Source: Intelligent Taiwan Plan; Compiled by III-FIND.

Progress of related government agencies in meeting projected initiative goals as of the end of 2015 is shown below in ▶ Table 3-2.

Table 3-2 ▶ Goals and Progress of 2012-2016 National Information and Communication Initiative

| Area | Projected Goal (2016) | Progress (as of end of 2015) |
|----------------------------------|--|--|
| Convergence Network Construction | 7.2 million FTTx users by 2015; 80% of households with internet access of 100Mbps | 98% of households having gained access to 100Mbps high-speed broadband; 4.73 million FTTx users; 17.92 million wireless broadband internet subscribers |
| Government Services Innovation | Satisfaction rate of 70% on e-government services | Satisfaction rate of 77.35% on on-line government services |
| Applications | 65% of residents aged 15 years and older with access to innovative services with satisfaction rate of 70% | 62.9% of residents aged 15 years and older with access to innovative services with user satisfaction rate of 72% |
| Smart Life Industries | NT\$100 billion in private investment (2010-2014) | NT\$268.6 billion in private investment (2010-2015) |
| Digital Care Penetration | Internet penetration rate of 72% in rural areas 117,000 senior citizens instructed in computer training | Internet penetration rate of 58.9% in remote rural areas reaches Internet penetration rate of 74.5% in rural areas |

Source: Office of Science and Technology, Executive Yuan.



3-2 Digital Convergence

The Digital Convergence Development Plan, 2010-2015, enacted by the Executive Yuan in 2010 states that the government shall work to promote digital convergence, assist in industry transformation, and strengthen international competitiveness through the six pillars of "high-speed broadband internet preparation", "telecom convergence services promotion", "television digitization acceleration", "new video services construction", "telecommunications industry upgrade", and "digital convergence regulatory environment mediation". Meanwhile, a digital convergence task force was established to assist and promote the work of digital convergence in Taiwan. In view of the changes in the technology and industry of broadcasting, in May 2012, the Executive Yuan reviewed and approved a second version of the Digital Convergence Development Plan, 2010-2015, adding "TV content enrichment" as the plan's 7th pillar and bringing together various departmental resources to promote and encourage local audio-visual content production and transmission.

Following the implementation of the Digital Convergence Development Plan, Taiwan's overall broadband infrastructure has been greatly improved. As of the end of the 2015, the following milestones have been reached:

- (1) In June 2012, analog TV signals were discontinued thereby completing the conversion to digital TV; currently each TV station has at least one channel capable of broadcasting high definition programming.
- (2) The release of 4G mobile broadband services was completed in 2014. At the end of 2015, 4G services have 11.57 million subscribers and it is estimated by 2020 that number will rise to 28 million.
- (3) 100Mbps broadband service expanded among households. Currently, including those with fixed cable television broadband, 100% of households in Taiwan now have access to 100Mbps broadband network service.
- (4) Promotion of cable TV digitization. Digitization of cable TV has achieved an overall penetration rate of 87.41%, with penetration rates on the island's more remote east coast and outlying islands at 22%.
- (5) Currently Taiwan has 171 high definition TV channels offered by cable and broadcast TV stations, offering residents the ability to easily access HD program.

Being responsible for the supervision of the convergence initiative, the Executive Yuan Digital Convergence Task Force was merged with the National Information and Communication Initiative Committee in January 2014. This new digital converge committee, now supervised by the NCC, continues to work to promote digital convergence.

3-3 Mobile Broadband

Since 2014, Taiwan has been promoting the Mobile Broadband Service and Industry Development Initiative. The focus of the initiative has been to accelerate the rate of mobile broadband network construction so that residents can enjoy high-quality, yet affordable high-speed mobile broadband service. The initiative contains five action plans: (1) expediting network deployment, (2) creating innovative applications and services, (3) protecting consumers' rights, (4) developing advanced core technologies, and (5) nurturing innovative high-tech talent. When fully implemented, the initiative is expected to bring 4G service to 13 million Taiwanese households and annually generate over US\$1 billion in business. Along with the plan, it is hoped that the following milestones can be achieved by the end of 2017:

- 4G coverage available for 90% of the population
- 16 million 4G subscribers
- The establishment of a beyond 4g (B4G) innovative application certification and a HetNet equipment testing domain
- The creation of rich and innovative digital services content, creative talent training content, MIT brands/content, and associated overseas marketing
- The creation of advanced 4G business models and the world's first 4G interactive shopping district
- The establishment of a "Smart Broadband City" in the creation of a new, convenient high-tech lifestyle
- The development of independent key technologies, the establishment of next generation mobile broadband technology, and training in cutting-edge mobile broadband technologies

Following the issuance of 4G mobile broadband licenses in late 2013 and the implementation of Mobile Broadband Service and Industry Development Initiative, in mid-2014, Taiwan's telecommunications carriers began offering 4G services to the public. In the later part of 2014, the carriers also started to expand the deployment of cell sites in an effort to make 4G services more widely available. The result was, by the end of 2014, Taiwan already had 3.45 million 4G subscribers, a number that accounted for 11.5% of total mobile communication subscribers.

At the same time, the introduction of 4G into the marketplace resulted in a series of restructuring among the players of the telecommunications industry. In May 2014, Ambit acquired Asia-pacific Telecom, and Taiwan Star Telecom (T STAR) merged with Vibo Telecom in October 2014. In an effort to attract subscribers, both T STAR and Ambit began offering unlimited data plans. They were soon followed by the industry's three largest carriers—Chunghwa Telecom, Taiwan Mobile and FarEasTone—creating an intensely competitive marketplace.

At the end of 2015, the number of 4G subscribers has reached 11.57 million, with a further increase to 16.73 million in September 2016—accounting for 57.7% of total mobile communication subscribers. It



is estimated that by the end of 2016, 4G subscribers will reach over 18 million and account for over 60% of total mobile subscribers.

The 5G network is characterized by large bandwidth, low latency, high connectivity, and seamlessness and will serve as the foundation for the application of IoT and bring about an explosive growth within the digital economy. It is estimated that by 2025, the potential economic impact of 5G will be as high as NT\$160 trillion. Breaking that down, the 5G industry would be worth NT\$4.9 trillion, the 5G hardware industry would be worth NT\$41.1 trillion, and the 5G service application industry would be worth NT\$114 trillion. In order for Taiwan to take advantage of this potential enormous economic, it is necessary to invest in the development of 5G autonomous systems to consolidate and advance Taiwan's advantages in the fields of ICT end terminals and chips, and for Taiwan to begin to develop 5G creative application services. At present, Taiwan's plan for the development of its 5G industry aims to consolidate its advantages in the ICT industry and encourage industrial transformation from manufacturing to application services. The goal is to master 5G key technologies, software, and application services by 2025 and—following the development of dedicated network systems—leverage Taiwan's experience in the field in exporting this know-how worldwide.

3-4 Equal Digital Opportunities

Starting from 2000, the issue of digital divide has become an area of focus for governmental efforts. It has been 14 years since the National Information Communication Initiative first passed in 2002. During this period the government has worked to diminish digital divide and to create new digital opportunities. Relevant policies include: Reducing Digital Divide Plan in 2004, Creating Digital Opportunities Plan (second stage) from 2008-2011 and Digital Care Penetration Plan (third stage) from 2012-2015. The achievements are listed below:

- (1) 12 years of digital opportunity survey data are readily available, which can be used as references for future policy creation and promotion. For example, in 2004 there was 26.1% difference of internet usage between the cities with the highest rate and those with the lowest. In 2014, this difference was decreased to 17.2%. Over the same period, the difference between male and female internet users also dropped from 4.2% to 3.5%.
- (2) The openings of digital opportunities centers (DOC) have offered opportunities such as continual education and digital consultation, to residents living in remote areas. 241 DOCs were opened from 2005 to 2015 and 22,701 training courses on ICT application has been conducted, benefitting a total of 351,122 persons.
- (3) College students have been recruited and trained to be learning partners for middle and elementary school students living in rural areas. Telecommunication systems and digital learning platforms offered by DOC were used to facilitate one-on-one online teaching and learning services between them.

From 2006 to 2015, 11,170 college students served as learning partners of 7,827 students in 627 DOCs, middle schools, and elementary schools in rural areas. With the addition of more private resources since 2015, more innovative teaching approaches have been adopted, and as many as 2800 students from January to September in 2015 are benefitted, with a total of 36,570 learning hours.

- (4) ICT volunteers are organized to take part in reducing the digital divide between urban and rural areas. From 2005 to 2015, a total of 23,589 high school, college or graduate student volunteers organized 1,187 teams, visiting 2,474 rural schools and DOCs.
- (5) From 2007 to September 2013, 13,201 economically disadvantaged students from third grade to seventh grade were subsidized with one new personal computer and three years of free internet access. A total of 1,104 computer training courses or workshops were held with 14,561 participants.
- (6) Businesses or enterprises caring for public welfare and non-governmental organizations are invited to contribute. From 2005 to September 2015, more than 70 enterprises or organizations have donated NT\$680 million of software and hardware.
- (7) E-info website for new citizens is built and updated. The site sees a total of 498,566 visitors, offering 3,108 courses and having trained 34,167 persons.
- (8) 258 local enterprises around Taiwan are coached on establishing effective operational mechanisms, making use of e-commerce to develop new marketing strategies online. SME Online University has been established as an interactive learning environment, offering as many as 500 enterprises with online learning resources.
- (9) 56 libraries and information sites in various aboriginal villages are built, offering courses on ICT. As of September 2015, 419 persons have finished those trainings.

The The Expansion of Digital Opportunities in Remote Areas (4th stage), which will be carried out from 2016-2019, extends the care for disadvantaged groups by ensuring sufficient opportunities to participate in Taiwan's ever-growing digital society. The main impetus of the plan is to enhance digital proficiency and enrich digital life applications. The plan's priority is among digital development areas levels 1-5, remote villages and townships, outlying islands, and aboriginal areas, with target beneficiaries being the elderly, aboriginal groups, new immigrants, the disabled, women, those living in low income households, or any other group that require assistance when it comes to digital development. Assisting the groups above, as well as micro-enterprises in the use of online tools, digital life applications, digital marketing, online self-study, they are given the ability to meet and fulfill growing digital needs and requirements.

The Expansion of Digital Opportunities in Remote Areas is based on the following concepts:

- (1) Enhancing digital application abilities: Enhancing the public's digital literacy, ICT application and value-added capabilities, working towards the popularization of online learning.



- (2) Enriching digital applications: Digital daily information application and popularization; online health education and preventative health care information services.
- (3) Enjoying mobile services and applications: Accomplishing mobile infrastructure and providing localized mobile services.
- (4) Enhancing digital marketing abilities for enterprises in rural areas: promoting group e-commerce and digital care; encouraging virtual sales channel and business digital applications for micro-enterprises; creating smart micro-enterprises and mobile learning.
- (5) Strengthening agricultural digital applications: Digital care and marketing assistance for farmers; localized agricultural community services.

Expected benefits of the Expansion of Digital Opportunities in Remote Areas are as follows:

- (1) Cultivating the public's digital literacy and fostering the use of ICT and smart digital tools to solve life's digital application problems.
- (2) Broadcasting smart life information services from the government to bridge the government and the public.
- (3) Communicating governmental digital care policies through the friendly smart spaces and digital health counseling for the elderly.
- (4) Enhancing community organization, cultural collections, civic participation, and life-long learning; using digital technology to create opportunities for community building; promoting services to help overseas talent return to Taiwan.
- (5) Cultivating talent in local industries; fostering the digital development in digitally backward areas, enhancing the core capabilities of enterprises.

3-5 Cloud Computing

As the technology and applications for cloud computing continue to grow and mature, in order to uphold Taiwan's advantages in ICT hardware manufacturing and rapid market adaptation and thereby grasp future global cloud computing market opportunities and acquire a competitive advantage, since 2010, the government has been working through Cloud Computing Industry Development Plan to ensure Taiwan's cloud computing application industry has a strong foundation from which to grow. However, in order to meet the global trends in cloud computing and take advantage of Taiwan's considerable technological and developmental experience, on November 15, 2012 the plan was amended and approved as the Cloud Computing Applications and Industry Development Plan. With the idea of "application" front and center, through the establishment of Government Cloud (G

Cloud), the Cloud Computing Applications and Industry Development Plan will work to assist industry development and encourage the development of a cloud computing industry chain in order to create an industry whose benefits can be felt in the public's everyday life. To date, the main results of the program includes: the establishment of cloud applications, infrastructure, and supporting mechanisms in the areas of disaster prevention, food safety, health care, policing, and education; thereby creating an excellent foundation for future industry transformation and increased competitiveness.

The Cloud Computing Development Program 2016–2020 was approved and passed on October 12, 2015 under the stated goals of "introducing cloud computing technology in daily life, the spread and development of creative services, and the foundational building for smart cities and the future industries of IoT, Productivity 4.0 and big data". It is hoped that through such efforts the two goals of public application and industry development will be met. Furthermore, with regard to the three areas of public safety, economic development, and sustainable environments, future government cloud computing applications will cover health management passbooks, policing and neighborhood safety, school mobile learning, and several others for a total of eight plans.

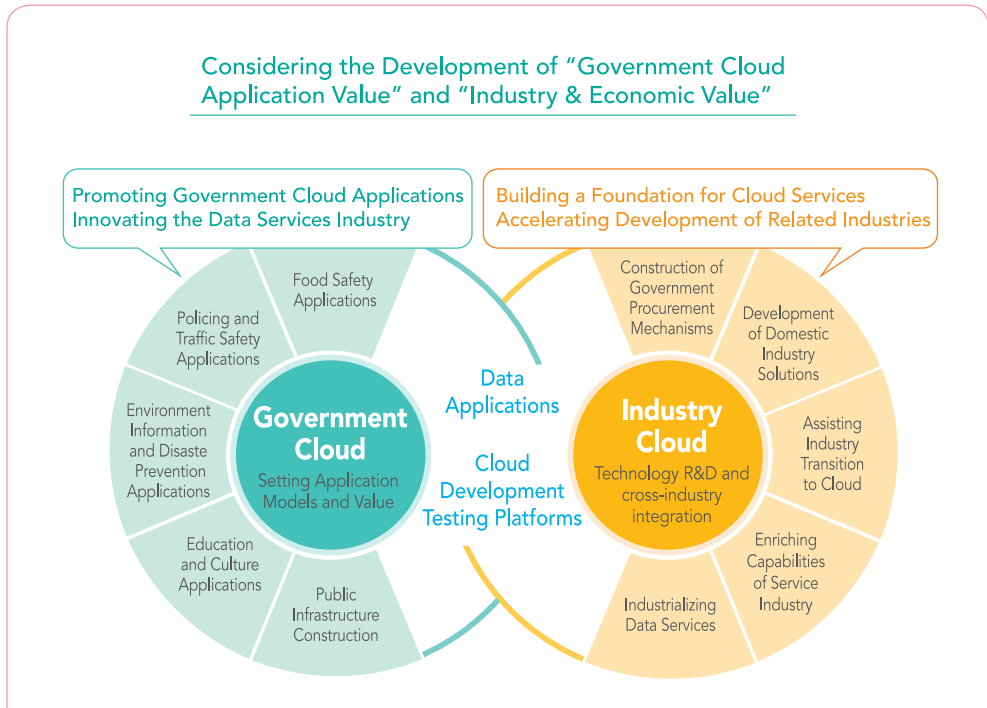


Figure 3-1 ▶ Taiwan's Cloud Computing Plan Promotional Strategy

Source: Office of Science and Technology, Executive Yuan.



3-6 Big Data and Government Open Data

In light of the growth of the worldwide data economy, in Taiwan, focus was turned towards the government, which holds the largest amount of information of any public or private entity in the country. First off, the government's open data policy was researched, with appropriate industry counseling mechanisms updated to encourage the creation of industry value-added applications. Government-academia cooperative platforms and governmental policies were also used to kick start interdepartmental information sharing application mechanisms, as well as proactively researched issues with regard to future cooperation between public and private bodies. Civic associations and corporations were used to encourage the industry to liberally utilize value-added data in the creation of new services and business models and better prepare it for the new markets of IoT, Smart Cities, and Productivity 4.0.

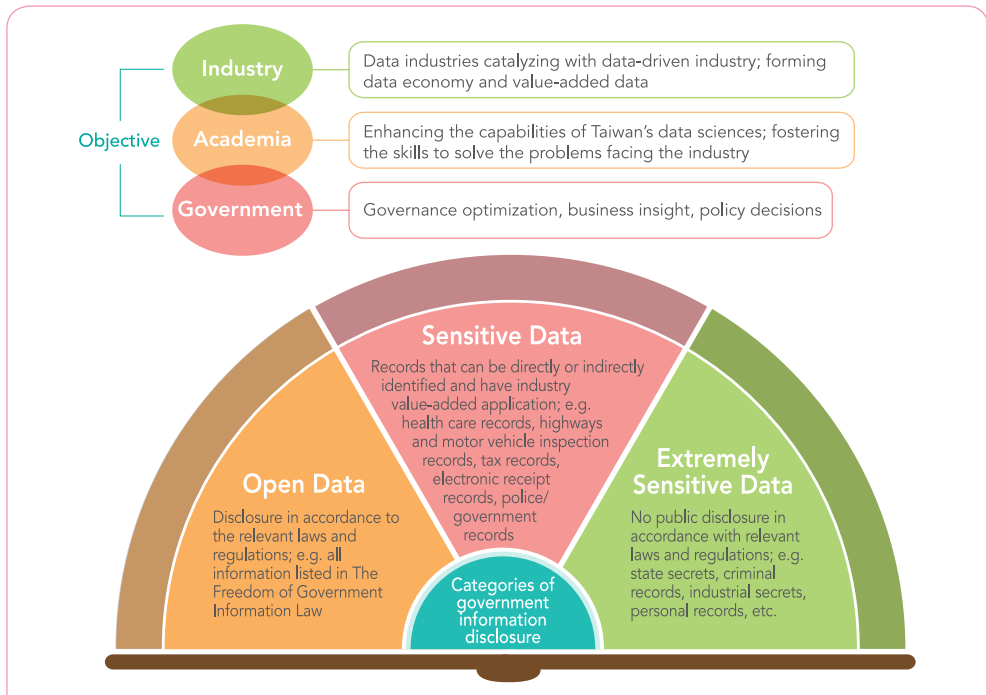


Figure 3-2 ▶ Taiwan's Big Data Goals and Open Data Guidelines

Source: National Development Council (2015).

In line with open data release guidelines and the continuing work of big data analysis, the government of Taiwan has continued to undertake and promote big data-related work, with strategies chosen in accordance to the data upon which the work is based:

- Industry data → value-added applications created by Big Data Industry Consulting Groups

- Open government data → In-depth and value-added application created by civic and social groups
- Sensitive government data → Executed upon government and academia cooperative plans and initiatives
- Confidential government data → Big data analysis on issues selected in accordance to national policy undertaken by Big Data Technical Support Task Force

In the preparation of the foundation of an data economy, issues that have been targeted include improving platforms for big data analysis and process of de-identification. Furthermore, through the design of an data economy industry ecosystem and platforms for industry, government, and academia collaboration, it is hoped that the implementation of various big data plans will foster the R&D capabilities and technological maturity of data scientists, develop new business models and catalyze innovative big data solution enterprises and big data driven industries.

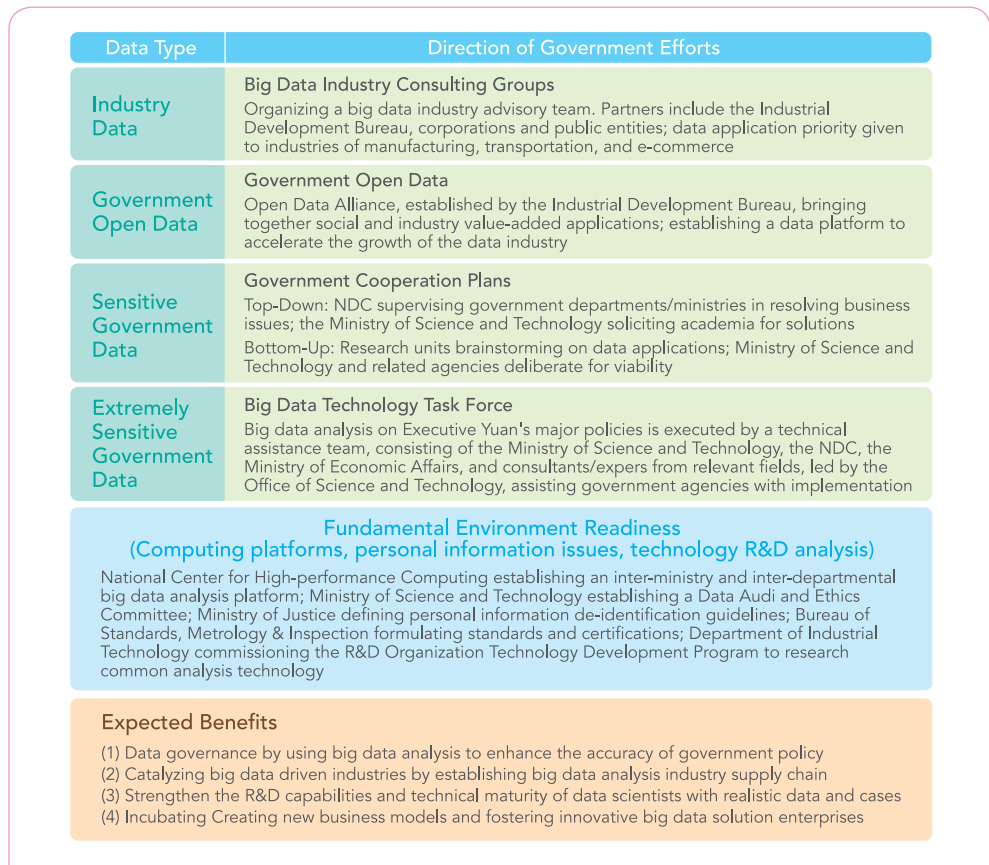


Figure 3-3 ▶ Taiwan's Big Data Promotion Efforts

Source: Office of Science and Technology, Executive Yuan.



The expected benefits of government led efforts in the promotion of big data-related work are as follows:

- (1) Data governance by using big data analysis to enhance the accuracy of government policy
- (2) Catalyzing big data driven industries by establishing big data analysis industry supply chain
- (3) Strengthen the R&D capabilities and technical maturity of data scientists with realistic data and cases
- (4) Incubating Creating new business models and fostering innovative big data solution enterprises

Taiwan officially kicked off government open data in November 2012 at the 3,322 assembly of the Executive Yuan with the passage of the Government Open Data Promotion Strategy. The National Development Council (NDC) and Ministry of Economic Affairs were charged with carrying out the resolution among the public sector and industrial sector respectively and National Information and Communication Initiative Civil Advisory Committee was commissioned to create a series of events aimed at raising public awareness.

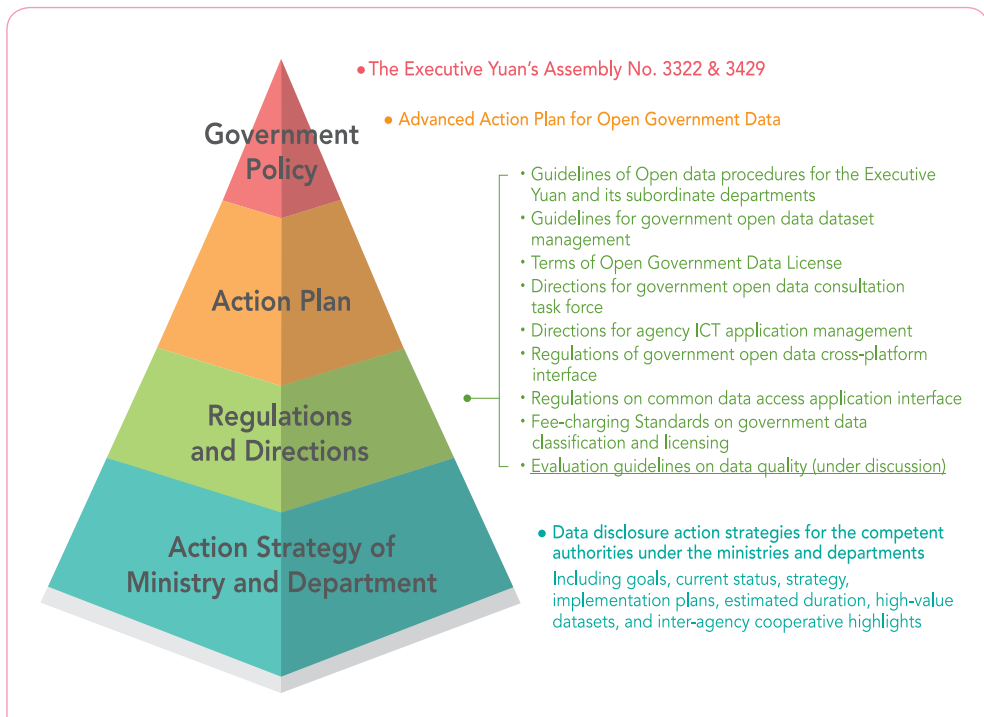


Figure 3-4 ▶ Government Open Data Document Rank & Order

Source: Office of Science and Technology, Executive Yuan.

To ensure the promotion of government open data, the NDC has drawn up related criteria and standards. In December 2015, the NDC drafted the Advancing Government Open Data Action Plan with the plan being composed of three specific actions: (1) the establishment of a government open data consultation mechanisms; (2) the creation of a complete and trustworthy open data environment; (3) the applied cooperation between public and private spheres.

To accelerate the release of more high-value data from all levels of government, an open data two-tier consultation mechanism was established. In June 2015, the Executive Yuan and various departments and ministries established an open data consultation task force. Working to foster dialogue between the government and public/civic groups, the task force ensures that public needs are heard and met, thereby improving the government's efforts in the area of open data disclosure.

In order to enlarge the scale of these open data efforts, all government departments and ministries can follow the "Open Data SOP Guideline"⁷ in the disclosure of information. Based on a system, information database and public opinion, the method lays out tasks for the head of government agencies in the area of information disclosure, while also establishing yearly goals and future implementation.

Regarding the readiness of a complete and trustworthy open data environment, the public and the government shall continue to work together to define the criteria by which information disclosure should proceed. In line with developmental trends, such efforts will also continue to reflect and advance the vision put forth in Taiwan's first government open data license article of law to meet international standards (CC-BY 4.0 compatible), which was passed on July 2015.

As of November 2016, Taiwan's open data platform (data.gov.tw) has already received 22,279 datasets. In its 2015 Open Data Index, the Open Knowledge Foundation⁸ had Taiwan in first place. This distinction is the direct result of the government of Taiwan working to promote cooperation within various departments and with public and civic groups, while also engaging in various international cooperative efforts and exchanges.

⁷ The 4 steps of open data are: (1) undertaking information inventory, (2) examining integrity of information rights, (3) selecting scope of data disclosure and licensing terms, (4) releasing datasets.

⁸ The Open Knowledge Foundation is an NGO founded in Cambridge, UK in 2004, devoted in promoting open knowledge in various form. It is currently active in over 30 countries and territories and its main focus is on the support and spread of open data and government.

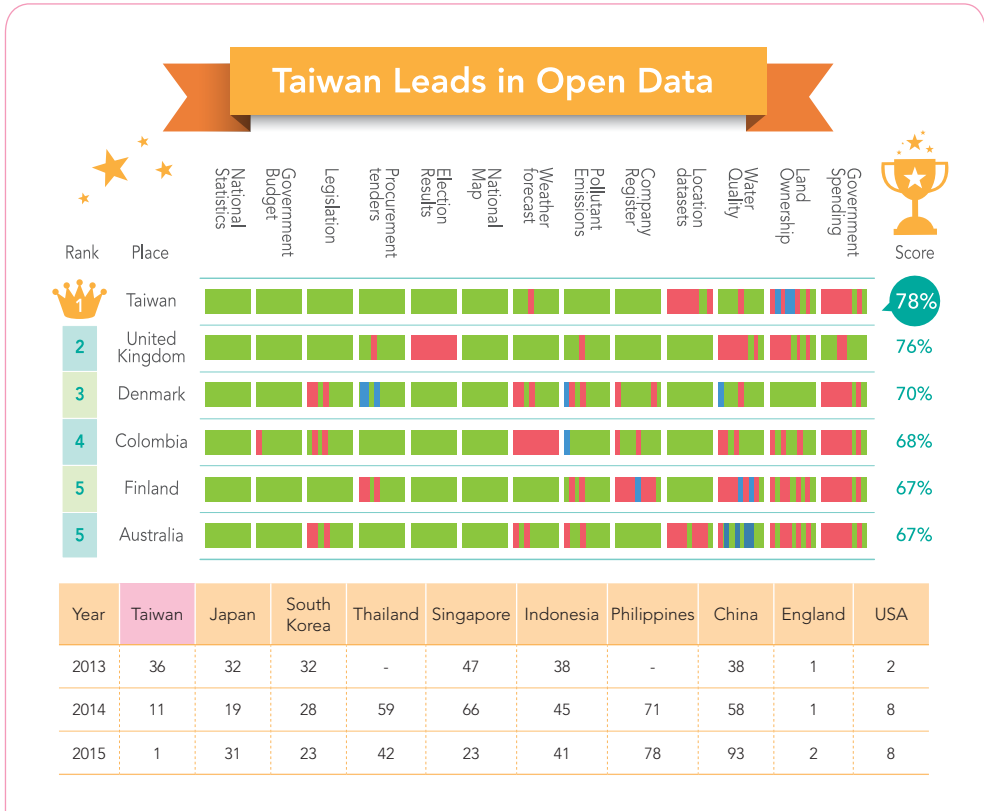


Figure 3-5 OKFN 2015 Global Open Data Index Ranking

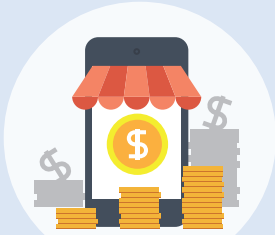
Source: OKFN; Compiled by the Office of Science and Technology, Executive Yuan.



Chapter 4

A Look to the Future

Important Issues and Trends in ICT Policies Worldwide |



Digital technology is driving economic activity and the creation of digital economies



The evolution of seamless mobile networks



Prioritizing converged applications within social and economic fields



ICT creating new waves of innovation and entrepreneurship



ICT Media Links Leading to a Better Life



Chapter 4. A Look to the Future

4-1 International Trends in ICT Policies

ICT technology is an important driver in economic growth and social innovation; therefore, in countries worldwide it has been given the mission of addressing social issues and creating new needs. A quick look at the policies currently being planned by the US, UK, Germany, Japan, South Korea, Singapore, and China (see ▶ Table 4-1) gives us a picture of recent international trends in ICT policy framework, while also serving as a reference for the next round of policy planning in Taiwan.

Table 4-1 ▶ Future ICT Policies Announced by Major Counties in the Last Three Years

| Country | Policy |
|-----------|--|
| US | Gigabit City Challenge |
| | Connect Home Programs |
| UK | The UK's vision for the EU's Digital Economy in 2020 |
| Germany | Digital Strategy 2025 |
| Japan | Declaration on the Creation of the World's Most Advanced IT Nation |
| | Smart Japan ICT Strategy |
| | Japan's ICT policy heading towards 2020 |
| Korea | SAQ2 Japan Project |
| | K-ICT strategy |
| | South Korean Software as Center of Social Diffusion Program |
| Singapore | National Information Vision 2025 |
| | Info-communication Development Blueprint 2025 |
| China | Smart Nation |
| | National Development Strategy Outline |
| | Internet+ Action Instructions |

Source: III-FIND.



Using C-P-N-D (Contents, Platform, Network, Device) to organize that ICT plans and policies listed above, we arrive at a clearer picture of focus and trends (see ▶ Table 4-2 below).

Table 4-2 ▶ ICT Future Policy Focus Among Major Countries

| Country | Contents/Data | Platform | Network | Device/End User |
|------------------------------------|-------------------|--|---------------------------------|----------------------------------|
| US | Digital Education | Innovative Digital Education System | Low-cost Broadband Connectivity | Disadvantaged Groups |
| | | | Google Fiber | OTT Terminal Equipment |
| UK | Anonymous Data | Online Public Services | Uniform Broadband fees | Transnational Consumers |
| | Big Data | Transnational Online Services | | |
| Germany | Big Data | IoT Platforms | Gigabit FTTx Broadband Network | Manufacturing Terminal Equipment |
| | Open Data | | | |
| Japan | Open Data | Multilingual Voice Translation Systems | Free Wi-Fi | Foreign Tourists |
| | Big Data | Cloud Service Platforms | Universal 4G/5G | Smart Mobile Devices |
| | | Open Data Platforms | FTTx Broadband | Japanese Telecom Sim Card |
| Korea | Big Data | IoT | 5G Mobile | Smart Devices |
| | UHD | Online Poll | Social Networking | Wearable Devices |
| | Digital Content | Smart City | Giga Broadband | Open Source Hardware |
| Multi-screen Educational Platforms | | | | |
| Singapore | Digital Harbour | Logistics IoT Platforms | HetNet | The Elderly |
| | Big Data | Computational Thinking | | Business |
| | | | | Medical Sensors |
| China | Big Data | E-commerce | Universal Broadband | Smart Terminals |
| | | IoT | Cognitive Networks | Cars/Robots |

Source: III-FIND

From the CPND breakdown, the following points emerge regarding the ICT policy framework of major countries through 2025:

- In Content, it is estimated that in the next 5-10 years the various emerging fields of government open data will become further integrated with Big Data application services.
- In Platforms, we see IoT platforms finding a role in various applications within the social economy and helping to create smart cities.
- In Network, we see the continuing development of high speed mobile broadband. In addition to faster speeds, issues of broadband connectivity and digital fairness are both receiving more attention.
- In Device/End User, targeting different users and utilizations has led to the creation of more target-orientated, specialized terminal network equipment.

The ICT policies of the above countries point to five upcoming policy issues and trends:

(1) Digital technology is driving economic activity and the creation of digital economies

The acceleration of innovation in the digital economy fields of network technology, mobile devices, social media, Big Data is helping businesses create new business opportunities, driving growth, and changing how we live our lives. With changes to how both businesses and consumers think, traditional business models are being upended. Business needs to leverage digital technology and dedicate resources to the development of talent in related fields and applications. Efforts in the direction will help to drive and enlarge the continued growth of the digital economy.

(2) The evolution of seamless mobile networks

The spread of FTTx networks, the rapid development of 4G/5G mobile networks, the appearance of White Space and Super Wi-Fi applications in the digitization of TV broadcasting, and the push towards next generation Gigabit Wi-Fi all show that, along with targeting increased speeds for mobile network, giving users a stable, uninterrupted mobile network experience and achieving a truly seamless broadband network environment has become an important focal point in the development of mobile broadband applications.

(3) Prioritizing converged applications within social and economic fields

With broadband network coverage in major countries becoming more complete, and cognitive networks now offering diverse applications, in using forward-looking fields to promote practical applications, governments have discovered that ICT networks have become an important driver of innovation in both social and economic spheres. Therefore, the next stage of policy considerations and promotional measures will focus on how to deepen the merger of ICT networks within social and economic fields in order to better address social concerns and create new value-added systems.



(4) ICT creating new waves of innovation and entrepreneurship

In recent years countries have encouraged innovation and entrepreneurship through various policy measures—whether it be the establishment of an ICT innovative platforms or Maker Spaces on behalf of online entrepreneurial talent. Germany looks to assist the development of innovation and entrepreneurship by encouraging cooperation between new and established companies. While Japan sees innovation and entrepreneurship as an important IT tool to address social issues. Although every country's policy interpretation is different, they have all been successful in using ICT applications for the benefit of new enterprises.

(5) ICT Media Links Leading to a Better Life

ICT's innovative media technology and solutions have brought many changes to how we live and work. Regardless of the policy, the goal is to solve the difficulties or problems we may encounter in our lives, and fulfill the expectations that we have for new technology. One example would be Singapore's applications dedicated to ensuring the health and comfortability of the nation's elderly by 2025.

4-2

Digital Nation and Innovative Economic Development Plan (DIGI+2025)

In 2015, President Tsai Ing-wen, laid out her Light up Taiwan technology policy, stating that Taiwan, as a county, needed ground-breaking innovative thinking, a better environment for its younger generation, and ways to accelerate the transformation of economic structures. The answer was Digital Nation, Smart Island — one of the country's most important development strategies—in which cloud technologies, Big Data, 5G, and IoT would be used to instill new drive within Taiwan's economy. This building of a foundation for a digital nation and developing Taiwan into smart island will stimulate innovation and entrepreneurship and create platforms for new industries while increasing government transparency and openness, and upgrading the quality of life among Taiwanese citizens.

In her inaugural speech, President Tsai made special mention of looking to build new economic models that align with the pursuit of sustainable development and have the qualities of innovation, employment and equal distribution at their center. The first step, therefore, is to strengthen economic activity and autonomy with priority given to the five innovative industries and, through this industry restructuring, to reshape Taiwan's global competitiveness.

To ensure that these government prioritized industries have a sufficiently robust foundation from which to grow, 2016 saw the release of the *Digital Nation and Innovative Economic Development Plan 2017-2025*, otherwise known as DIGI+2025. The plan works to actively build an infrastructure for digital

innovation and the consolidation of support measures for the foundation of a digital nation by building a friendly regulatory environment, fostering cross-discipline digital talent, and developing an advanced digital technology. By creating a first-rate digital economy, digital government, network society, and smart urban and rural areas, the plan looks to build a digital nation and innovative economic ecosystems that will serve as a critical foundation for the development of innovative industries. Only through such an innovative ecosystem can the industries of green energy, national defense, smart machinery, biotech, new agriculture, new material recycling, and the "Asian Silicon Valley" develop and grow. By building this foundation for industry innovation and strengthening the convergence of industry innovative applications, the vision of "developing an active internet society, promoting high-value innovative economies, and developing affluent digital nation" can be fully realized.

■ Problem Analysis

Currently, the Executive Yuan's NICI task force is responsible for Taiwan's ICT development. Since 2002, the task force has released three phases of the National Information and Communication Initiative. The initiative has succeeded in enlarging the population of internet users, promoting readily available services, smart life services, and other phased objectives. However, if we take a look at the initiative and its related plans and policies as a whole, we see that there has been an over-emphasis on the area of hardware construction, with the regulatory environment, industry personnel, and other supporting foundations still primarily focused on hardware. Furthermore, during the formulation of government policy, the focus has been on supply side developmental planning to the detriment of measures advancing application needs. Government policy implantation is also still very much a top-down affair and lacks sufficient mechanisms to drive cooperation between central and local governments. Finally, integration is lacking among the implementation of programs; the result being a lack of focus in both future goals and resource usage.

From the perspective of the long-term development of Taiwan's ICT sector, the following areas need to be reviewed and addressed:

1. Taiwan's excellent ICT readiness foundation needs to play a bigger role in society and the economy

The strength of a nation's information readiness is closely connected with the direction of associated policy and can be seen in the degree of its implantation and use in the sectors of government, industry, or the life of the individual. The World Economic Forum's (WEF) National Readiness Index (NRI) is one of the world's most respected indexes on information readiness. Prior to 2012, the NRI was divided into the three pillars of "environment", "readiness", and "usage". Following 2012, however, a fourth pillar—"influence"—was added to better assess the social and economic impact of ICT development. This change to the index echoes the OECD's view on ICT development—i.e. when the "environment", "readiness", and "usage" of ICT are sufficiently strong, the importance shifts to the "influence" of ICT on a country's public life, business interests, and national economy.



Taiwan has consistently been ranked in the top 20 of the WEF's NRI report. Regarding its rank among the four pillars: from 2012-2016, Taiwan's rank has gone from 24th to 29th in the "environment" pillar; its "readiness" ranking has gone from 14th to 2nd over the same period of time; while ranking in the "usage" pillar has gone from 14th to 16th. Unfortunately, Taiwan's ranking in the "influence" pillar has dipped, going from 3rd place in 2012 to 20th in 2016. Taken together, these rankings show that although Taiwan has world-class ICT infrastructure, the question of how to use this foundation to the benefit of society and the economy urgently needs to be addressed.

2. WEF stresses that the use of ICT in a digital economy is key to promoting national development

The 2016 WEF's Global Information Technology Report (GITR) took as its topic Innovating in the Digital Economy. A digital economy was defined as using digital technology to drive economic activity, for example, using digital technology to create new business models. "Digital" here not only refers to technology, but something that can drive new business models, new consumption patterns, and promote innovation in both the individual and businesses as a whole. With the view that the digital economy will be the foundation for the world's fourth industrial revolution, the WEF points to active participation in the development of network infrastructure and the fostering of related talent as key to developing a digital economy and ensuring digital technology continues to benefit the development of a country's economy and society.

The WEF further explored a key condition in the development of digital economies. In its analysis of the performance of the top seven ranked countries, the WEF notes that although the seven countries showed different strengths and weakness, the one area they shared in common were high scores in the "business usage" pillar. This shows that in developing a digital economy, governments should encourage the application of digital technology in enterprises and businesses at all levels. In turn, these companies will drive the creation of innovative products and services to further advance the digital economy.

3. Developmental efforts within the Industrial Innovation should seek new sources of economic momentum and innovative economic models

The NDC is currently working on structural transformation economic policies targeting the "Industrial Innovation" that offer sustainable development and have the qualities of innovation, employment, and equal distribution at their heart. As part of the plan, priority is being given to the areas of the "Asian Silicon Valley", smart machinery, green energy, biotech, national defense, new agriculture, and high-value material recycling. Using local characteristics to integrate local advantages in the creation of innovative R&D industry clusters, these industries will drive the next generation of industry, accelerate the process of industrial restructuring, and reshape Taiwan's global competitiveness.

In addition to strengthen its ultra wide band (UWB) networks, IoT and other ICT infrastructure, Taiwan needs to create innovative ecosystems, advance the development of innovative and

entrepreneurial industry clusters, and strengthen cooperative mechanisms between targeted industries and academia. The end goal is to transform Taiwan into a Digital Nation, Smart Island, one complete with a vibrant value-added service industry and an energy saving, low carbon footprint, non-nuclear energy network.

To sum up, on the way to becoming a Digital Nation, Smart Island, Taiwan needs to first undergo a SWOT analysis of the challenges and opportunities that it faces on the road ahead.

1. Strengths

Taiwan already has a world class ICT infrastructure, placing it in the top 20 nations of the WEF's NRI. The government is actively promoting innovation driven policies as Taiwan also maintains its place among the top 20 nations of the WEF's GCI. In recent years, experience in local networking and e-commerce has begun to pay off. Taiwan's hardware design capabilities are also a boon to the acquisition of international competitive strengths in the areas of hardware/software integration and cyber physical systems. Finally, the public has access to strong science and technology skills, resulting in growing capabilities for the future development of a digital economy.

2. Weaknesses

Adjustments to the current regulatory environment have been unable to keep up with changes in the digital economy. There also exists a shortage of cross-discipline talent within the digital economy, with new university graduates lacking the training to meet industry needs. The digital economy industry's transnational operational capabilities are also still insufficient, with progress in cross-industry integration and the development of innovative applications that could promote new digital economy ecosystems being far too slow. Finally, inertia among leading hardware manufacturers is impeding the labor market, regulatory policy, and forward thinking among industrial management.

3. Opportunities

A maturation of technologies such as global Big Data, IoT, AI, VR/AR has led to new business opportunities within the digital economy, with the growth of digital economies among emerging markets currently being very high. The world's advanced economies also view the digital economy as a major factor in social progress and economic transformation. At home, Southeast Asia has a relative advantage in the areas of engineering talent and industry chains, while Taiwan is pushing its Industrial Innovation and New Southward Policy initiatives to reshape its global competitiveness with the development of a digital economy being the main driver.

4. Threats

Global digital industry chain decoupling and reorganization have impacted Taiwan's traditional strengths in OEM. As well, there is a current lack of interest in industry reorganization investment,



with prior efforts being ineffective. Development in the digital economy lacks strong support in domestic markets. Not only is the scale currently insufficient, but there is a lack of incentives to attract international business cooperation. Finally, the influx of foreign talent cannot match the outflow of talent to emerging markets.

Taiwan should, therefore, make good use of its advantages in the development of a digital economy, grasp the opportunities that are currently available, work to face current dangers, and overcome its disadvantages to achieve the dream of becoming a Digital Nation, Smart Island. With this goal in mind, future solutions and developmental directions are as follows:

1. Strengthen communication with the public and parliament; accelerate the implementation of innovative laws and a flexible regulatory environment; use active, innovative applications to drive the rapid development of a digital economy
2. Establish policies that increase private sector investment in the expansion of the digital economy; accelerate the development of innovation-driven industry ecosystems; establish international links
3. Strengthen integration between industry and academia; improve university R&D; promote training of digital talent, R&D, and the market for intellectual property
4. Integrate ICT technology in the Industrial Innovation and new media content industries to drive the development of a digital economy; promote cross-industry cooperation and balanced development of various industries
5. Leverage the superior resources of the IC electronics industry; support innovation and entrepreneurship in the young generation; assist the development of a new generation digital industry ecosystem
6. Build mechanisms for the promotion of a national digital economy; strengthen digital economy development and promotional policies; assist industries in meeting international standards and to penetrate global emerging markets
7. Expand implementation of Public Private Partnership (PPP) cooperation mechanisms; integrate government and private sector resources to develop a digital nation

■ Vision and Goals

The *Digital Nation and Innovative Economic Development Plan 2017-2025* has taken "developing an active internet society, promoting a high-value innovative economy, and developing an affluent digital nation" as its overarching vision. Working to complete a digital innovative infrastructure, build a friendly regulatory environment, develop advanced digital technology, foster cross-discipline digital talent, encourage innovation and entrepreneurship, develop a digital economy, expand international

e-commerce, and support the "Asian Silicon Valley" and other high-value developments within the Industrial Innovation initiative are just some of the steps towards nurturing innovative and vibrant national digital strengths. While forging digital a government, building smart urban and rural areas, developing an active internet society, implementing a participatory democracy, digital fairness, and digital rights will be all key to developing a safe, healthy, and prosperous digital nation. The overall structure of this plan is detailed below:

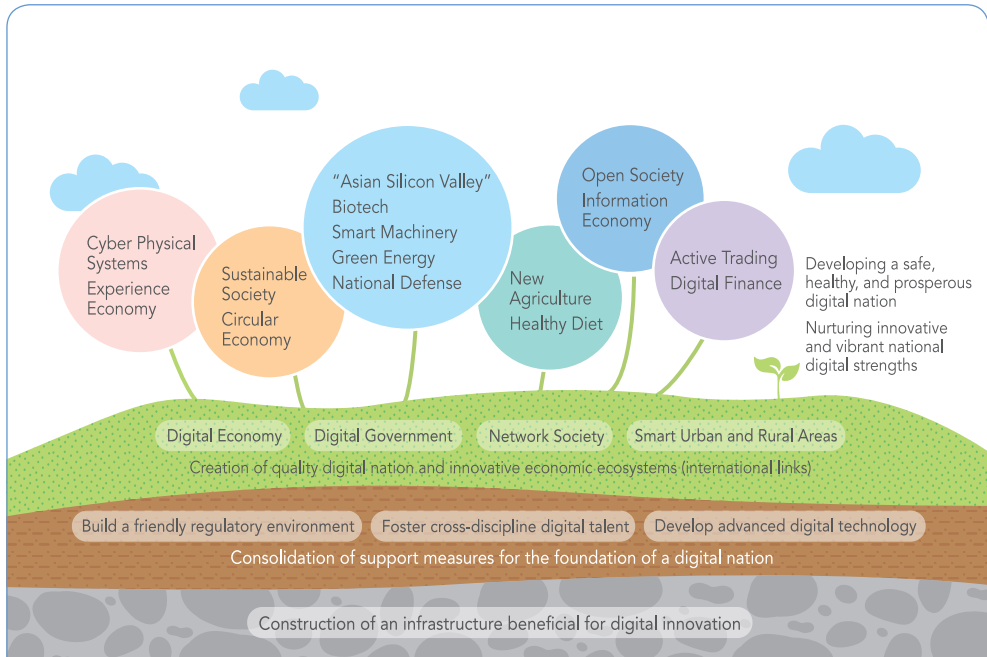


Figure4-1 ▶ Digital Nation and Innovative Economic Development Plan 2017-2025 Developmental Framework

Source: Office of Science and Technology, Executive Yuan.

In order to achieve the vision of "developing an active internet society, promoting a high-value innovative economy, and developing an affluent digital nation", the *Digital Nation and Innovative Economic Development Plan* looks to achieve the following developmental goals in the areas of innovative digital economy, active internet society, and quality broadband environment by 2025:

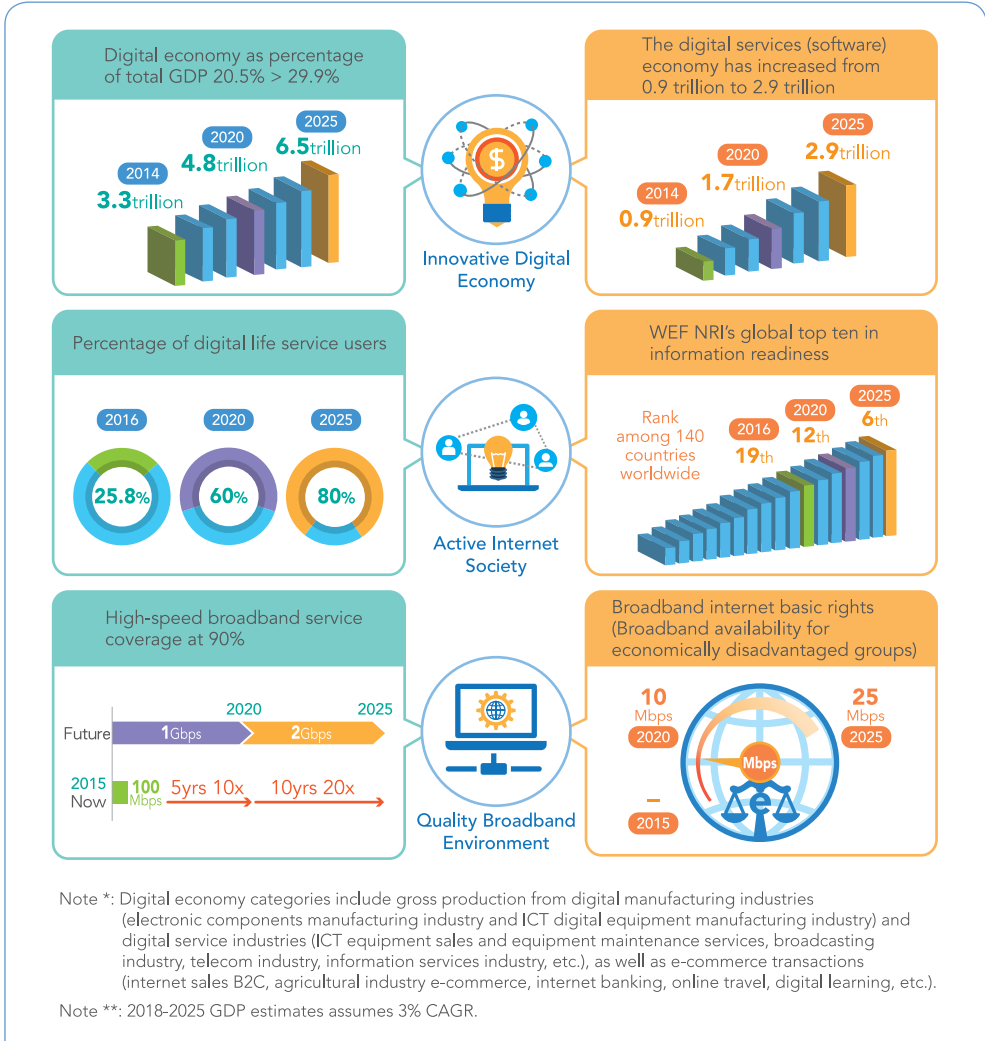


Figure 4-2 Digital Nation and Innovative Economic Development Plan 2017-2025 Development Goals

Source: Office of Science and Technology, Executive Yuan.

■ Developmental Strategies

While implementing President Tsai Ing-wen's Digital Nation, Smart Island initiative and accelerating the building of a digital nation infrastructure, the *Digital Nation and Innovative Economic Development Plan 2017-2025* includes the following developmental strategies: DIGI+Infrastructure (constructing an infrastructure beneficial for digital innovation); DIGI+Talent (fostering talent in digital innovation); DIGI+Industry (using digital innovation to support industry restructuring and upgrading); DIGI+Right (transforming Taiwan into a nation with digital rights and an open internet society); DIGI+Cities (collaboration between central and local governments and academia in the creation of smart urban and rural areas); DIGI+Globalization (promoting Taiwan's position in the global digital services economy).

■ Key Areas

To support the *Digital Nation and Innovative Economic Development Plan 2017-2025* and achieve the vision of "developing an active internet society, promoting a high-value innovative economy, and developing an affluent digital nation", the following key areas need to be addressed:

1. Constructing an infrastructure beneficial for digital innovation has as its goal the building of a quality digital innovative application environment. Key working priorities include: Promotion of forward looking spectrum policies, a strengthening of the responsibilities and functions of the competent authorities, the development of a safe and reliable application environment, and the construction of an ultra wide band (UWB) cloud infrastructure.
2. Strengthening foundational support measures has as its goal the adjustment of a digital regulatory environment, fostering cross-discipline digital talent, and the opening of innovative industries/academia research links. Key working priorities include: Building a friendly regulatory environment, fostering cross-discipline digital talent, and developing an advanced digital technology.
3. Expediting digital economic development has as its goal using digital innovation to support cross-industry restructuring and upgrading. Includes the three major areas of innovative applications promotion, e-commerce expansion, and innovation and entrepreneurship support. Key working priorities include: Stimulating digital innovative applications and driving cross-industry digital innovation, accelerating innovative government procurement, creating a friendly environment for commerce through digital innovative applications, strengthening international development mechanisms for the e-commerce industry, building an environment suitable for e-commerce development, strengthening digital economy inter-ministry/department promotional mechanisms, making available financial support for innovative industries and entrepreneurs, pooling Taiwan's innovation and R&D resources, pooling international innovative resources, promoting flexible and practical mechanisms, accelerating the practicality of digital innovation services, and strengthening entrepreneurial post-incubation efforts and IPO counseling mechanisms.



4. Forging a service-based digital government and promoting open governance has as its goal developing a government Open API and the construction of a demand-oriented, one-stop smart government cloud service for the public. Key working priorities include: strengthening digital governing mechanisms and functions of related ministries and local governing bodies, creating comprehensive relevant regulations targeting IC security management and digital governance, establishing mechanisms by which the private individual may assist with the digitization of government bodies, implanting in digital governance at various levels of government, actively forwarding government information disclosure, constructing government/private sector cooperative mechanisms, and developing value-added data applications.
5. Developing a fair and active internet society has as its goals to transform Taiwan into a country of digital rights and possessing of an open internet society. Key working priorities include: Creating a comprehensive legal foundation for digital rights, offering equal digital development opportunities for all citizens, expanding digital infrastructure to rural areas and outlying islands, boosting and guaranteeing the development of digital applications in rural areas, outlying islands, and for small and medium enterprises (SMEs) and micro-enterprises, ensuring equal opportunities for digital development across the island and all sectors of society, safeguarding the rights of disadvantaged social groups to enjoy broadband usage through the promotion of relevant support measures, using public technology to deepen public policy communication, network integration and citizen assistance mechanisms; integrating government resources, industrial sectors and civic groups; breaking new ground for digital technology, digital governance, and digital economy international partnerships.
6. Building sustainable and smart urban and rural areas has as its goal using the central and local governments along with academia to build smart urban and rural areas. Key working priorities include: Integrating resources among the government and private sector, promoting smart urban and rural joint governance and infrastructure, developing personal innovative life applications and public services, using IoT technology to build high-quality living spaces for citizens—including the use of public land, the maintenance of environmental quality, the safeguarding of national security, and the development of smart living environments.

References

1. Chris Rhodes Daniel Rathbone (2016). Digital economy: statistics and policy. England: House of Commence Library. Retrieved from: http://www.legco.gov.hk/general/english/library/stay_informed_overseas_policy_updates/digital_economy.pdf
2. Global Entrepreneurship and Development Institute. (2016). Global Entrepreneurship Index. USA: Global Entrepreneurship and Development Institute. Retrieved from: <https://thegedi.org/global-entrepreneurship-and-development-index/>
3. International Institute for Management Development (2016). World Competitiveness Yearbook 2016. Switzerland: International Institute for Management Development. Retrieved from: <http://www.imd.org/wcc/news-wcy-ranking/>
4. III-FIND, 2015, International ICT Outlook Policies and Application Case Studies Report.
5. III-FIND, 2016, International ICT Outlook Policies and Index Improvement Case Studies Report.
6. Ministry of Communications and Information (2015). Infocomm Media 2025. Singapore: Ministry of Communications and Information. Retrieved from: <https://www.mci.gov.sg/infocomm-media-2025>
7. National Development Council (2015). 2015 Household Digital Opportunities Survey Report. Taiwan: National Development Council. Retrieved from: <http://www.ndc.gov.tw/cp.aspx?n=55C8164714DFD9E9>
8. National Communications Commission (2016). NCC Announces 2015 Fixed Broadband Internet Speed Test Results: Taiwan's Fixed Broadband Service Offers Stable Speeds. Taiwan: National Communications Commission. Retrieved from: http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&sn_f=35352
9. National Communications Commission (2016). 2016 First-stage 4G Internet Speed Test Results Taiwan: National Communications Commission. Retrieved from: http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&is_history=0&pages=1&sn_f=35671
10. World Economic Forum (2015). The Global Competitiveness Report 2015-2016. Switzerland: World Economic Forum. Retrieved from: <http://www3.weforum>
11. World Economic Forum (2016). The Global Information Technology Report 2016. Switzerland World Economic Forum. Retrieved from: http://www3.weforum.org/docs/WEF_GITR2015.pdf
12. Waseda University (2016). 2016 Waseda-IAC International e-Government Ranking Survey. Japan: Waseda University. Retrieved from: <https://www.waseda.jp/top/en-news/43676>



資訊國力年鑑

TAIWAN E-COMPETITIVENESS ANNUAL REPORT

2015 ▶ 2016

郭耀煌 編
行政院科技會報辦公室執行秘書

序

過去30年，臺灣靠著製造的效率，將效率經濟發揮到極致，達到全球第一，也創造了許多臺灣的經濟奇蹟。但是，過去的成功經驗，讓整個社會與經濟習慣於「供給導向的效率思維」，牽制了人才培育、法規制定以及經營模式。未來30年，面對快速變遷的數位科技，必須在效率經濟的基礎上，強化創新的友善法制環境、跨域數位人才、先進數位科技等基磐配套措施，方能反轉為「需求導向的創新思維」，奠定數位國家創新經濟的發展契機，創造下一個臺灣的成功故事。

行政院為落實蔡總統提出的「數位國家、智慧島嶼」主張，2016年11月提出「數位國家·創新經濟發展方案（2017-2025年）」，希望能夠跳脫過去產業發展瓶頸、強化數位基磐建設、發展數位經濟、實現平等活躍之網路社會，以及打造服務型數位政府，同時亦期望透過建設永續、智慧城鄉，提升生活品質，讓國民享有富裕安康的生活。期望在2025年時，我國數位經濟規模能夠成長至新台幣6.5兆元、民眾數位生活服務使用普及率達到80%、寬頻服務可達2Gbps、保證國民25Mbps寬頻上網基本權利、我國資訊國力排名能夠躍進到前10名。

「資訊國力」簡單地說，代表一個國家資通訊基礎建設的整備度，以及對社會與經濟發展之影響力。《2015-2016年資訊國力年鑑》不僅呈現政府資通訊建設所展現國際競爭力的評比之外，亦向國內外宣達我國資通訊政策推動主軸以及企圖改善民眾生活品質與發展數位經濟的決心。

為了方便國人及國際人士參閱，本書採取中英文雙語版本，期許能提供閱讀本書的國內民眾與企業，理解並認同政府下一階段推動「數位國家·創新經濟發展方案（2017-2025年）」的重點方向。更重要的是：實際感受政府提升民眾、企業享有最佳生活品質與產業健全發展之決心，更期許藉由本書的出版與國際人士進行資訊交流，將臺灣資通訊發展的實力展現於國際。

行政院政務委員



2016年12月

序

「數位國家·創新經濟發展方案（2017-2025年）（簡稱DIGI+2025）」，即將於2017年正式啟動，其中，為健全我國數位經濟（Digital Economy）發展，有兩項不可或缺的基礎，分別是「平等而活躍的網路社會」與「開放治理的數位政府」。前者，「數位涵容（Digital Inclusion）」，是指透過數位科技運用，提供所有人公平發展機會，以及更多元的社會參與管道；後者，「開放治理（Open Governance）」，則是強化政府部門運用數位科技的能力，透過開放資料與開源精神即時回應社會需求。

具體來說，希望公部門與民間共同協力，導入機器學習、網實整合等系統，帶動相關人才培育。也可以透過集思廣益、公開透明的政策形成過程，來活絡民間力量。更可以透過完備的政府治理機制，在保障數位人權的同時，也協助商業活動更順暢的進行。這些都是我擔任數位政委任內努力落實的推動項目，正如我在上任前即自我定位，作為「公僕的公僕」，也就是運用數位技術及系統，輔助公務體系解決問題，並強化政府部門與公民科技、公共社群的對話與合作。

《2015-2016年資訊國力年鑑》是政府與民間交流我國資訊國力資訊的重要媒介。本年鑑內容包含網路整備、創新創業、經商環境、開放資料、電子化政府等8項重要國際評比，從全球的高度鳥瞰我國資訊國力表現。同時也介紹我國最新資通訊建設現況，以及臺灣民眾數位生活的品質滿意度。另外，以行政院「數位國家·創新經濟發展方案（DIGI+2025）」的願景擘劃為結語。

最後，將《2015-2016年資訊國力年鑑》推薦給國內外想要瞭解我國資訊國力推動的人士參考，希望透過本年鑑，讓大家瞭解我國資訊國力表現，及政府推動最新政策，期盼大家能攜手推動我國「數位國家·創新經濟」的發展，為臺灣創造出「數位國家、智慧島嶼」的契機。

行政院政務委員



2016年12月

編者 序

資訊國力代表一個國家資通訊基礎建設的完整度及其構築國家競爭力的重要性。它不僅涵蓋資通訊產業對經濟發展的貢獻，也代表著政府、社會、企業及個人的數位創新能力，正是提升國家總體競爭力和民眾生活品質的關鍵驅動力量。行政院科技會報辦公室自2003年起開始建立「資訊國力衡量體系」，藉由國際指標包括：世界經濟論壇（WEF）網路整備度指標（NRI）及全球競爭力指標（GCI）、瑞士洛桑管理學院（IMD）世界競爭力等知名評比項目，長期觀測並評估我國資通訊政策推動成果及在重要國際評比中的表現。

2016年我國WEF/NRI網路整備度指標全球排名第19名，亞洲第4名。雖然基礎建設等之整備度蟬聯第2名，但在政治法規、商業創新環境構面排名卻居28名，資通訊對經濟和社會影響構面排名20名。這些現象不僅影響我國整體國際指標排名，更彰顯了資通訊政策需加強的重要關鍵因素。2016年WEF/NRI評比報告選定「數位經濟再創新」，指出數位經濟（Digital Economy）意指透過資通訊力量帶動的經濟活動。報告中強調「數位」不單指科技而是一種促進企業、個人創新的思維：強化資通訊科技應用，帶動商業模式與服務的創新，進而反映在協助社會及產業之發展與進步。

2015年我國WEF/GCI全球競爭力指標為全球第15名（共有144個國家），其中創新一項位居第11名。IMD世界競爭力評比，2016年則因GDP成長率不佳影響，相關指標皆呈現退步，整體排名滑落至第14名（共60個國家評比）。這兩份評比報告很清楚地指出，資通訊科技應用與創新力對經濟發展的重要性，也呈現出影響國際競爭力的關鍵因素。爰此，行政院科技會報辦公室於今年（2016年）研擬完成「數位國家·創新經濟發展方案（2017-2025年）」，期能在推動各項資通訊科技政策下，建構友善法制環境與培育跨域數位人才，以奠定「數位經濟」軟實力，進而促成異業合作，運用數位創新加速產業轉型升級，激勵我國發展創新驅動經濟與GDP之持續成長。

除了數位經濟發展議題外，這個方案將加強政府與民間社群及企業之夥伴關係，以提升政府的智慧治理能力及網路公民社會運作的機能，發展平等而活

躍的網路社會。另外，政府也將積極推動Gbps級超寬頻暨物聯網公共建設，落實區域均衡發展及聯合治理精神，以建設智慧城鄉，普及創新應用服務，讓台灣成為「數位國家」發展之典範。

這些以「智慧島嶼」為政策目標的數位國家發展措施將可改善我國國民的生活品質，並且建設台灣成為全球智慧科技應用的典範，也會讓我國在電子化政府評比、經商環境評比、全球創業發展評比、全球開放資料指標、製造業競爭力評比等資訊國力指標有長足的進步。希望在未來2020-2025年間，能促使臺灣在國際各項重要的競爭力評比中維持前10名。

《2015-2016年資訊國力年鑑》特別增加了「數位生活品質滿意度」一節。這項根據OECD美好生活指標架構、呈現資通訊科技應用對社會影響的關聯性分析。經論文發表，其創新做法在WEF國際組織討論並受到高度重視。因為長年來，國際社會比較偏重於政策投資對經濟影響，但對於民眾生活品質改善則比較缺乏，而這項研究工作恰好可以補其不足之處。在此，特別要感謝參與此項工作的同仁和資訊工業策進會研究團隊，不僅爭取與國際組織互動且受肯定的機會，相信對我國在有關於「民眾有感」之科技政策規劃及績效評估，可提供具體而客觀的調查及評估方法。

臺灣未來的資通訊科技發展政策，將秉持過去堅實的基礎，持續建構數位創新應用優勢環境。以營造友善法制環境、培育跨域數位人才、研發先進數位科技等鞏固數位國家的基磐措施，有效發展「數位經濟、數位政府、網路社會、智慧城鄉」且能連結國際的優質創新生態。出版已經邁入第13個年頭的「資訊國力年鑑」未來將持續見證臺灣發展「數位國家、智慧島嶼」與優質網路社會的歷程，同時讓臺灣人民及國際社會更了解我國的資訊國力與國家總體競爭力。並從分享過程中，為臺灣資訊國力的發展與提升共同努力。

行政院科技會報辦公室 執行秘書



2016年12月

- 60 **第一章、我國在資通訊國際評比的表現**
- 63 1-1 世界經濟論壇網路整備度評比 (WEF NRI)
- 64 1-2 世界經濟論壇全球競爭力評比 (WEF GCI)
- 65 1-3 瑞士洛桑管理學院世界競爭力評比
- 66 1-4 日本早稻田大學電子化政府評比
- 67 1-5 世界銀行經商容易度評比
- 68 1-6 全球創業發展學院全球創業發展評比 (GEDI GEI)
- 70 1-7 開放知識基金會全球開放資料評比
- 71 1-8 勤業眾信全球製造業競爭力評比
- 72 1-9 小結
- 74 **第二章 我國資通訊建設發展現況**
- 76 2-1 我國資通訊建設指標現況
- 77 2-1-1 固定網路
- 80 2-1-2 行動網路
- 82 2-2 數位生活品質滿意度
- 83 2-2-1 臺灣民眾生活品質
- 84 2-2-2 臺灣民眾資通訊服務使用狀況

88 第三章 我國資通訊政策推動現況

- 90 3-1 國家資通訊建設
- 92 3-2 數位匯流
- 93 3-3 行動寬頻
- 94 3-4 公平數位機會
- 96 3-5 雲端運算
- 97 3-6 大數據與政府資料開放

102 第四章 願景擘劃

- 104 4-1 資通訊政策國際趨勢
- 107 4-2 數位國家・創新經濟發展方案（DIGI+2025）

113 參考文獻

► 圖目錄

- 68 圖1-1 我國與美國、澳洲在GEDI GEI14個支柱表現的比較
- 69 圖1-2 我國與英國、新加坡、以色列在GEDI GEI14個支柱表現的比較
- 77 圖2-1 歷年來我國固網寬頻帳號數的變動情形
- 77 圖2-2 最近一年我國固網寬頻帳號數的變動情形
- 78 圖2-3 近一年我國有線廣播電視數位機上盒及多媒體內容傳輸平台服務訂戶數
- 79 圖2-4 2012-2015年全國家戶固網上網速率比較
- 80 圖2-5 近一年我國行動寬頻帳號數的變動情形
- 81 圖2-6 行動寬頻上網速率消費者端量測歷年結果
- 83 圖2-7 ICT應用服務各領域及項目
- 83 圖2-8 2015民眾生活品質滿意度
- 84 圖2-9 不同族群之生活品質滿意度差異
- 85 圖2-10 ICT應用服務使用對生活品質領域之影響力
- 86 圖2-11 ICT應用服務好感度
- 87 圖2-12 各領域服務使用情形與滿意度
- 96 圖3-1 我國雲端運算方案推動策略
- 97 圖3-2 我國政府導入大數據目的與資料公開原則
- 98 圖3-3 我國大數據推動方向與預期效益
- 99 圖3-4 政府資料開放文件位階
- 100 圖3-5 OKFN 2015 Global Open Data Index Ranking
- 110 圖4-1 數位國家·創新經濟發展方案(2017-2025年)之發展架構
- 111 圖4-2 數位國家·創新經濟發展方案(2017-2025年)之總體發展目標

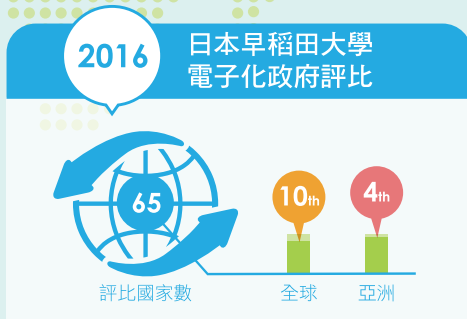
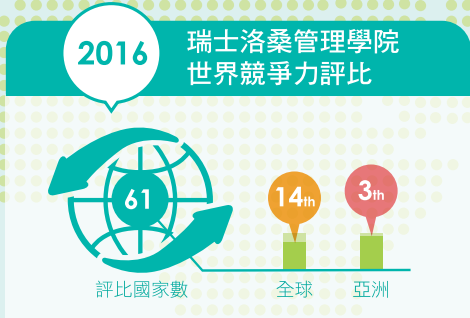
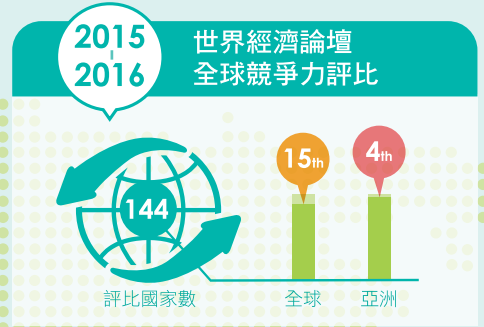
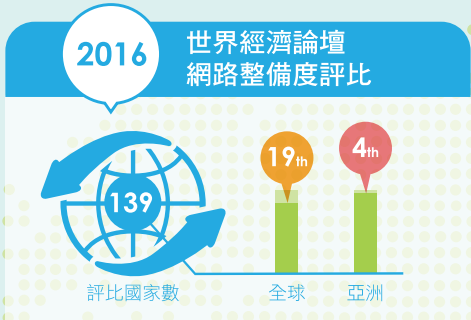
▶ 表目錄

- 62 表1-1 我國在重要資通訊相關國際評比的排名
- 63 表1-2 我國在WEF 2015及2016年網路整備度評比各構面表現
- 64 表1-3 我國在WEF 2014-2015及2015-2016年全球競爭力評比各構面表現
- 65 表1-4 我國在IMD 2015及2016年世界競爭力評比各構面的排名
- 66 表1-5 近5年我國在早稻田大學電子化政府評比排名
- 66 表1-6 我國在早稻田大學2016年電子化政府評比各構面分數及排名
- 67 表1-7 我國在世界銀行2015年及2016經商容易度評比各構面排名
- 70 表1-8 臺灣在歷年全球開放資料評比指標排名
- 71 表1-9 2016年全球製造業競爭力評比前10名及預估其2020年預估名次
- 76 表2-1 我國資訊基礎建設現況
- 90 表3-1 「國家資通訊發展方案（2012-2016年）」亮點成果
- 92 表3-2 國家資通訊發展方案（2012-2016年）目標達成情形
- 104 表4-1 主要國家近3年公布的資通訊前瞻政策
- 105 表4-2 主要國家資通訊前瞻政策推動項目



第一章

我國在資通訊國際評比的表現

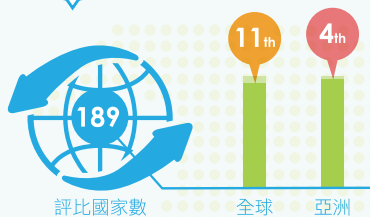


註：此處的亞洲不包含中東地區



2016

世界銀行 經商環境評比



評比國家數

全球

亞洲

2016

全球創業發展學院 全球創業發展評比



評比國家數

全球

亞洲

2015

開放知識基金會 全球開放資料指標



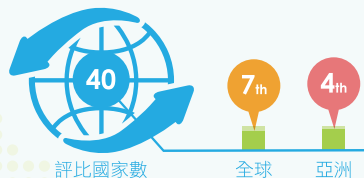
評比國家數

全球

亞洲

2016

勤業眾信 製造業競爭力評比



評比國家數

全球

亞洲



第一章、我國在資通訊國際評比的表現

資訊國力的強弱可展現於政府、產業、個人對於資訊化應用的落實和活用程度，並且與國家政策推動方向息息相關，更是用來衡量一個國家總體競爭力與預測國家經濟走向的重要依據。

本章節整理包含世界經濟論壇（World Economic Forum, WEF）網路整備度指標（Networked Readiness Index, NRI）與全球競爭力評比（Global Competitiveness Index, GCI）、瑞士洛桑管理學院（International Institute for Management Development, IMD）世界競爭力年報揭露的競爭力評比（World Competitiveness）、世界銀行（World Bank）經商環境評比（Doing Business）、日本早稻田大學（Waseda University）電子化政府評比（International e-Government Rankings Survey）、全球創業發展學院（The Global Entrepreneurship and Development Institute, GEDI）全球創業發展評比（Global Entrepreneurship and Development Index, GEDI），以及為了探究現今開放資料、工業4.0等科技發展大趨勢對資訊國力的影響，而首度收錄於資訊國力年鑑中的開放知識基金會（Open Knowledge Foundation）全球開放資料指標（Global Open Data Index）與勤業眾信（Deloitte）的製造業競爭力評比（Global Manufacturing Competitiveness Index）兩項國際相關評比。以下針對8項資訊國力相關國際指標評比，說明臺灣在各國際指標評比的最新表現。我國在重要資通訊相關國際評比的排名整理如 ▶ 表1-1。

表1-1 ▶ 我國在重要資通訊相關國際評比的排名

| 評比年度 | 評比機構 | 評比名稱 | 我國排名 | | 評比國家數 |
|-----------|----------|----------------------|------|-----|-------|
| | | | 全球 | 亞洲* | |
| 2016 | 世界經濟論壇 | 網路整備度評比- 影響構面 | 19 | 4 | 139 |
| | | | 20 | 5 | |
| 2015-2016 | 世界經濟論壇 | 全球競爭力評比- 創新分項 | 15 | 4 | 144 |
| | | | 11 | | |
| 2016 | 瑞士洛桑管理學院 | 世界競爭力評比- 技術基礎建設分項 | 14 | 3 | 61 |
| | | | 12 | | |
| 2016 | 日本早稻田大學 | 電子化政府評比 | 10 | 4 | 65 |
| 2016 | 世界銀行 | 經商環境評比 | 11 | 4 | 189 |
| 2016 | 全球創業發展學院 | 全球創業發展評比- 創業抱負次指標 | 6 | 2 | 130 |
| | | | 2 | | |
| 2015 | 開放知識基金會 | 全球開放資料指標 | 1 | 1 | 122 |
| 2016 | 勤業眾信 | 製造業競爭力評比 | 7 | 4 | 40 |

* 註：此處的亞洲不包含中東地區。

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)

WEF NRI為全球最具代表性的資訊國力評比，本年度年出版全球資訊技術報告 (The Global Information Technology Report, GITS) 的主題為「數位經濟再創新」。我國在2016年度的NRI評比全球第19名、亞洲第4名¹，我國得分維持與去年相同水準5.5分。

我國在影響構面排名全球第20名，其中資通訊科技對經濟的影響指標排名全球第18名，在資通訊科技對社會的影響指標排名全球20名，顯見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的表現參見表1-2。

WEF於年度報告，分析前7名國家在各分項指標的表現後，發現這7個國家在不同分項指標各有千秋，唯獨企業使用表現皆優異，顯示出這些國家的企業ICT採用程度極高。因此如何協助我國企業透過資通訊科技力量帶動經濟發展，例如科技驅動的新商業模式，為下階段發展數位經濟的重要關鍵因素。

表1-2 我國在WEF 2015及2016年網路整備度評比各構面表現

| 構面 | 2016 | | 2015 | |
|---------|------|-----|------|-----|
| | 排名 | 分數 | 排名 | 分數 |
| 環境 | 29 | 4.8 | 28 | 4.8 |
| 政治法規環境 | 40 | 4.2 | 38 | 4.3 |
| 商業及創新環境 | 14 | 5.3 | 12 | 5.3 |
| 整備 | 2 | 6.4 | 2 | 6.4 |
| 基礎建設 | 1 | 7.0 | 1 | 7.0 |
| 負擔能力 | 12 | 6.5 | 13 | 6.5 |
| 技能整備 | 23 | 5.8 | 23 | 5.8 |
| 使用 | 16 | 5.5 | 22 | 5.3 |
| 個人使用 | 24 | 6.0 | 26 | 5.7 |
| 企業使用 | 12 | 5.5 | 17 | 5.1 |
| 政府使用 | 24 | 5.0 | 21 | 5.1 |
| 影響 | 20 | 5.2 | 15 | 5.3 |
| 經濟影響 | 18 | 5.0 | 17 | 4.9 |
| 社會影響 | 20 | 5.4 | 8 | 5.8 |

資料來源：WEF 2015及2016年全球資訊科技報告；資料整理：資策會FIND

1 此處的亞洲不包含中東地區。

1-2 世界經濟論壇全球競爭力評比 (WEF GCI)

WEF GCI的評比架構涵蓋能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就占30%，當中的創新與企業成熟度各占全體分數的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已在創新階段國家的創新能力。

我國在2015-2016年度的GCI評比全球第15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，在創新指標的表現居全球第10名，是表現最好的項目，但有部分細部指標呈現退步狀態，如我國在研發能量，以及人才培育部分都有退步的現象。報告指出創新能力的提升與人才的培育是現今低成長環境中，能打破困境提升競爭力的重要因素。我國今年度創新項目下有幾個創新能力與人才相關指標表現退步，尤值得注意。我國近2年在WEF GCI的表現參見 ▶ 表1-3。

表1-3 ▶ 我國在WEF 2014-2015及2015-2016年全球競爭力評比各構面表現

| 構面 | 2015-2016 | | 2014-2015 | |
|---------|-----------|-----|-----------|-----|
| | 排名 | 分數 | 排名 | 分數 |
| 基本需求 | 14 | 5.8 | 14 | 5.7 |
| 體制 | 27 | 4.9 | 27 | 4.8 |
| 基礎建設 | 12 | 5.9 | 11 | 5.8 |
| 總體經濟穩定 | 13 | 6.2 | 23 | 5.8 |
| 健康與初等教育 | 14 | 6.5 | 13 | 6.5 |
| 效率提升 | 15 | 5.2 | 16 | 5.1 |
| 高等教育與訓練 | 14 | 5.6 | 12 | 5.6 |
| 商品市場效率 | 13 | 5.2 | 11 | 5.2 |
| 勞動市場效率 | 22 | 4.8 | 32 | 4.6 |
| 金融市場成熟度 | 17 | 4.8 | 18 | 4.9 |
| 技術整備 | 28 | 5.5 | 30 | 5.2 |
| 市場規模 | 20 | 5.2 | 17 | 5.2 |
| 創新與成熟 | 16 | 5.1 | 13 | 5.1 |
| 企業成熟度 | 21 | 5.0 | 17 | 5.1 |
| 創新 | 11 | 5.1 | 10 | 5.1 |

資料來源：WEF 2014-2015及2015-2016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世界競爭力年報揭露的競爭力評比，堪稱是目前世界上評比涵蓋範圍最廣、評比指標數最多的國家競爭力評比。臺灣在2016年的排名因受GDP成長率不佳的影響，多項與GDP相關聯指標皆呈現退步狀態，整體名次滑落至第14名。

臺灣在基礎建設構面的技術基礎建設分項指標居全球第12名，IMD指出我國在技術基礎建設分項內表現較突出的指標為高科技出口、行動寬頻帳號數占比；而有待精進的指標為ICT服務出口、行動電話月費。近兩年來，IMD在行動通訊相關指標進行調整與增加，顯示出對行動寬頻發展狀況的重視。同時我國在高科技出口（製造業）表現名列前茅，惟在ICT服務出口表現卻未如同製造業出口的優異表現，顯示我國在ICT服務的發展還有很大空間。我國近2年在IMD世界競爭力評比的表現參見 ▶ 表1-4。

表1-4 ▶ 我國在IMD 2015及2016年世界競爭力評比各構面的排名

| 構面 | 2016 排名 | 2015 排名 | 構面 | 2016 排名 | 2015 排名 |
|------|------------|------------|--------|------------|------------|
| 經濟表現 | 15 | 11 | 企業效能 | 16 | 14 |
| 國內經濟 | 30 | 9 | 生產力與效率 | 15 | 15 |
| 國際貿易 | 7 | 14 | 勞動市場 | 33 | 25 |
| 國際投資 | 33 | 29 | 金融 | 19 | 17 |
| 就業人口 | 16 | 18 | 管理實務 | 13 | 10 |
| 物價 | 23 | 15 | 態度與價值 | 19 | 15 |
| 政府效能 | 9 | 9 | 基礎建設 | 19 | 18 |
| 政府財務 | 12 | 13 | 基本基礎建設 | 28 | 25 |
| 財務政策 | 4 | 4 | 技術基礎建設 | 12 | 9 |
| 制度架構 | 16 | 19 | 科學基礎建設 | 10 | 9 |
| 商務法規 | 25 | 25 | 衛生與環境 | 32 | 29 |
| 社會架構 | 21 | 22 | 教育 | 25 | 21 |

資料來源：IMD 2015及2016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，2016年的評比結果，我國的整體表現居全球第10名、亞洲區第4名²、在APEC成員國中第8名。我國近5年在早稻田大學電子化政府評比的表現參見 ▶ 表1-5。

表1-5 ▶ 近5年我國在早稻田大學電子化政府評比排名

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|------|------|------|------|------|------|
| 我國排名 | 10 | 8 | 18 | 17 | 10 |

資料來源：2012至2016年間早稻田大學電子化政府評比；資料整理：資策會FIND

因今年度評比中僅公布前10名之各構面分數，我國在10大構面中，「電子化政府推廣」、「開放政府」以及「新興資通訊科技之使用」分別獲得第8、第8和第10名，其他構面則未進入前10名（參見 ▶ 表1-6）。我國今年度名次大幅躍進，從去年的第18名進步至第10名。此外，報告中依照技術整備程度以及政府組織整備程度，將評比各國分置於四個象限。臺灣則居於技術整備程度以及政府組織整備程度皆達完善，整體表現居於高於平均的第四象限。

報告中指出我國今年表現較去年大幅進步，在「開放政府」的表現尤為突出，顯示我國在推動電子化政府成果獲得肯定，不過在「電子化參與」及「新興資通訊科技之使用」部分則有待精進。

表1-6 ▶ 我國在早稻田大學2016年電子化政府評比各構面分數及排名

| 構面 | 2016 分數 | 2016 排名 | 構面 | 2016 分數 | 2016 排名 |
|----------|------------|------------|------------|------------|------------|
| 網路覆蓋率 | 5.3 | - | 電子化政府行銷推廣 | 7.4 | 8 |
| 管理優化 | 8.8 | - | 電子化參與 | 7.5 | - |
| 網站介面功能應用 | 8.8 | - | 開放政府 | 9.0 | 8 |
| 國家入口網 | 5.6 | - | 資訊安全 | 7.6 | - |
| 政府機關CIO | 7.7 | - | 新興資通訊科技之使用 | 5.0 | 10 |

資料來源：早稻田大學2016年電子化政府評比；資料整理：資策會FIND

2 此處的亞洲不包含中東地區。



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，針對各國企業營運從開辦到結束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。

在2015年10月發布的2016年報告中，臺灣的經商容易度在189個國家中排名第11名，較2015年度報告中的第19名大幅進步。另外由於各構面中的評比方式有所調整，在10個構面中，部分構面表現波動較大。例如「執行契約」構面進步了77名。我國近2年在世界銀行經商容易度評比的表現參見▶表1-7。

表1-7 ▶ 我國在世界銀行2015年及2016經商容易度評比各構面排名

| 構面 | 2016 排名 | 2015 排名 |
|---------|------------|------------|
| 開辦企業 | 22 | 15 |
| 申請建築許可 | 6 | 11 |
| 電力取得 | 2 | 2 |
| 財產登記 | 18 | 40 |
| 獲得信貸 | 59 | 52 |
| 弱勢投資人保護 | 25 | 30 |
| 繳納稅款 | 39 | 37 |
| 跨境貿易 | 65 | 32 |
| 執行契約 | 16 | 93 |
| 關閉企業 | 21 | 18 |

資料來源：世界銀行2015及2016年經商環境報告；資料整理：資策會FIND

1-6 全球創業發展學院全球創業發展評比 (GEDI GEI)

2016年全球創業與發展學院的全球創業發展評比，評比全球132個經濟體，包含亞太21個經濟體。我國排名全球第6，亞太第2。

在GEDI GEI的態度、能力、抱負3個副指標 (sub-index) 當中，我國在創業者的抱負表現最好，位居全球第2。在GEI的14個支柱中，我國在「風險資本 (Risk Capital)」、「產品創新 (Product Innovation)」、「高成長 (High Growth)」、「程序創新 (Process Innovation)」表現最好，在「競爭 (Competition)」、「開辦企業技能 (Startup Skill)」、「國際化 (Internationalization)」、「科技吸收 (Technology Absorption)」表現則有待進一步努力。

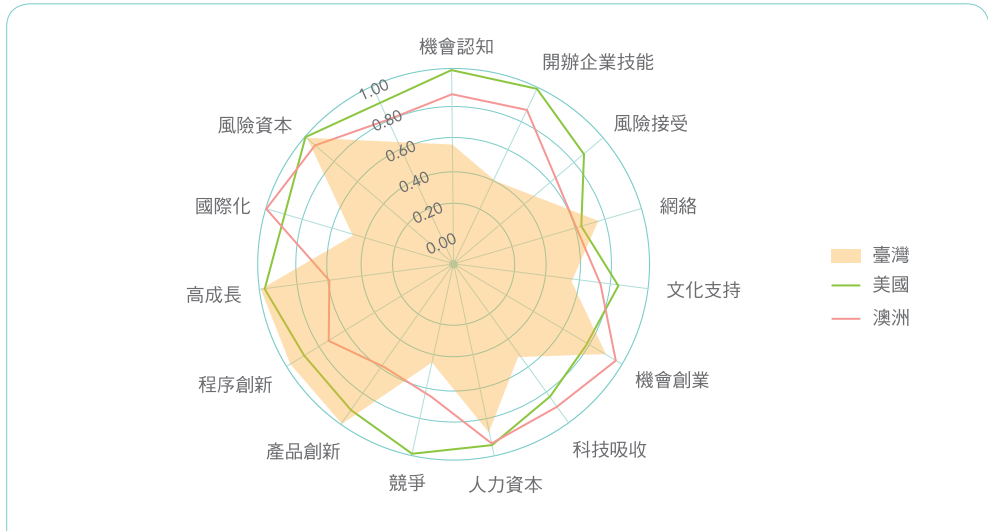


圖1-1 我國與美國、澳洲在GEDI GEI 14個支柱表現的比較

資料來源：GEDI 2016年全球創業發展評比；資料整理：資策會FIND

相較於GEI表現全球第1的美國，我國在「產品創新」、「程序創新」有較佳的表現；相較於亞太第1的澳洲，我國在「產品創新」、「程序創新」、「高成長」有較佳的表現。而我國需要加強的是「國際化」、「開辦企業技能」、「機會認知」、「競爭」、「科技吸收」。

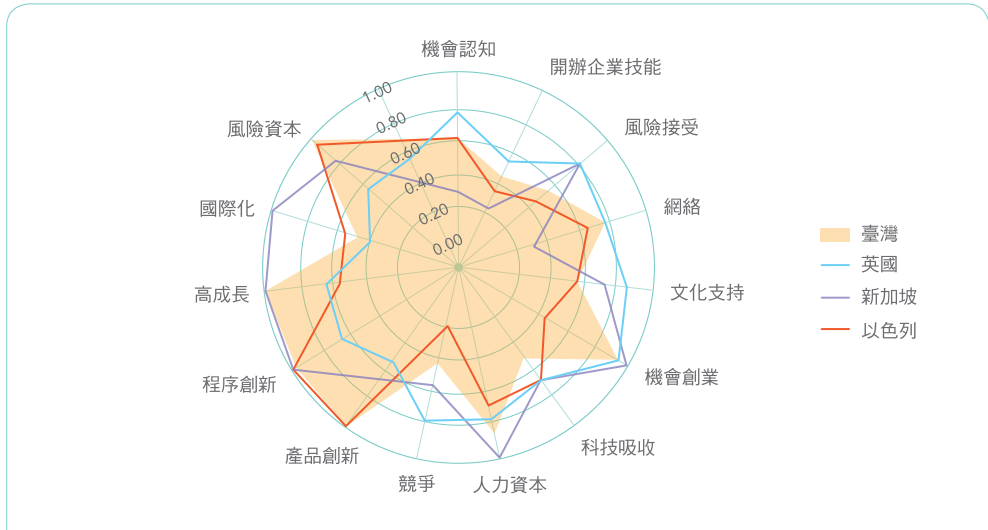


圖1-2 我國與英國、新加坡、以色列在GEDI GEI 14個支柱表現的比較

資料來源：GEDI 2016年全球創業發展評比；資料整理：資策會FIND

相較英國，我國在「產品創新」、「程序創新」、「高成長」、「風險資本」表現較佳，在「競爭」、「文化支持（Cultural Support）」表現較差。相較新加坡，我國在「機會認知（Opportunity Perception）」、「網絡（Networking）」、「產品創新」表現較佳，在「國際化」表現則有待精進。相較以色列，我國在「機會創業（Opportunity Startup）」、「高成長」表現較佳。

1-7 開放知識基金會全球開放資料評比

全球在萬物聯網（Internet of Everything, IoE）趨勢下創造出一個以資料加值，提供知識服務應用的新經濟時代。開放資料（open data）躍居成為促進產業創新與成長的關鍵動能，也讓「開放政府」成為世界各國的新政府治理模式。作為資料上游供應商的政府，如何建構一個資料能夠被安全加值運用於開發有益於民眾生活所需的應用服務，顯得格外重要。有鑑於此，英國開放知識基金會，致力於推廣開放資料與開放政府，自2013年起，每年進行全球開放資料現況調查，並公布全球開放資料排名指標以了解各國政府在開放資料的推動情況。

2015年12月公佈第3次發布全球開放資料評比結果，臺灣從2013首次調查的36名、2014年的11名、進步到2015年的第1名。我國從過去有過半數指標獲得低於第20名，到2015年度時進步到在13項指標中有9項獲得第1名。

表1-8 ▶ 臺灣在歷年全球開放資料評比指標排名

| 指標名稱 | 2013 排名 | 2014 排名 | 2015 排名 |
|-----------|------------|------------|------------|
| 國家統計資料 | 44 | 60 | 1 |
| 採購招標 | - | - | 1 |
| 地理圖資 | 44 | 20 | 1 |
| 法規 | 10 | 12 | 1 |
| 污染排放 | 49 | 6 | 1 |
| 選舉結果 | 35 | 51 | 1 |
| 公司登記 | 50 | 5 | 1 |
| 政府預算 | 19 | 22 | 1 |
| 水質 | - | - | 1 |
| 天氣預報 | - | - | 7 |
| 政府支出 | 20 | 15 | 8 |
| 郵遞區號/位置資料 | 8 | 10 | 49 |
| 土地所有權 | - | - | 53 |
| 交通時刻 | 52 | 1 | 刪除指標 |

資料來源：2013-2015年開放知識基金會全球開放資料評比；資料整理：資策會FIND



1-8 勤業眾信全球製造業競爭力評比

勤業眾信（Deloitte）與美國競爭力協會（US Council on Competitiveness）繼2010及2013年之後，於2016年再度發布全球製造業競爭力評比，針對全球製造業競爭力現況進行研究，並對未來發展做出預測，推估2020年時各國名次表現。報告指出，製造業的發展將持續影響全球經濟，如推動基礎建設發展、創造就業機會，以及增加國家收入的經濟貢獻。繼2010、2013年度之後，2016年中國大陸繼續蟬聯全球最具競爭力的製造業國家。而美國從2013年的第3名進步至第2名，評比更是預測美國有望於2020年成為第1名。

我國表現則是從2013年的第6名退步1名，在2016年評比中獲得第7名，而在2020的預估名次，更是被預估將退步至第9名。目前製造業為我國重要產業之一，面對預估名次表現逐漸下滑的趨勢，臺灣應提升創新突破與吸引人才的能量。

表1-9 2016年全球製造業競爭力評比前10名及預估其2020年預估名次

| 國家 | 2016 名次 | 2020 預估名次 | 國家 | 2016 名次 | 2020 預估名次 |
|------|------------|--------------|-----|------------|--------------|
| 中國大陸 | 1 | 2 | 英國 | 6 | 8 |
| 美國 | 2 | 1 | 臺灣 | 7 | 9 |
| 德國 | 3 | 3 | 墨西哥 | 8 | 7 |
| 日本 | 4 | 4 | 加拿大 | 9 | 10 |
| 韓國 | 5 | 6 | 新加坡 | 10 | 11 |

資料來源：Deloitte 2016年全球製造業競爭力評比；資料整理：資策會FIND

1-9 小結

綜觀臺灣在上述各項資訊國力相關國際評比近幾年的表現，可以發現過往臺灣以製造業硬體代工思維，創造臺灣經濟發展，成就國際上資通訊競爭力的亮眼表現，在最近1、2年的評比中確實有待提升與革新之處。顯示面對全球資通訊科技之快速變化，創新思維已不可或缺，特別值得關注的是WEF NRI評比的表現。2016年臺灣全球排名第19名，其中資通訊科技對國家經濟與社會產生的影響方面，排名第20名。顯示近年政府欲透過推動資通訊科技發展，對民眾生活、企業經營、國家經濟與社會帶來正向實質影響的政策目標，仍有待努力。

同時，從今年度新關注兩項資訊國力相關國際評比來看，探究英國開放知識基金會全球開放資料指標架構內涵，反思國內開放資料推動現況，政府掌握許多與民生息息相關的開放資料與資源，若能借助資通訊科技的力量進行加值運用，提供民眾與企業更優質的政府服務，政府亦足以主動扮演驅動創新的角色。另外，根據動業眾信全球製造業競爭力評比報告，工業4.0時代來臨，今年度評比中名列前茅的美國、德國和中國大陸的企業執行長均表示，過去三年在其國家均有政府主導推動對製造業競爭力產生利多的政策，而其中不乏以資通訊協助製造業智慧化與數位化為推動主軸的政策措施，提供製造業朝向研發高價值商品與先進製造轉型邁進，該研究結果亦清楚地載明製造業將持續地影響全球經濟發展，並且明確展現製造業競爭力與創新之間的緊密關聯。

因此，時值政府與產業轉型之際，國家需要一個改變的創新思維。行政院科技會報辦公室已規劃「數位國家·創新經濟發展方案（2017-2025年）」（簡稱DIGI+2025方案），將持續升級臺灣數位創新應用優勢的基礎建設，積極鞏固國內友善法制環境、跨域數位人才、先進數位科技等數位國家基磐配套措施。徹底轉變過去習慣追求硬體發展的思維，從軟性基礎建立國家長期發展實力，藉以打造我國數位經濟、數位政府、網路社會、智慧城鄉等優質數位國家創新生態。從社會面、產業面形成創新思維的翻轉，並驅動臺灣經濟與社會的創新永續發展新動能，為人民提供優質的數位生活環境，方可實際反饋在未來各項資訊國力相關國際評比排名提升上，達成透過數位國家與創新經濟的推動，打造人民安居樂業的智慧島嶼之願景目標。



第二章

我國資通訊建設發展現況

固定網路

✦ 2016年7月固網寬頻帳號數達 **568.8萬戶**

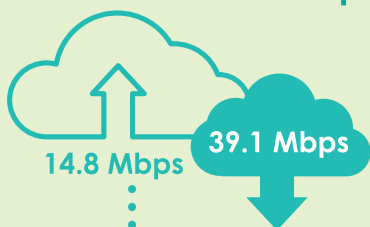
其中光纖帳號數347.7萬戶，占固網寬頻帳號的 **61.1%**

固網上網平均下載速率

39.1 Mbps

上傳速率

14.8 Mbps



家庭連網普及率

82.0%

民眾上網普及率

78.0%

有線廣播電視
訂戶數達

514.4萬戶

有線電視數位
機上盒訂戶占比

92.9%

多媒體內容傳輸
平台服務訂戶數

131.7萬戶



行動網路

智慧手機持有率

71.5%



行動上網普及率

70.4%

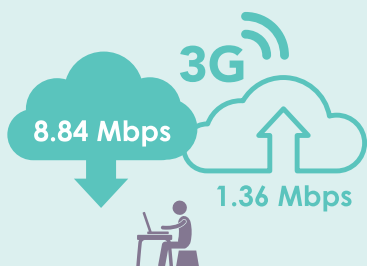


行動寬頻帳號數達 2,066.7萬戶



人 = 一百萬戶

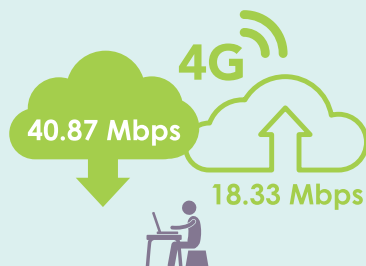
無線寬頻帳號數達 2,077.2萬戶



3G行動上網速率 (消費者端平均速率)

下載 8.84 Mbps

上傳 1.36 Mbps



4G LTE行動上網速率 (消費者端平均速率)

下載 40.87 Mbps

上傳 18.33 Mbps

第二章 我國資通訊建設發展現況

2-1 我國資通訊建設指標現況

在政府及產學研各界的努力下，我國資通訊建設表現穩健，各項資通訊基礎建設重要指標的發展情形，整理如 ▶ 表2-1。

表2-1 ▶ 我國資訊基礎建設現況

| 指標分類 | 指標名稱 | 數據 | 資料時間 | 資料來源 |
|---|--------------------------|------------|------------|------|
| 固網  | 固網寬頻帳號數 | 568.8萬 | 2016/07 | 通傳會 |
| | 光纖帳號數占比 | 61.1% | 2016/07 | 通傳會 |
| | 有線廣播電視訂戶數 | 514.4萬 | 2016/06 | 通傳會 |
| | 有線電視數位機上盒訂戶占比 | 92.9% | 2016/06 | 通傳會 |
| | 多媒體內容傳輸平台服務訂戶數 | 131.7萬 | 2016/06 | 通傳會 |
| | 家庭連網普及率 | 82.0% | 2015/07-08 | 國發會 |
| | 固網上網平均下載速率 | 39.1Mbps | 2015 | 通傳會 |
| | 民眾上網普及率 | 78.0% | 2015/07-08 | 國發會 |
| 行動  | 行動寬頻帳號數 | 2,066.7萬 | 2016/07 | 通傳會 |
| | 無線寬頻帳號數 | 2,077.2萬 | 2016/05 | 通傳會 |
| | 3G行動上網速率 (消費者端量測) | | 2016/01-03 | 通傳會 |
| | 平均下載速率 | 8.84Mbps | | |
| | 平均上傳速率 | 1.36Mbps | | |
| | 4G LTE行動上網速率 (消費者端量測) | | 2016/01-03 | 通傳會 |
| | 平均下載速率 | 40.87Mbps | | |
| | 平均上傳速率 | 18.33Mbps | | |
| 民眾智慧手機持有率 | 71.5% | 2015/07-08 | 國發會 | |
| 民眾行動上網普及率 | 70.4% | 2015/07-08 | 國發會 | |

資料來源：通傳會、國發會；資料整理：資策會FIND



2-1-1 固定網路

根據國家通訊傳播委員會（簡稱通傳會）的統計，近年來我國固網寬頻帳號數已處於穩定的階段（如圖2-1）。光纖（FTTx）快速取代ADSL，2011年光纖帳號數超越ADSL帳號數，而Cable Modem帳號數持續小幅成長，並在2015年正式超越ADSL帳號數。

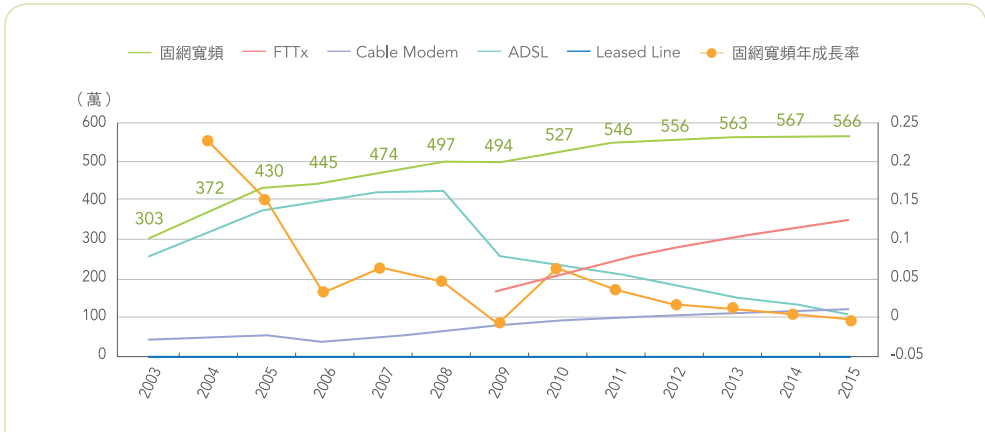


圖2-1 歷年來我國固網寬頻帳號數的變動情形

資料來源：通傳會；資料整理：資策會FIND

雖然從歷年固網寬頻帳號數變化來看，我國固網寬頻帳號數已處於穩定的階段，但從最近一年內固網寬頻帳號數的變化觀之（如圖2-2），固網寬頻帳號數自從2015年8月達到高點567.8萬戶之後，逐月降低達到2015年11月的低點565.6萬戶，隨後又逐月上升到2016年7月新高點568.8萬戶，固網寬頻帳號數有往上增長的跡象。



圖2-2 最近一年我國固網寬頻帳號數的變動情形

資料來源：通傳會；資料整理：資策會FIND

光纖帳號數由2015年7月的324.2萬，增加到2016年7月的347.7萬。光纖帳號數占固網寬頻帳號數的比例由2015年7月的57.1%，提高到2016年7月的61.1%。ADSL帳號數由2015年7月的118.2萬，降低到2016年7月的92.9萬。

在光纖連網費用方面，中華電信供裝的光纖網路接取方案³中，最高速的1G/600M和次高速的500M/250M，其非固定制上網費率與去年相同，為每月3,599和2,399元，300M/100M為1,699元，而100M/40M為976元，較去年降價約3%。供裝的最低速方案由去年的6M/2M提高為16M/3M，每月費用為669元。

截至2016年6月，我國有線電視訂戶數達514萬，平均每百家有線電視訂戶數達60.52戶；數位機上盒訂戶數478萬戶。有線電視數位化的比例（數位機上盒訂戶數占有線電視訂戶數的比例）達92.87%，相較2015年6月提高了近8個百分點（如▶圖2-3）。數位付費頻道訂戶數為133萬戶，占數位機上盒訂戶數的比例27.93%，多媒體內容傳輸平台服務訂戶數132萬戶。顯示雖然一年來我國有線電視數位化比例有明顯提升，但數位付費頻道訂戶數和多媒體內容傳輸平台服務訂戶數卻沒有明顯地增加。

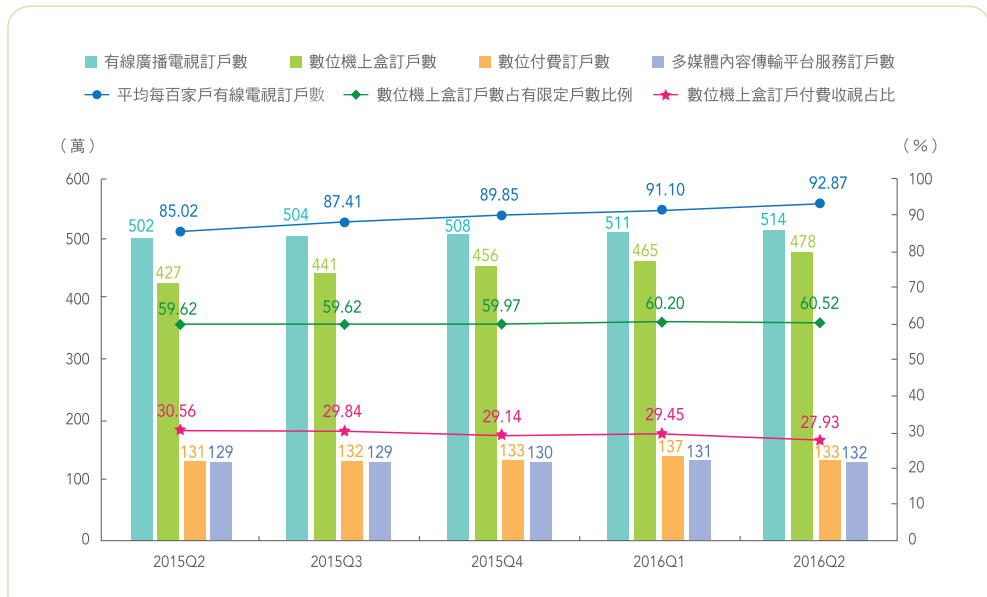


圖2-3 ▶ 近一年我國有線廣播電視數位機上盒及多媒體內容傳輸平台服務訂戶數

資料來源：通傳會；資料整理：資策會FIND

3 中華電信，2016，最新優惠-光世代，<http://broadband.hinet.net/fttx.do?s=1159>



根據國家發展委員會（以下簡稱國發會）發布的2015年個人家戶數位機會調查報告⁴（2015年7月20日至8月29日調查），我國12歲以上民眾中，85.3%家中擁有電腦設備，82.0%家戶可連網，78.0%曾經上網。換算我國12歲以上網路人口約有1,638萬人。12歲以上網路人口中，90.2%曾使用過無線或行動上網。

根據通傳會於2016年3月底公布的2015年固網寬頻上網速率量測結果⁵，全國22縣市家庭用戶固網上網平均下載速率達39.1Mbps，平均上傳速率達14.8Mbps（如圖2-4）。在用戶之速率一致性（Consistency of Speeds）方面，全國70/70（70%的使用者在70%的時間內所能達到的廣告速率達成率）及80/80（80%的使用者在80%的時間內所能達到的廣告速率達成率）下載達成率指標為94.0%與87.9%；而70/70與80/80上傳達成率指標為95.7%、93.5%。各種供裝速率的平均下載廣告速率達成率介於93.8%到106.2%之間，平均上傳廣告速率達成率介於93.3%到123.6%之間。顯示我國固網寬頻業者提供用戶使用寬頻上網效能已相當穩定。為排除用戶端上網設備性能差異對量測的影響，本量測採用安裝於用戶家中的硬體測試盒進行，以能達到高度準確性。

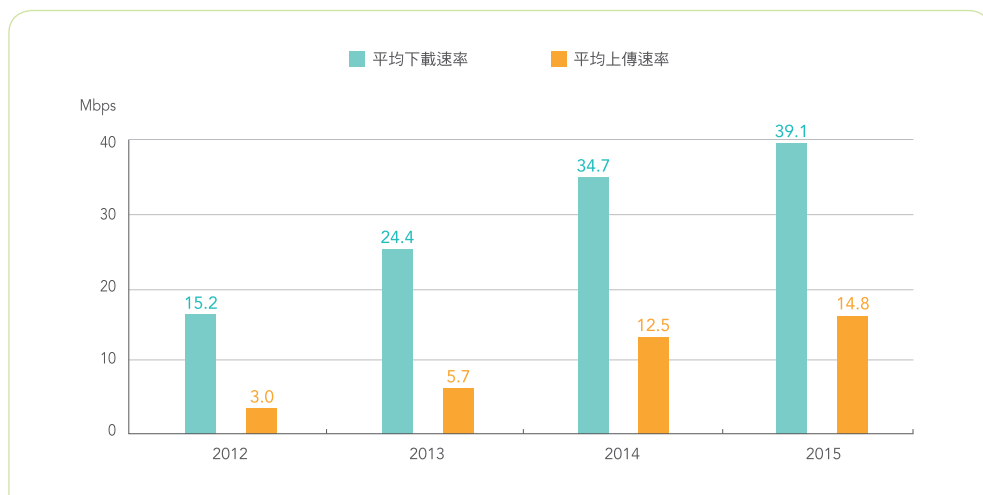


圖2-4 2012-2015年全國家戶固網上網速率比較

資料來源：通傳會；資料整理：資策會FIND

4 國發會，2015，104年個人家戶數位機會調查報告，<http://www.ndc.gov.tw/cp.aspx?n=55C8164714DFD9E9>

5 通傳會，2016，「NCC公布104年固網寬頻上網速率量測結果，我國固網寬頻服務速率已具穩定效能」，http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&sn_f=35352

2-1-2 行動網路

根據通傳會的統計，我國4G行動上網用戶數在2015年9月超越了3G行動上網用戶數（如圖2-5），4G行動上網在極短的時間內取代了3G行動上網。在2015年7月到2016年7月的一年期間，3G行動上網用戶數降幅達47.8%，減少了456萬戶；同期間4G行動上網用戶數增加了775萬戶，達到1,568萬戶。從行動通信業務來看，在2015年7月到2016年7月的一年期間，3G行動電話用戶數從1,996萬戶降為1,281萬戶，減少了715萬戶；同期間4G行動電話用戶數增加了775萬戶。一年期間3G行動電話用戶中開通行動上網服務的比例由47.9%降為39.0%，顯示4G上網速率對使用行動上網的民眾非常有吸引力，因而選擇了升級到4G行動上網服務。2016年7月行動寬頻上網用戶數達2,066.7萬戶，平均每百人口有87.9個行動寬頻上網用戶。

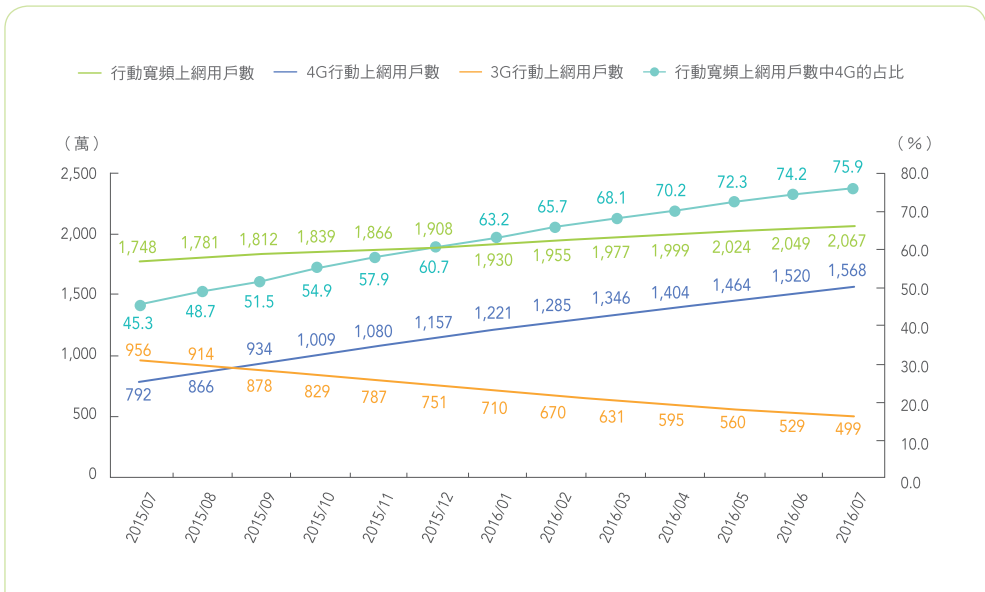


圖2-5 ▶ 近一年我國行動寬頻帳號數的變動情形

資料來源：通傳會；資料整理：資策會FIND

通傳會更新了公眾無線區域網路（Public WLAN，PWLAN）帳號數的定義，由曾經登記使用改為最近一年有使用的帳號數，這使得PWLAN帳號數出現大幅減少的情形。根據通傳會統計，2016年7月我國PWLAN帳號數為10.4萬戶，加上行動寬頻上網用戶數後，我國無線寬頻上網用戶數為2,077.2萬戶。



根據通傳會於2016年5月公布的2016年第1階段（於1月21日至3月31日間進行）全國行動寬頻上網速率量測結果⁶，消費者端4G平均下載速率為40.87Mbps，上傳速率為18.33Mbps；3G平均下載速率為8.84Mbps，上傳速率為1.36Mbps（如圖2-6）。顯示4G建設已為我國行動寬頻上網速率帶來高度成長，也為使用者帶來極大的便利。

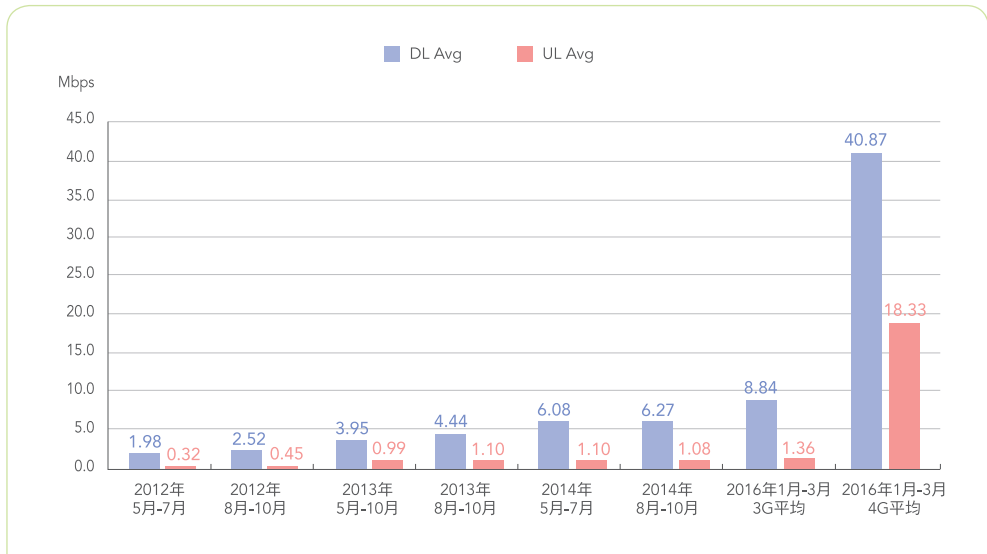


圖2-6 行動寬頻上網速率消費者端量測歷年結果

資料來源：通傳會；資料整理：資策會FIND

另根據國發會發布的2015年個人家戶數位機會調查報告，我國12歲以上民眾中，持有智慧手機的比例由2014年的66.2%成長到71.5%；12歲以上網路人口中，持有智慧手機的比例更由2014年的84.9%成長到91.6%。在行動上網方面，我國12歲以上民眾上網普及率達78.0%，行動上網普及率達70.4%。

⁶ 通傳會，2016，「105年第1階段4G上網速率量測結果出爐」，http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&is_history=0&pages=1&sn_f=35671

2-2 數位生活品質滿意度

國際間評量一個國家之發展，除經濟範疇外，應包含衡量國民福祉及社會進步的指標，尤其是網路快速發展的時代，衡量資通訊科技（Information and Communication Technology, ICT）如何提升民眾生活品質是一個重要的議題。因此，資策會在行政院科技會報辦公室的支持下，首度建構數位生活滿意度的衡量指標，透過彙整專家學者及民眾意見，整理出智慧交通與運輸服務、就業與創新創業服務、數位家庭與智慧服務、環境品質監視與改善、災害預防與社區安全、食品安全與生產履歷、數位醫療與健康促進、即時通訊與網路社群、網路金融融與購物消費、電子化與互動化政府、數位教育與終身學習、數位娛樂與觀光體驗，總計12項民眾有感ICT應用服務領域，進行現況調查與服務需求議題探討。

各領域下有3-9項不等的服務項目（包含服務缺口，服務缺口指目前臺灣尚未有的服務或是僅在發展初期，民眾對該服務項目普遍不瞭解），在12項ICT應用服務領域中，於2015年統計共計91項應用服務，其中有26項為服務缺口，有65項為目前已有的服務（如 ▶ 圖2-7）。

| ICT-B1 即時通訊 與網路社群 | ICT-B2 食品安全 與生產履歷 | ICT-B3 災害預防 與社區安全 | ICT-B4 智慧交通 與運輸服務 | ICT-B5 數位家庭 與智慧服務 | ICT-B6 數位教育 與終身學習 |
|--|---|--|---|--|---|
| <ul style="list-style-type: none"> • 即時影音與社群服務 • 網路安全與個人隱私 • 網路帳號整合與管理 • 創意與創新社群服務 • 即時通商業整合服務 • 擬真人互動即時會談 | <ul style="list-style-type: none"> • 有機農產品管理服務 • 食物生產履歷與查詢 • 健康營養知識庫揭露 • 優良食品查詢與管理 • 保健食品資訊應用通 • 團膳營養與履歷查詢 • 食安追蹤與回報平台 | <ul style="list-style-type: none"> • 頻災地區監視與通報 • 整合型社區安全服務 • 智慧型災害通報服務 • 即時安全檢舉與報案 • 天然災防疏通與引導 • 整合型居住安全資訊 | <ul style="list-style-type: none"> • 交通悠遊一卡通服務 • 公共運輸時刻即時覽 • 道路交通狀況即時通 • 替代與疏導道路指引 • 個別化商業運輸服務 • 交通預訂與查詢服務 • 交通觀光即時整合通 • 道路安全與即時監控 • 智慧停車導航便利通 | <ul style="list-style-type: none"> • 智慧家電整合型服務 • 家庭與社區安全服務 • 社區服務查詢便利通 • 智慧型舒眠舒壓服務 • 智慧型管家應用服務 • 智慧型居家維運服務 | <ul style="list-style-type: none"> • 整合數位教學與評量 • 互動學習與伴讀機制 • 數位典藏公共服務化 • 普及圖書館數位閱讀 • 數位校園暨偏鄉學習 • 區域型數位內容服務 • 數位終身學習與服務 • 產學研合作服務平台 • 整合數位教材與資源 |



| ICT-B7 就業與創新 創業服務 | ICT-B8 數位醫療 與健康照護 | ICT-B9 數位娛樂 與觀光體驗 | ICT-B10 電子化與 互動化政府 | ICT-11 環境品質 監視與改善 | ICT-12 網路金融 與購物消費 |
|--|---|--|--|--|---|
| <ul style="list-style-type: none"> 青年就業與創業服務 分族群就業媒合服務 創新與創業商業媒合 國際投資媒合與服務 品牌與行銷顧問服務 薪資與工時資訊公開 專業資訊查詢與整合 精準即時翻譯與紀錄 | <ul style="list-style-type: none"> 網路掛號管理與服務 跨院電子病歷的交換 遠距醫療與照護服務 健康存摺與評估管理 網路醫療與健康查詢 健康促進的服務平台 智慧型身障居民護照 整合型健康社區照護 客製化醫療保健服務 | <ul style="list-style-type: none"> 高畫質影音增值服務 寬頻行動高畫質影音 活絡動畫暨文創市集 活化空間暨數位體驗 拓展國際化數位匯流 區域特色故事化行銷 智慧型數位影音服務 擴充實境體驗與服務 | <ul style="list-style-type: none"> 數位化公共資訊公開 民眾導向整合型服務 公共政策及資訊開放 公部門即時監督影音 巨量資料分析與服務 互動式公共議題參與 開放式雲端增值服務 智慧社會福利卡服務 | <ul style="list-style-type: none"> 環境氣候預測與分析 綠色建築與低碳應用 碳含量估算檢測服務 線上汙染檢舉與追蹤 整合性綠色空間管理 公園與復育林區監視 環境危險警示與監測 智慧型清淨空調系統 | <ul style="list-style-type: none"> 線上金融與小額付款 網路消費資訊查詢通 網路預訂票券與服務 第三方支付認證服務 網路交易安全與管理 智慧信用卡選用付款 交易與消費資訊整合 |

註：標底線表示為服務缺口

圖2-7 ▶ ICT應用服務各領域及項目

資料來源：資策會FIND調查

2-2-1 臺灣民眾生活品質

本研究調查於2015年8月3日至2015年8月27日進行第一年度的調查，針對臺灣各縣市15歲以上中華民國國民，共計完成1,603份有效樣本數。由調查結果得知2015年民眾生活品質為62.8分，而生活品質滿意度分數最高的領域為健康狀況（70.1分），其次依序為社會聯繫（68.8分）、居住條件（67.8分）（如 ▶ 圖2-8）。

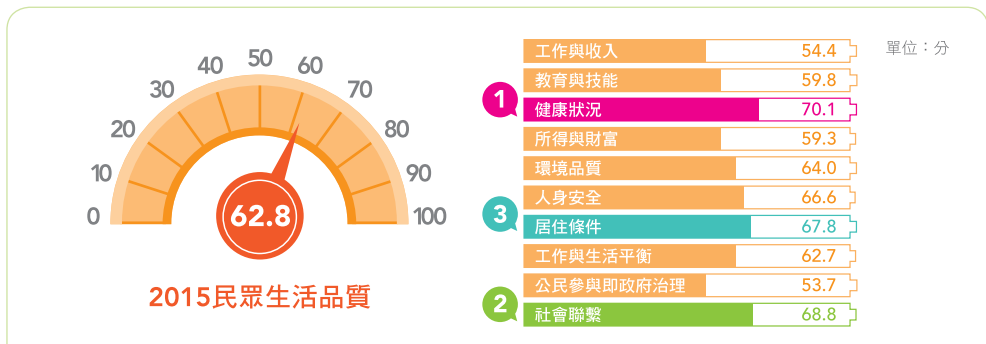


圖2-8 ▶ 2015民眾生活品質滿意度

資料來源：資策會FIND調查

以年齡層來看，15-24歲正處於求學階段的學生族群其滿意度顯著高於其他年齡層。以教育程度來看，教育程度愈高者滿意度愈高，教育程度在研究所以上者滿意度顯著高於其他族群。有上網經驗者滿意度顯著較高。在收入方面，亦呈現收入愈高滿意度愈高之情形（如 ▶ 圖2-9）。

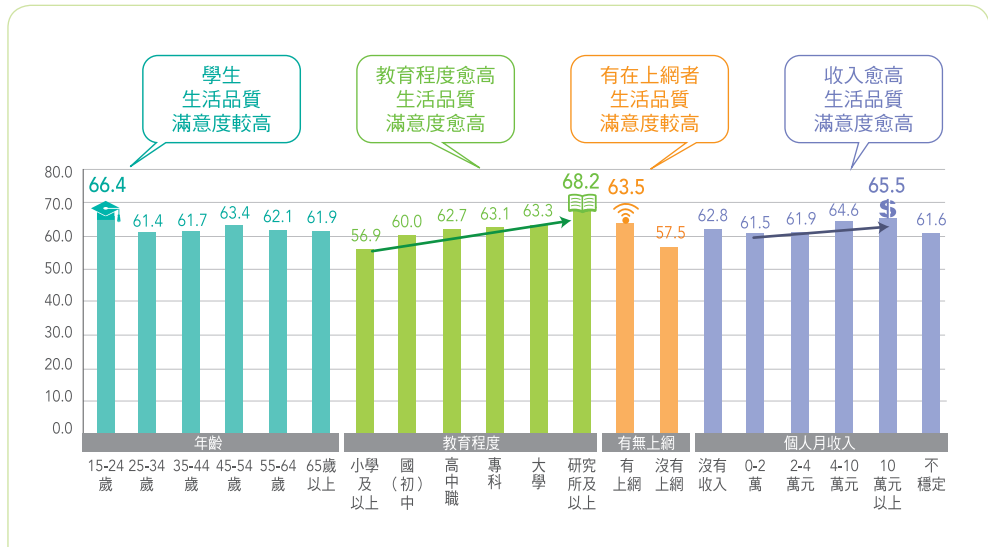


圖2-9 ▶ 不同族群之生活品質滿意度差異

資料來源：資策會FIND調查

2-2-2 臺灣民眾資訊服務使用狀況

以2015年度研究顯示，資訊科技應用服務對生活品質的影響程度已有顯著影響。每當ICT滿意度增加時，生活品質滿意度也顯著增加，可見臺灣已邁入高度資訊化社會，未來若持續提升於ICT服務之投資，可有效提升民眾生活品質。

其中對生活品質影響力最大的前三名ICT應用服務，依序為即時通訊與網路社群、食品安全與生產履歷以及災害預防與社區安全。此三大服務對民眾生活品質的影響層面最廣也最深，顯示民眾非常重視安全相關之服務，其中包含人身安全及網路安全等議題（如 ▶ 圖2-10）。



| 生活品質領域 ICT領域 | 工作與收入 | 教育與技能 | 健康狀況 | 所得與財富 | 環境品質 | 人身安全 | 居住條件 | 工作與生活平衡 | 公民參與及政府治理 | 社會聯繫 | 總影響力排序 |
|-------------------|-------|-------|------|-------|------|------|------|---------|-----------|------|--------|
| ICT-B1-即時通訊與網路社群 | | ★ | ★ | ★ | ★ | ★ | ★ | | ★ | ★ | 1 |
| ICT-B2-食品安全與生產履歷 | ★ | | ★ | ★ | | | | ★ | ★ | | 2 |
| ICT-B3-災害預防與社區安全 | | | | | ★★ | ★★ | ★ | | | | 3 |
| ICT-B4-智慧交通與運輸服務 | | | ★ | ★ | | ★ | ★ | | | ★ | 4 |
| ICT-B5-數位家庭與智慧服務 | | | | | | | | ★★ | ★ | ★ | 5 |
| ICT-B6-數位教育與終身學習 | | ★★ | ★ | | | | | ★ | | | 6 |
| ICT-B7-就業與創新創業服務 | ★ | | | ★ | | | | | ★ | | 7 |
| ICT-B8-數位醫療與健康促進 | | | ★★ | | | | ★★ | | | | 8 |
| ICT-B9-數位娛樂與觀光體驗 | | | ★ | | | ★ | | | | ★ | 9 |
| ICT-B10-電子化與互動化政府 | ★ | | | | | | | | ★★ | | 10 |
| ICT-B11-環境品質監視與改善 | | | | | ★ | | | | ★ | | 11 |
| ICT-B12-網路金融與購物消費 | ★ | ★ | | | | | | | | | 12 |

★表示顯著影響力，★越多，意謂ICT對該生活品質的影響力越大

圖2-10 ▶ ICT應用服務使用對生活品質領域之影響力

資料來源：資策會FIND調查

為了瞭解臺灣民眾對於各ICT領域的印象分數及感受，不論有無使用過，皆形容相關服務和情境，詢問其對周遭環境或服務的好感程度，並對其評分，0分表示最低，100分表示最高。以不同領域之好感度來看，智慧交通與運輸服務的好感度分數最高，有72.1分，其次依序為數位醫療與健康促進（68.7分）、數位娛樂與觀光體驗（65.8分）、網路金融與購物消費（62.6分）、數位家庭與智慧服務（62.3分）等（如 ▶ 圖2-11）。

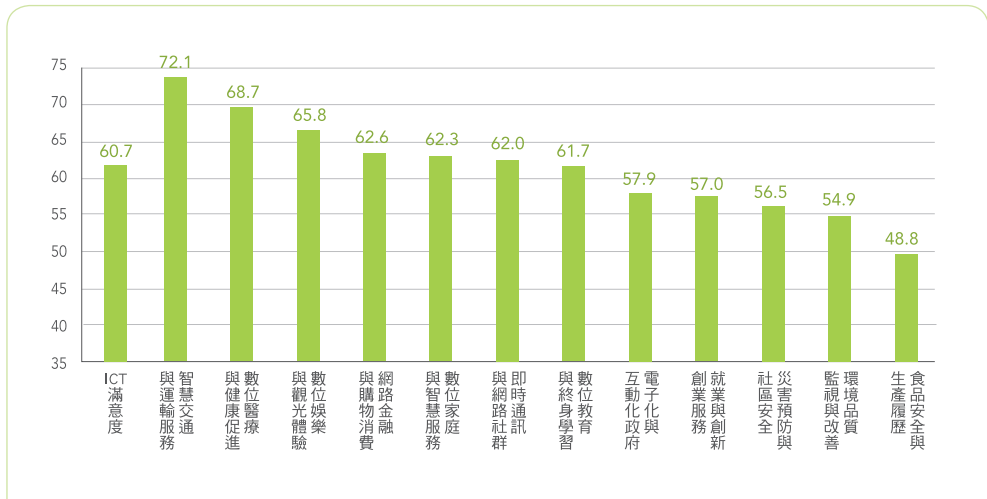


圖2-11 ▶ ICT應用服務好感度

資料來源：資策會FIND調查

各領域服務使用情形以智慧交通與運輸服務的使用度最高，有90.9%，其次依序為即時通訊與網路社群（77.8%）、網路金融與購物消費（76.5%）、數位醫療與健康促進（76.3%）、數位娛樂與觀光體驗（73.6%）等。12項ICT領域中，滿意度最高之前3項為智慧交通與運輸服務、數位醫療與健康促進、數位娛樂與觀光體驗，滿意度皆超過六成。從質化訪談中也得知民眾希望未來可強化交通運輸整合型ICT服務，如結合旅遊（如景點、無障礙設施等）與交通資訊（大眾轉乘、道路、停車場等），以持續提升民眾滿意度（如 ▶ 圖2-12）。

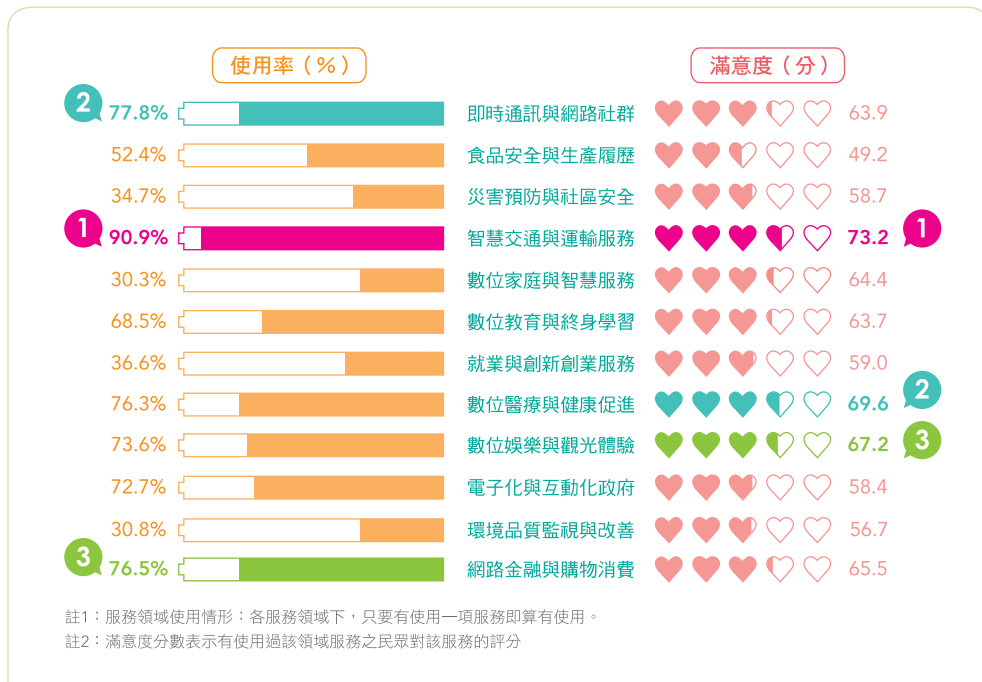


圖2-12 各領域服務使用情形與滿意度

資料來源：資策會FIND調查

本研究發現ICT應用服務項目對民眾生活品質具有高度影響力，亦找出重要影響民眾生活品質之ICT應用服務項目，以作為行政院科技會報辦公室於推動相關ICT政策及方案之參考，如智慧城市等政策方案擬定。在ICT應用服務的快速進化演變的過程中，宜長期持續的觀察ICT應用服務項目發展情形，累積長期調查資訊，以透過科學性、嚴謹的調查，觀察長期的趨勢變化，使ICT相關政策方針擬定時，能有更豐富且具價值的參考資訊。



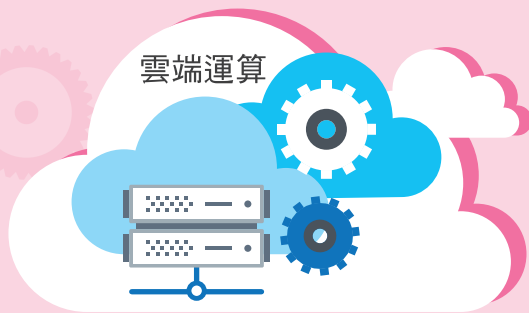
第三章

我國資通訊政策推動現況



100Mbps高速寬頻網路
涵蓋**98%**家戶

無線寬頻網路帳號數
1792.01萬戶



雲端運算

創新服務使用者
滿意度約**72%**

行動寬頻 (4G)
用戶數達
1,157萬戶





臺灣開放資料全球第**1**名



政府網路服務
滿意度達
77%



第三章 我國資通訊政策推動現況

3-1 國家資通訊建設

「國家資通訊發展方案（2012-2016年）」（簡稱NICI方案）係依據國家發展需要、全球資通訊發展趨勢，NICI民間諮詢委員會之建議，並邀請相關學者、專家詳細討論及審慎規劃而成。方案以推動「智慧臺灣」為主軸，期望建設臺灣成為安心、便利、健康、人文的優質網路社會。

在策略上，秉持節能減碳理念，推動ICT關鍵應用，協助解決社會發展議題，帶動科技化服務的發展，並深化資通訊科技的應用，落實終生學習觀念。不僅讓人民感受到ICT的好處，更使臺灣成為世界資訊化社會應用櫥窗，進而為國內業者擴大內需市場，提升業者能量，並為國內業者開拓國際市場。五大推動項目如下：

- （1）建設匯流網路：建構無線寬頻與數位匯流網路，推動物件連網，完善價廉物美之寬頻應用環境。
- （2）創新政府服務：運用ICT整合並創新政府服務，鼓勵公民參與，強化社會互信。
- （3）貼心生活應用：在食、醫、住、行方面，推動符合民眾需求、讓民眾感動的服務與應用，並達到節能減碳目的。
- （4）智慧生活產業：加速推動防救災、智慧醫療、智慧交通、智慧電網，以及智慧流通等產業，並研提誘因鼓勵地方政府與業者積極投入加值應用，開創新的商業模式。
- （5）深耕數位關懷：造福弱勢族群，創造公平數位機會，建立一個包容的資訊社會。

各推動領域亮點成果整理如 ▶ 表3-1。

表3-1 ▶ 「國家資通訊發展方案（2012-2016年）」亮點成果

| 領域 | 亮點成果 |
|------|---|
| 基礎環境 | 1. 加速我國寬頻網路建設，帶動我國通訊產業發展 佈纜長度多達1萬4,903公里，相當於臺灣環島15圈。 |
| | 2. 提供民眾多元優質的高畫質收視環境 高畫質電視節目製播多達4,774小時，提升國內電視品質之成效。 |
| | 3. 推動iTaiwan免費無線上網服務 全國建置逾9,800個熱點，提供民眾免費上網服務，使用人次已逾1億3,394萬次。 |



| 領域 | 資通訊應用亮點內容 |
|------|--|
| 基礎環境 | <p>4. 政府資料開放佳績耀眼全球</p> <ul style="list-style-type: none"> · 政府資料開放平臺已開放22,279筆資料集（2016/11）。 · 榮獲開放知識基金會（OKFN）2015年資料開放評比全球第1名。 |
| 有感服務 | <p>1. 便民有感行動服務：主動到府協助弱勢申辦社福服務</p> <p>與中央系統整合，在地行動服務實施免重複登打資料。並且可以由村里幹事或社工持行動載具設備至各案家協助申請急難救助等多項福利服務項目，縮短申辦流程7至14日。</p> <p>2. 建立以使用者為中心的政府服務網路平台</p> <p>數位生活儀表板會員人數逾91萬人，已介接各機關達 250 項訊息服務，個人訊息訂閱數超過217萬筆。</p> <p>3. 賦稅資訊系統整合再造行動條碼（QR-Code）繳稅服務</p> <p>使用行動條碼網路繳稅服務，瀏覽網頁及輸入資料約225秒完成繳稅；相對於傳統網路繳稅服務節省時間39.2%。</p> <p>4. 智慧交通管理及資訊服務系統之建置</p> <ul style="list-style-type: none"> · 即時路況資通平台：路口停等延滯時間平均約可減少10-15%。 · 聰明公車：14縣市建置市區公車動態資訊系統，降低乘客平均候車時間5-10分鐘以上。 · 智慧交控系統：18縣市建置標準化交控中心，完成3,476處路口號誌更新與擴充重整。 <p>5. M-Police行動警察建置與社區安全e化聯防機制</p> <ul style="list-style-type: none"> · M-Police行動警察裝置達1萬1,020部，追捕逃犯查獲率、失竊汽機車破獲率、失蹤人口尋獲率等各項查（破）獲率逐年成長。 · 政府錄監系統鏡頭建置數達14萬2,568支，打造妥適社會安全網絡，營造一個安全優質的生活環境。 <p>6. 公共建築太陽光電系統，建立多元創造自主電力</p> <ul style="list-style-type: none"> · 推動公共建築太陽光電系統共設置 561案，累計創造自主電力達992萬度，達到普及教育示範、推動再生能源、振興經濟與環境保護等目標。 |
| 數位關懷 | <p>1. 「行動教室」推動數位學習創新服務</p> <ul style="list-style-type: none"> · 行動學習車已在臺灣各地開出838班次，依開課需求，載著電腦抵達上課地點，成為「行動教室」，使新住民便於就近參訓，拉近學習距離。 · 3D列印行動實驗車巡迴全臺高中學校500車次，推動Fab Lab 3D列印技術與動手實作相關課程，使學生創意能夠具體實踐。 <p>2. 數位機會中心、數位學伴、資訊志工團隊等提升偏鄉數位素養</p> <ul style="list-style-type: none"> · 數位機會中心：累計補助507個數位機會中心（Digital Opportunity Center, DOC），辦理民眾資訊應用人才培訓，累計開設8,995班資訊應用課程，培訓人數計約14萬2,620人。 · 數位學伴：規劃94所夥伴大學（5,573位大學生）、學習陪伴344所國中小（4,234位國中小學童），參與數位學伴計畫。 · 資訊志工團隊：招募370隊資訊志工團隊，前往781所偏鄉學校及DOC協助資訊應用服務，累計出隊6,768次，服務已達5萬2,256人次、37萬6,256小時。 |

資料來源：智慧臺灣計畫；資料整理：資策會FIND

在相關部會的努力下，截至2015年底方案目標的達成情形如 ▶ 表3-2。

表3-2 ▶ 國家資通訊發展方案（2012-2016年）目標達成情形

| 項目 | 預期目標（2016年） | 目標達成情形（2015年底） |
|--------|----------------------------------|---|
| 建設匯流網路 | 2015年光纖用戶數達720萬，80%家戶可享100M上網速度 | 100Mbps高速寬頻網路之家戶98%，光纖用戶數473.71萬戶，無線寬頻網路帳號數1,792.01萬戶 |
| 創新政府服務 | 電子化政府服務滿意度達70% | 政府網路服務滿意度達77.35% |
| 貼心生活應用 | 65%全國民眾（15歲以上）享用創新服務，使用者滿意度70% | 62.9%全國民眾（15歲以上）享用創新服務，使用者滿意度72% |
| 智慧生活產業 | 促成民間投資達新台幣1,000億元（2010-2014年） | 促成民間投資新台幣2,686億元（2010-2015年） |
| 深耕數位關懷 | 偏鄉民眾上網普及率達72% 中高齡民眾電腦訓練11.7萬人 | 高偏鄉民眾上網普及率58.9% 低偏鄉民眾上網普及率74.5% |

資料來源：行政院科技會報辦公室

3-2 數位匯流

行政院於2010年通過「數位匯流發展方案（2010-2015年）」（以下簡稱「匯流方案」），宣示政府將從「整備高速寬頻網路、推動電信匯流服務、加速電視數位化進程、建構新興視訊服務、促進通訊傳播產業升級、與調和匯流法規環境」六個主軸，全力推動數位匯流，協助產業轉型、強化國家競爭力。並且成立「數位匯流專案小組」，協調與推動我國的數位匯流工作。有鑑於通訊傳播技術與產業環境持續變遷，2012年5月行政院復核定通過「數位匯流發展方案（2010-2015年）第二版」，新增「豐富電視節目內容」為第七個主軸，整合部會資源，推動並鼓勵本土視聽媒體內容的產製與播送。

透過匯流方案的推動，我國的寬頻基礎環境建設已大致完善，至2015年底達成之重要成果如下：

- （1）於2012年6月全面關閉無線電視類比訊號，完成無線電視數位轉換，且每家無線電視台至少有一個可播放高畫質節目之頻道。
- （2）於2014年完成行動寬頻業務（4G）釋照，至2015年底行動寬頻（4G）用戶數達1,157萬戶，預計至2020年可達2,800萬戶。



- (3) 推動100M寬頻到戶，加計固網有線電視系統，可接取100Mbps寬頻網路之家戶率約100%。
- (4) 推動有線電視全面數位化，全國有線電視數位化普及率約87.41%，花東離島地區有線電視數位化普及率約22%。
- (5) 全國有線、無線電視台播放之高畫質電視頻道共171個，民眾可普遍接取收看高畫質電視節目。

負責督導推動匯流方案的「行政院數位匯流專案小組」，則在2014年1月併入行政院NICI小組，並於其下成立「數位匯流組」，由國家通訊傳播委員會主責並持續推動數位匯流。

3-3 行動寬頻

我國自2014年起規劃並推動「加速行動寬頻服務及產業發展方案」，希望加速行動寬頻網路建設，讓所有民眾能早日享受優質且價格合理的高速行動寬頻服務。五大推動主軸包括：加速行動寬頻網路布建、行動寬頻創新應用服務、消費者權益保障、行動寬頻技術發展，以及行動寬頻尖端技術人才培育。期望藉本方案之推動，於2017年底達成以下目標：

- 4G人口覆蓋率達90%。
- 4G用戶數達1,600萬用戶。
- 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。

在4G行動寬頻特許執照的發放以及加速行動寬頻服務與產業發展方案的推動下，我國電信業者的4G業務陸續於2014年中正式商用，並且於2014下半年著手擴大基地台之布建；至2014年底，我國4G用戶數（subscribers）已達345萬戶，占行動通信用戶數的11.5%。同時，4G執照的發展也帶動新進電信業者的重組。如國碁電子於2014年5月底收購亞太電信股權、臺灣之星於2014年10月併入威寶電信。而隨著新加入之臺灣之星與國碁等4G電信業者藉吃到飽費率吸引用戶青睞，使得中華電信、臺灣大哥大和遠傳電信等前三大業者紛紛跟進推動，形成極其競爭的市場態勢。至2015年底，我國4G用戶數倍數成長至1,157萬戶；截至2016年9月4G用戶數已達1,673萬戶，占行動通信用戶數的57.7%；預計至2016年底，4G普及率將突破六成，用戶數達1,800萬戶。

5G具有大頻寬、低延遲、大連結、無縫隙的特性，為物聯網（IoT）應用服務的基礎，其將引爆數位經濟市場。預估2025年5G全球潛在經濟影響將達160兆新台幣。其中，5G產業為4.9兆，5G關聯硬體產業為41.1兆，5G關連應用服務為114兆。為進軍國際新市場搶佔先機，必須投入5G自主系統開發，以鞏固及提升資通訊終端與晶片領域優勢，並提早發展5G創新應用服務。現階段我國規劃的5G產業發展以「鞏固ICT產業優勢、引領產業轉型，由製造大國到應用服務大國」為願景，以「2025年掌握5G關鍵技術、軟體與應用服務，發展具特色專用網路系統，透過臺灣場域經驗將應用服務推向國際市場」為目標。

3-4 公平數位機會

我國在2000年初開始重視數位落差的議題。自2002年通過「國家資訊通信發展方案」伊始，迄今推動縮減數位落差及創造數位機會的政策已歷時14年。相關政策包括：2004年「縮減數位落差」、2008至2011年「創造數位機會」（第2期計畫），2012至2015年「深耕數位關懷」（第3期計畫）。重要成果如下：

- (1) 累積有12個年度的數位機會調查資料，可提供政策擬定與推動績效的參考。例如2004年民眾上網率最高的縣市和最低的縣市差了26.1個百分點，2014年此差距降到17.2個百分點。同期間，男女性上網率差距由4.2個百分點降為3.5個百分點。
- (2) 設置數位機會中心，提供偏遠地區民眾教育學習場域及服務諮詢。自2005年起至2015年累計設置241個數位機會中心（DOC），開設22,701班資訊應用課程，培訓35萬1,122人。
- (3) 招募、培植大學生擔任偏鄉國中小學童之學伴，運用視訊設備與數位學習平台，跨越城鄉空間障礙，讓大學端與國中小及DOC一對一線上陪伴與學習。自2006年起至2015年累計培訓11,170位大學生擔任大學伴，服務627所偏鄉國中小及DOC共7,827學童。2015年起更結合民間資源展開新的教學方式，2015年1-9月媒合教學端與學習端達2,800人，學習陪伴總時數達3萬6,570小時。
- (4) 組織資訊志工投入縮減城鄉數位落差行列。2005年至2015年共組織1,187隊，23,589位大專以上及高中生擔任資訊志工，前往2,474所鄉偏學校及DOC進行數位服務。
- (5) 補助國小3年級以上至國中1年級在學學童之低收入戶1台全新電腦及3年免費上網服務。自2007年起至2013年9月累計達13,201戶，辦理國民電腦相關研習活動共1,104場，參與研習人數達1萬4,561人。
- (6) 邀請熱心公益的企業及民間團體共同投入。自2005年起至2015年9月共獲得70餘家企業及民間單位贊助軟硬體，市值達6億8千萬元。



- (7) 建置及更新新住民數位資訊e網，瀏覽人次達498,566人次；實體課程共開辦3,108堂，有34,167人次結訓。
- (8) 深入368鄉鎮地區，輔導258個地方群聚業者建立營運機制，運用電子商務共同行銷，協助偏鄉企業開拓網路市集。建構「中小企業網路大學校」網路學習互動環境，帶動500家中小企業運用網路學習。
- (9) 建置56處原住民部落圖書資訊站，並開辦資訊教育研習課程，104年截至10月底有419人結業。

2016-2019年推動「普及偏鄉數位應用計畫」（第4期計畫），以延續政府對弱勢族群於資訊化社會中數位機會的照顧。願景是「提升數位能力，豐富生活應用」。以數位發展程度1-5級區域及偏遠鄉鎮、離島地區、原住民族地區為優先，服務對象以中高齡、原住民、新住民、身心障礙者、婦女、低收入戶等數位發展程度較需關懷的族群為主，培養上述族群及微型企業使用網路科技工具的能力，並使能進行數位生活應用、數位行銷、線上自我學習，滿足生活上數位使用的需求。

「普及偏鄉數位應用計畫」的推動主軸如下：

- (1) 提升數位应用能力：培訓民眾資訊基礎素養、資訊應用與加值能力並推廣線上學習觀念。
- (2) 豐富數位生活應用：數位生活資訊應用與推廣、網路衛教及預防保健資訊服務。
- (3) 享受行動服務與應用：提供偏鄉據點行動環境及適地性行動服務。
- (4) 提升偏鄉企業數位行銷应用能力：推動偏鄉群聚網銷共營與數位關懷、微型企業虛擬通路與商務應用、打造微型智慧企業與行動學習。
- (5) 強化農民數位應用：偏鄉農民數位關懷與行銷、適地性農業社區服務。

「普及偏鄉數位應用計畫」的預期效益整理如次：

- (1) 培育民眾利用資通訊科技的能力，應用智慧型數位工具，解決生活上數位應用的問題。
- (2) 傳播政府智慧生活的服務資訊，搭起政府與民眾間的橋樑，拉近政府與民眾間的距離。
- (3) 藉由長青族健康諮詢數位化與智慧型友善空間的提供，傳達政府深耕數位關懷之施政。
- (4) 提升社區組織、文化典藏、公民參與、終身學習的能力；運用數位科技創造社區營造亮點機會，促進遊子返鄉服務，增加人才回流的機會。
- (5) 培育在地產業的種子人才，扶植數位發展程度較慢區域，提升企業的核心能力。

3-5 雲端運算

在全球雲端運算技術及應用服務發展陸續起飛之際，為延續我國原有資通訊產業硬體製造基礎與快速因應市場變化等優勢，以取得全球雲端運算市場先機與競爭優勢，政府自2010年開始推動「雲端運算產業發展方案」，為我國雲端運算應用打下很好的根基。為因應雲端運算國際發展趨勢，在技術與發展經驗更具成熟之際，考量應透過政府雲之建置，以「應用」二字來強調政府施政，以協助產業發展，催生雲端運算產業鏈，進而達到「民眾有感」之目的，於2012年11月15日核定修正方案名稱為「雲端運算應用與產業發展方案」。重要成果包括：建立災防雲、食品雲、健康雲、警政雲、教育雲之平台應用、基礎建設及協調機制等，為產業轉型與競爭力提升奠定良好基礎。

現階段雲端運算發展方案（2016-2020年）於2015年10月12日奉核通過，以「活用雲端運算技術，普及開放創新服務，建構智慧城市、物聯網、生產力4.0與巨量資料產業的發展基礎」為願景，期望達成民眾有感應用與產業發展兩項主要目標，並以社會安全、經濟發展、環境永續等3個構面，規劃國民健康管理存摺、警政治安守護、校園行動學習等8朵政府雲，做為後續雲端應用計畫。

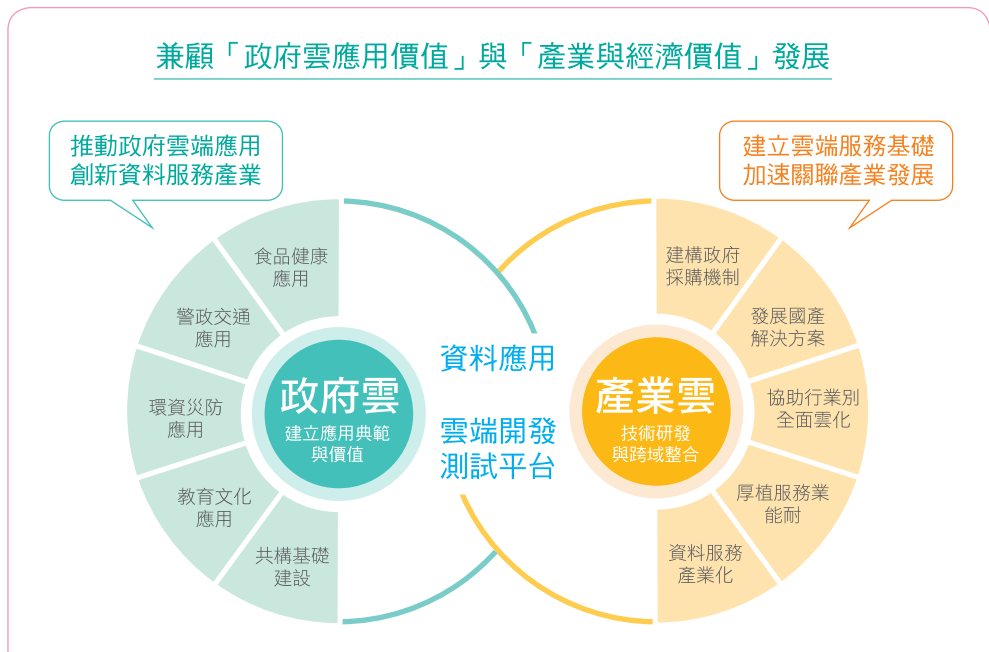


圖3-1 ▶ 我國雲端運算方案推動策略

資料來源：行政院科技會報辦公室



3-6 大數據與政府資料開放

順應資料經濟的發展趨勢，我國從擁有最大量資料的政府開始，首先研擬政府資料開放政策，更新適合的輔導產業機制，拋磚引玉來驅動產業加值應用；運用政學合作平台及政府施政議題來開啟政府跨部會資料融合的運用機制，以及探索公私合作的前瞻議題；透過公協會及法人，促使產業界大量運用資料加值，以產生新的服務或新的商業模式，讓產業在物聯網、智慧城市，以及生產力4.0的波瀾下，能開創更亮麗的市場新局面。



圖3-2 我國政府導入大數據目的與資料公開原則

資料來源：國發會（2015）

政府依據資料開放原則及精進大數據，分析推動大數據相關工作。推動策略依資料特性不同而有不同：

- 產業資料 → 透過大數據產業輔導團加值應用。
- 政府開放資料 → 透過民間及社群加值運用與深化。

- 政府敏感資料 → 透過政府及學研合作方案推動。
- 政府機敏性資料 → 透過大數據技術指導小組，依政府施政需要挑選議題，進行大數據分析，以提高施政決策品質。

在資料經濟的基礎環境的整備上，議題包括完善大數據分析平台及個資去識別化程序等；並構思建構資料經濟產業生態圈，以及產政學合作平台，希望能藉由各種數據計畫的實作，培養資料科學家的研發能量及技術成熟度，開發創新商業模式，催生大數據創新服務公司以及數據化產業。

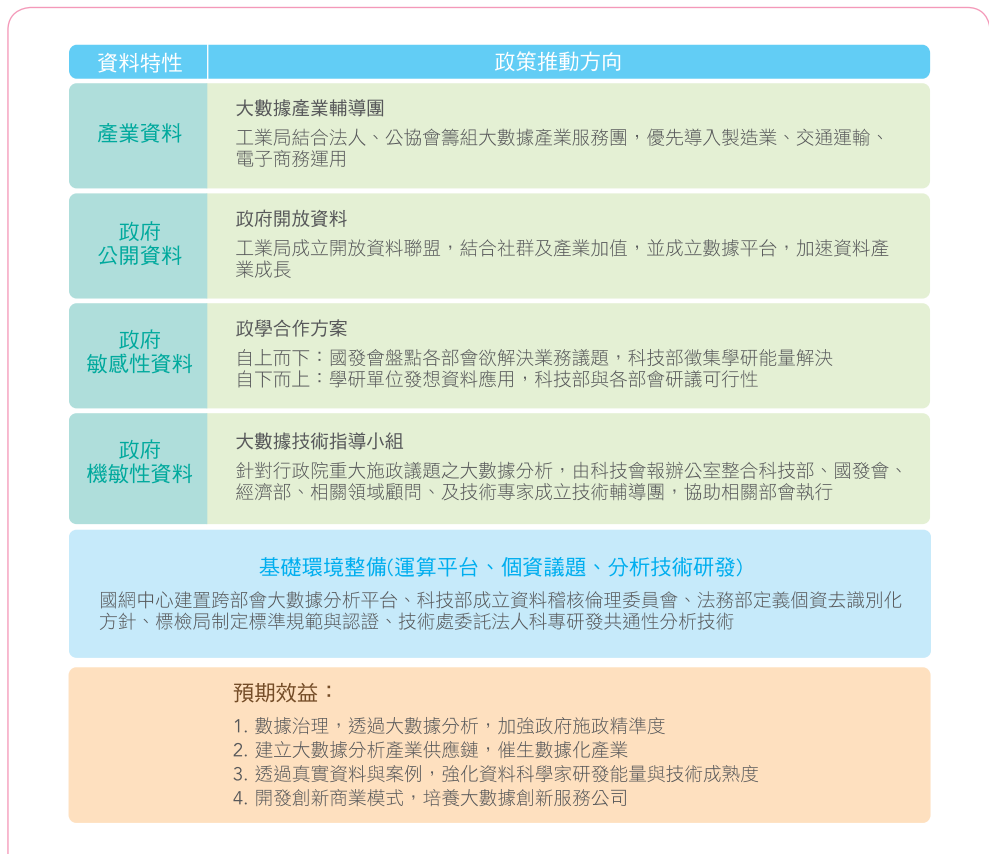


圖3-3 ▶ 我國大數據推動方向與預期效益

資料來源：行政院科技會報辦公室



政府推動大數據相關工作主要預期效益如下：

- (1) 數據治理，透過大數據分析，加強政府施政精準度。
- (2) 建立大數據分析產業供應鏈，催生數據化產業。
- (3) 透過真實資料與案例，強化資料科學家研發能量與技術成熟度。
- (4) 開發創新商業模式，培養大數據創新服務公司。

我國政府資料開放是從2012年11月行政院第3322次會議決議通過「政府資料開放推動策略」後正式推動，並分別由國發會和經濟部規劃公部門與產業面之推動，再委由NICI小組民間諮詢委員會進行民眾認知系列活動。

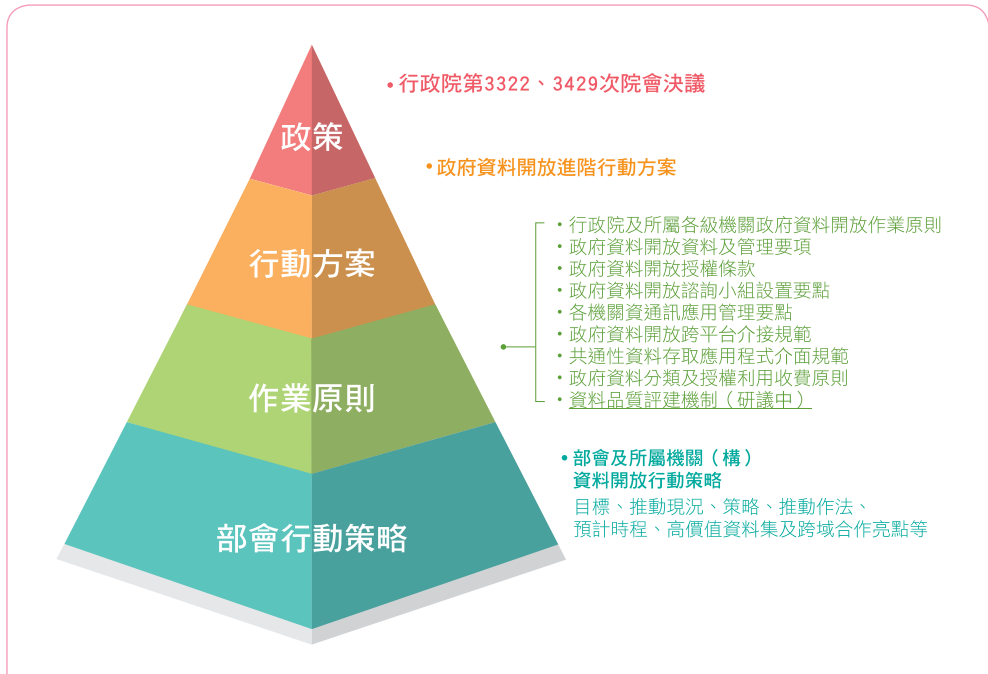


圖3-4 政府資料開放文件位階

資料來源：行政院科技會報辦公室

為順利推動政府資料開放，國發會陸續擬訂相關規範。2015年12月國發會擬訂「政府資料開放進階行動方案」，三大具體做法為：建立政府資料開放諮詢機制、完備信賴資料開放環境、公私跨域合作應用推廣。

為加速推動各級機關主動開放更多高價值的資料，實施政府資料開放諮詢二級制。行政院及各部會自2015年6月起成立「資料開放諮詢小組」，藉由民間/社群端與政府端之對話，落實研析民間需求，完善政府資料開放的推動。

為擴大開放政府資料，各部會參照開放資料四步驟⁷，以系統及資料庫與民間意見為基礎，深入規劃部會主管業務資料開放作業，擬定分年開放目標，落實執行。

在完備信賴資料開放環境方面，由民間和政府共同逐步研訂政府資料開放相關指導規範。配合發展趨勢，持續精進我國在2015年7月第一版符合國際標準（與CC-BY相容）的政府資料開放授權條款。

至2016年11月，我國開放資料平台（data.gov.tw）已收集22,279筆資料集（dataset）。英國開放知識基金會OKFN⁸於2015年12月公布2015 Open Data評比，臺灣領先各國全球排名第一。能獲如此佳績，重要的作為包括：政府各部會推動、民間與社群協同合作，加上各式國際合作與交流。

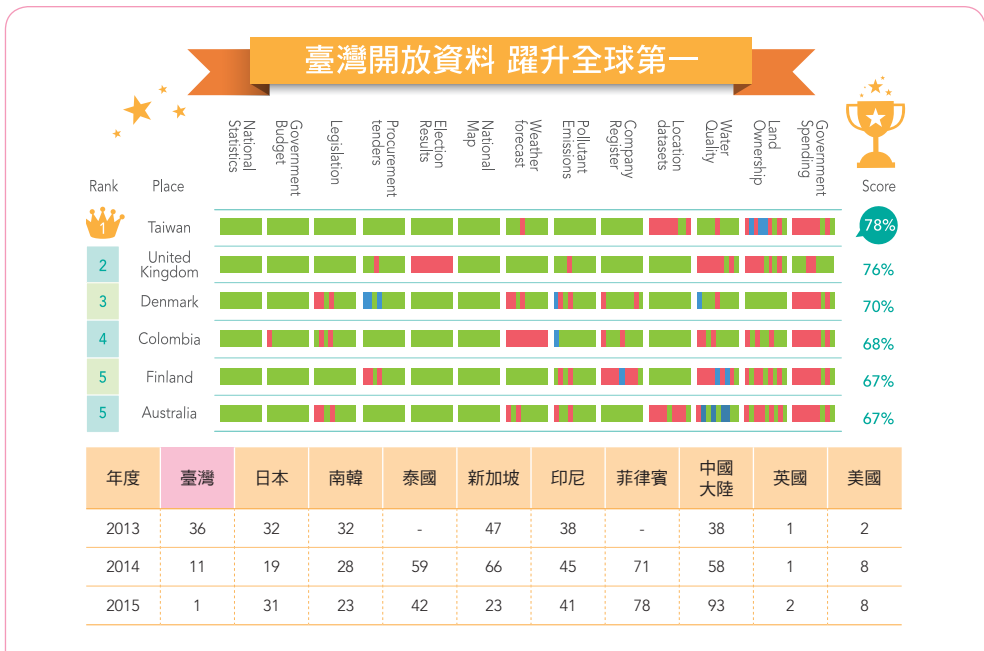


圖3-5 ▶ OKFN 2015 Global Open Data Index Ranking

資料來源：OKFN；資料整理：行政院科技會報辦公室

7 開放資料四步驟為：盤點資料、檢視資料權利完整性、選擇資料開放範圍及授權條款、發布資料集。

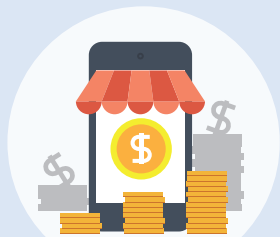
8 OKFN，開放知識基金會（Open Knowledge Foundation）是一個於2004年在英國劍橋成立的非營利性組織，長期致力於在數位時代推廣各類形式的開放知識。近年來活躍於全球30多個國家和地區，並主要著眼於開放資料和開放政府的推廣和支持。





第四章 願景擘劃

資通訊政策國際趨勢|



數位科技帶動經濟活動
成就數位經濟



優質行動
無縫網路再進化



重視與經濟/社會
各領域的融合應用



資通訊技術造就
創新創業風潮



資通訊媒體連結
讓生活更美好



數位國家·創新經濟發展方向



數位服務經濟



DIGI+ 2025

Development :: Stable Infrastructure
發展·堅固基磐

Innovation :: Digital Economy
創新·數位經濟

Governance :: Smart Nation
治理·智慧國家

Inclusion :: Civil Society
涵容·公民社會



建設智慧城鄉



人權網路社會



創新產業轉型



數位創新人才



數位基礎環境

1010101010101010101010101010



第四章 願景擘劃

4-1 資通訊政策國際趨勢

資通訊科技是帶動經濟成長和社會創新的重要引擎，因此被世界各國賦予解決社會課題與創造新需求的使命。透過分析美國、英國、德國、日本、南韓、新加坡、中國大陸等7個國家最近3年公布的資通訊前瞻政策（如▶表4-1），有助我們掌握資通訊政策的國際發展趨勢，做為規劃下一階段政策的參考。

表4-1 ▶ 主要國家近3年公布的資通訊前瞻政策

| 國家 | 政策案例 |
|------|--------------------|
| 美國 | Gigabit城市挑戰計畫 |
| | Connect Home計畫 |
| 英國 | 英國對歐盟2020年數位經濟之願景 |
| 德國 | 數位戰略2025 |
| 日本 | 世界最先端IT國家創造宣言 |
| | Smart Japan ICT戰略 |
| | 日本邁向2020年的資通訊政策 |
| | SAQ2 Japan Project |
| 南韓 | K-ICT戰略 |
| | 南韓軟體為中心社會擴散方案 |
| | 2025國家資訊化願景 |
| 新加坡 | 資通訊媒體發展藍圖2025 |
| | 智慧國家（Smart Nation） |
| 中國大陸 | 國家信息化發展戰略概要 |
| | 「互聯網+」行動指導意見 |

資料整理：資策會FIND



運用網際網路生態鏈C-P-N-D（Contents、Platform、Network、Device）四個面向，整理前述主要國家的資通訊前瞻政策（如▶表4-2）。

表4-2 ▶ 主要國家資通訊前瞻政策推動項目

| Country | Contents/Data | Platform | Network | Device/End User |
|---------|-----------------|------------------------|---------------|-----------------|
| 美國 | 數位教育 | 創新數位教育系統 | 低價寬頻連網 | 弱勢團體 |
| | | | Google Fiber | OTT終端設備 |
| 英國 | 匿名資料 | 線上公共服務 | 寬頻費用統一 | 跨境消費者 |
| | Big Data | 跨境/跨國線上服務 | | |
| 德國 | Big Data | IoT平臺 | Gigabit光纖寬頻網路 | 製造端設備 |
| | Open Data | | | |
| 日本 | Open Data | 多語言語音翻譯系統 | 免費Wi-Fi | 國際觀光客 |
| | Big Data | 雲端服務平台 | 4G/5G | 行動智慧裝置 |
| | | 開放資料平臺 | | 光纖寬頻普及 |
| 南韓 | Big Data | IoT | 5G Mobile | 智慧裝置 |
| | UHD | Online Poll | 社群網路 | 穿戴式裝置 |
| | 數位內容 | 智慧城市 多螢教育平臺 | Giga寬頻 | Open Source硬體 |
| 新加坡 | Digital Harbour | 物流業IoT平臺 | 異構網（HetNet） | 銀髮族 |
| | Big Data | Computational Thinking | | 企業 醫療感應器 |
| 中國大陸 | Big Data | 電子商務 | 寬頻普及 | 智慧終端機 |
| | | IoT | 感知網路 | 汽車/機器人 |

資料整理：資策會FIND

主要國家在2025年以前的資通訊政策推動重點，從CPND分類來看如下：

- 在內容部分，預期未來5-10年，將誕生多元政府開放資料結合大數據的應用服務。
- 在平臺部分，IoT平臺真正落實到社會經濟的各種領域應用，造就智慧城市。
- 在網路部分，高速行動寬頻快速發展，速度升級之外，更加重視寬頻連線品質與數位平權。
- 在終端/使用者部分，針對不同使用者與用途，產出各種目的性更強的終端連網設備。

從前述主要國家的資通訊政策整理，歸納出5個未來重要政策議題與趨勢：

(1) 數位科技帶動經濟活動，成就數位經濟

連網技術、行動裝置、社群媒體、大數據等數位經濟領域技術的創新加速，幫助企業創造許多新機會，也帶來成長，人類生活模式也隨之產生改變。在企業和消費者思考模式改變的同時，亦來到了顛覆傳統商業模式的臨界點。鼓勵企業大量採用數位科技與重視相關基礎與應用領域人才的培育，是帶動並擴大數位經濟正向成長的重要關鍵。

(2) 優質行動無縫網路再進化

光纖骨幹網路普及布建、4G/5G行動網路的快速升級發展，加上電視廣播數位化空白頻段（White Space）的超級WiFi（Super Wi-Fi）應用、次世代Gigabit Wi-Fi的進展等，這些推動項目正說明了行動連網除講求速度之外，讓使用者在行進中皆能享有穩定不中斷的均一連網品質，實現真正無縫接軌寬頻網路環境，已成為各國加速行動寬頻應用發展的重點推動目標。

(3) 重視與經濟與社會各領域的融合應用

主要國家寬頻網路覆蓋等基礎建設環境已趨完備，感知網路多元應用，從前瞻領域推動實證應用之成效，發現資通訊網路已成為經濟社會創新發展的重要驅動力。因此，下一階段政策推動的思維與具體的推動措施將著重在資通訊網路與經濟社會各領域的融合發展如何進一步深化，並幫助各領域解決社會議題與創造新價值體系。

(4) 資通訊技術造就創新創業風潮

近年主要國家推動鼓勵企業創新創業的政策措施，例如試著透過建立資通訊創意平臺、創客空間等提供網路創業人才一個激盪熱情的開放空間；又如德國協助創新創業並鼓勵初創公司與成熟公司之合作；日本則以運用IT解決社會課題的根本角度看待創新創業。各國政策詮釋角度不同，但均導向資訊科技的應用有利於新創事業的成功。

(5) 資通訊媒體連結讓生活更美好

創新的資通訊媒體技術和解決方案為人類的生活和工作方式帶來改變。各項政策的推動無非是要解決人類生活上的課題與困難，滿足人類對新科技帶來更高生活品質的期望，如新加坡著重在2025年高齡者健康又自在生活的應用。



4-2 數位國家·創新經濟發展方案 (DIGI+2025)

蔡總統於2015年發表之「點亮臺灣」科技政策中，表示臺灣需要一個改變國家的創新思維，為年輕人打造一個更好的國家，加速經濟結構的轉型，因此「數位國家·智慧島嶼」是臺灣在雲端、巨量資料 (Big data)、5G、物聯網 (Internet of Things, IoT) 時代，找回臺灣經濟發展動能，最重要的國家發展戰略之一。努力建設一個數位化的國家基礎建設，把臺灣發展成一個智慧化的島嶼，用來激發人民創新與創業帶動創平臺新產業，增加政府開放與透明，提升人民的生活品質。此外，蔡總統於就職演說中亦特別提到：新政府將打造一個以創新、就業、分配為核心價值，追求永續發展的新經濟模式，改革的第一步，就是強化經濟的活力與自主性，優先推動五大創新研發計畫，藉著這些產業來重新塑造臺灣的全球競爭力。

為了讓政府優先支持之產業創新能有堅實的發展基礎，2016年政府刻正規劃「數位國家·創新經濟發展方案 (2017-2025年)」，積極建構數位創新之基礎環境，並營造友善法制環境、培育跨域數位人才、研發先進數位科技做為鞏固數位國家基磐之配套措施，進而打造優質的數位經濟、數位政府、網路社會、智慧城鄉等數位國家創新經濟生態環境，以作為產業創新發展之重要基礎。惟有在優質的創新生態環境中，才能帶動綠能、國防、智慧機械、生技醫藥、亞洲·矽谷、新農業、新材料循環等產業創新之發展。藉以打造我國發展產業創新之基礎，並加強與產業創新應用之銜接，達成我國「發展活躍網路社會、推進高值創新經濟、開拓富裕數位國土」之發展願景。

■ 問題評析

政府過去以行政院國家資訊通信發展推動小組負責推動資通訊發展，自2002年起已經推動三期「NICI方案」，達成擴大上網人口、促進隨手可得服務與智慧生活服務等階段性目標。不過，綜合檢視過去NICI方案及相關方案之推動，仍過於重視硬體建設，其法制與人才等整體基磐配套仍然偏重硬體思維，而且在政策擬定上偏重於供應端發展規劃，缺乏應用需求端之促進措施，政策的執行上偏重中央主導，未充分落實中央與地方之合作推動機制；另眾多相關方案之間缺乏整合，導致推動目標及資源運用不易聚焦。

此外，從國家資通訊長期發展角度觀之，以下問題亟待謀求因應對策：

一、我國有良好ICT整備基礎，需強化對社會與經濟之影響力

一個國家資訊國力的強弱，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的程度。WEF NRI指標是當今全球最具代表性的資訊國力國際評

比。2012 年以前NRI以「環境、整備、使用」三構面進行評比，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經濟合作暨發展組織（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。

我國雖然於該評比中歷年整體排名維持全球前20名的領先群，但從四大構面排名分析，我國自2012年以來，環境構面從2012年24名至2016年29名、整備構面從2012年14名至2016年2名、使用構面從2012年14名至2016年16名、影響構面從2012年3名至2016年20名，發現我國目前已有國際級的資通訊基礎建設，但未來如何透過良好資通訊基礎建設有效帶動對社會與經濟發展，必為當務之急。

二、WEF強調數位經濟發揮ICT影響力帶動國家發展

2016年WEF全球資訊技術報告（GITR）以「數位經濟再創新（Innovating in the Digital Economy）」為主題，其中數位經濟（Digital Economy）指的是透過數位科技力量帶動的經濟活動，例如數位科技驅動的新商業模式。數位科技中的「數位」，不單指科技，也是一種能帶動新商業模式、新消費型態、促使企業及個人創新的思維。有鑒於數位經濟將是第4次工業革命的基礎，WEF建議積極投入網路基礎建設的發展和多方面培養相關人才，發展數位經濟，讓數位科技繼續協助國家經濟和社會發展。

WEF進一步探討一個國家發展數位經濟之關鍵條件，將排名前7名的國家觀察各分項表現後，發現這7個國家在不同分項中各有千秋，唯獨「企業使用」皆表現優異，排名高度集中。顯示出一個國家要發展數位經濟，政府應該要優先鼓勵提升企業應用數位科技程度，由企業大量運用數位科技推出創新的產品或服務，進而帶動數位經濟。

三、產業創新發展應尋求新成長動能暨經濟創新模式

國發會為落實政府「產業創新」之經濟結構轉型策略，打造一個以「創新、就業、分配」為核心價值，追求永續發展的新經濟模式。未來將優先推動亞洲、矽谷、智慧機械、綠能科技、生技醫藥、國防、新農業、高值材料循環專區等，具有在地特色，可結合地區優勢及發展條件創新研發產業聚落。

為了支持各項產業創新發展，臺灣需要加強超寬頻網絡、智慧聯網等資通訊建設基礎建設外，更要建構新的產業創新生態，促進創新創業聚落發展、強化產學合作機制與能量。藉著這些產業作為驅動臺灣下世代產業成長的核心，加速產業轉型升級，重新塑造臺灣全球競爭力。期能達成數位國家、智慧島嶼、服務業高值化、節能減碳非核家園之願景。



綜上，臺灣要發展成數位國家、智慧島嶼，應先針對我國發展數位經濟的挑戰與機會進行優劣勢（SWOT）分析：

1. 優勢（Strengths）

臺灣已具備國際級資通訊基礎建設，WEF NRI保持全球前20名。政府更積極推動創新驅動政策，維持WEF全球競爭力評比表現在全球前20名。近年來國內網路與電商經驗逐漸成熟，另硬體設計能力，有助於建構軟硬整合、虛實融合之國際競爭優勢，且公民科技人才輩出，已具未來數位經濟發展能力。

2. 劣勢（Weaknesses）

在法制環境，國內現有法規的調整無法跟上數位經濟的快速變化。在人才方面，數位經濟跨域人力短缺，學用落差大。在經營方面，數位經濟產業跨國經營能力不足，而跨業融合開發創新應用，促成新數位經濟生態圈之進展緩慢。在觀念上，硬體製造業的主導慣性，牽制了人才市場、法規政策及產業經營思維。

3. 機會（Opportunities）

全球巨量資料、IoT、AI、VR/AR/MR等技術漸趨成熟，帶動數位經濟新商機。全球新興市場數位經濟成長率高，全球先進國家都把數位經濟視為國家社會進步及經濟轉型之主軸，另我國工程師人才與產業鏈相對於東南亞具有優勢。政府積極推動產業創新及新南向政策，重新塑造臺灣的全球競爭力，發展數位經濟為重要驅動力。

4. 威脅（Threats）

由於全球數位產業鏈解構與重組，我國傳統代工製造的產業定位面臨衝擊，而產業轉型投資之動力及成效並未彰顯。數位經濟發展缺乏本土市場有力支撐，規模不夠大，也缺乏吸引國際企業合作的誘因。人才受到新興市場磁吸而外流，也缺乏國外人才引進。

我國應善用發展數位經濟的優勢，掌握邁向數位經濟機會，以及積極面對威脅與翻轉劣勢，俾達成數位國家、智慧島嶼之願景，未來因應對策與發展方向如下：

1. 加強與社會及國會溝通，加速推動創新立法及彈性法制環境，以活絡創新應用，驅動數位經濟高速發展。
2. 政策導引民間積極投資數位經濟，加速創新驅動產業生態環境之發展，並連結國際。
3. 強化產學研鏈結、提升大學教研能量，促進數位人才培育、科技研發及智財流通。

4. 積極融入資通訊科技於產業創新與新媒體內容產業之數位經濟發展，促成跨業合作，各產業同步均衡發展。
5. 橋接資通電子產業之優勢資源，支持年輕世代創新創業，協力發展新世代數位產業生態圈。
6. 建立國家數位經濟推動機制，加強規劃及推動我國數位經濟發展政策，協助產業與國際接軌，深耕全球新興市場。
7. 充分落實PPP（Public Private Partnership）公私協作，結合政府與民間資源，開拓數位國土。

■ 願景與目標

「數位國家·創新經濟發展方案（2017-2025年）」以「發展活躍網路社會、推進高值創新經濟、開拓富裕數位國土」為發展願景。積極完善數位創新基礎環境，營造友善法制環境、研發先進數位科技、培育跨域數位人才，進而激勵創新創業、發展數位經濟、拓展跨境電子商務，支持亞洲·矽谷等產業創新之高值化發展等「孕育創新活躍數位國力」。打造數位政府、建構智慧城鄉、發展活躍網路社會，落實參與式民主、區域平衡發展、保障數位人權等「開拓安康富裕數位國土」。本方案之整體發展架構如下：



圖4-1 ▶ 數位國家·創新經濟發展方案（2017-2025年）之發展架構

資料來源：行政院科技會報辦公室



為達到上述發展活躍網路社會、推進高值創新經濟、開拓富裕數位國土之發展願景，期望創新數位經濟、活躍網路社會、優勢寬頻環境等面向，在2025年達到下列總體發展目標：

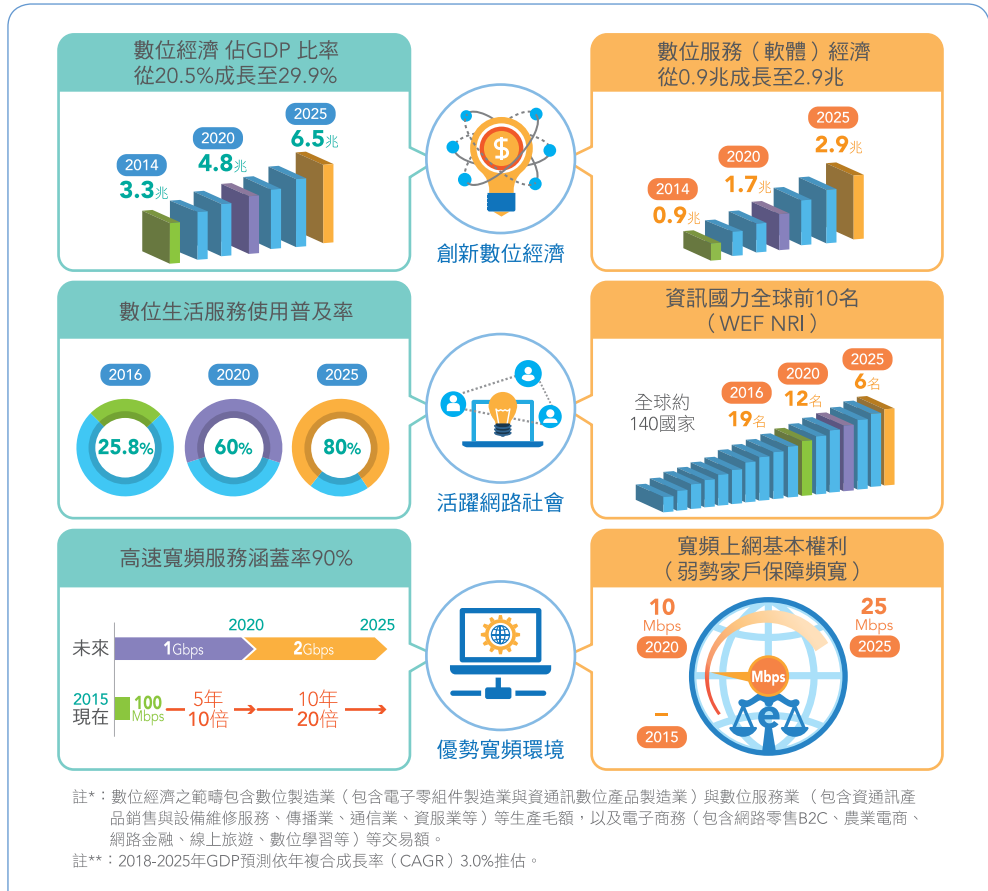


圖4-2 數位國家·創新經濟發展方案（2017-2025年）之總體發展目標

資料來源：行政院科技會報辦公室

■ 發展策略

落實總統提出「數位國家、智慧島嶼」主張，加速數位國家基礎建設，把臺灣發展成一個智慧化的島嶼，以及達成我國「發展活躍網路社會、推進高值創新經濟、開拓富裕數位國土」之發展願景。數位國家·創新經濟發展方案（2017-2025年）之重點發展策略包括：一、建構有利數位創新之基礎環境（DIGI+Infrastructure）；二、全方位培育數位創新人才

(DIGI+Talent)；三、數位創新支持跨產業轉型升級 (DIGI+Industry)；四、成為數位人權、開放網路社會之先進國家 (DIGI+Right)；五、中央、地方、產學研攜手建設智慧城鄉 (DIGI+Cities)；六、提升我國在全球數位服務經濟之地位 (DIGI+Globalization)。

■ 重點工作

為配合數位國家・創新經濟發展方案 (2017-2025年) 之推動，重點工作摘要如下：

1. 「建構有利數位創新之基礎環境」以建構數位創新應用優勢環境為目標，重點工作包括：「前瞻頻譜政策」、「強化主管機關權責與職能」、「安全可信賴應用環境」及「超寬頻雲端基礎建設」。
2. 「鞏固基磐配套措施」以創新的數位法規環境調適、全方位培育數位創新人才、開放創新的產學研鏈結為目標，重點工作包括：「營造友善法制環境」、「培育跨域數位人才」及「研發先進數位科技」。
3. 「加速數位經濟發展」以數位創新支持跨產業轉型升級目標，分別推動創新應用、拓展數位商務、支持創新創業等三大推動主題，重點工作包括：「激勵數位創新應用暨帶動跨業數位創新」、「加速推動政府創新採購」、「營造數位創新應用商業化發展之友善環境」、「強化數位商務產業之國際拓展機制」、「健全數位商務產業發展環境」、「強化數位經濟跨部會推動機制」、「完善創新創業資金協助」、「串接全國創新及研發資源」、「串接國際創新資源」、「推動彈性實證機制，加速數位創新服務實證」、「強化新創事業之後育成至IPO輔導機制」。
4. 「打造服務型數位政府、推動開放治理」以開發政府資訊Open API，建構需求導向之一站式智慧雲端政府服務為目標，重點工作包括：「強化相關部會及地方政府數位治理體制與職能」、「完備資通安全管理、數位治理等相關法制」、「建立民間專業人士協助政府機構深化數位治理之機制」、「落實各級政府資料治理，積極開放政府資料，建立政府與民間合作機制，發展資料加值應用」。
5. 「發展平等、活躍網路社會」以成為數位人權、開放網路社會之先進國家為目標，重點工作包括：「完備數位人權之法制基礎，提供國民之公平數位發展機會」、「普及偏鄉與離島數位建設，促進偏鄉、離島、中小企業與微型企業數位應用發展，保障城鄉與社會階層平等之數位發展機會」、「推動保障社會弱勢享有寬頻近用機會之相關配套措施」、「運用公民科技，深化公共政策多元溝通、網實整合及全民協作機制」、「結合政府資源、產業界及民間社群，開拓數位科技、數位治理與數位經濟之多元國際合作關係」。
6. 「建設永續、智慧城鄉」以中央、地方、產學研攜手建設智慧城鄉為目標，重點工作包括：「結合政府及民間資源，推動智慧城鄉區域聯合治理與建設，發展以人為本之創新生活應用及公共服務」、「運用智慧聯網科技，建構國民優質生活空間，包含提升國土運用、維護環境品質、保障國民安全、智慧生活環境」。

參考文獻

1. Chris Rhodes Daniel Rathbone (2016) 。Digital economy: statistics and policy。英國：House of Commence Library。網址：http://www.legco.gov.hk/general/english/library/stay_informed_overseas_policy_updates/digital_economy.pdf。網址：<https://opensignal.com/reports/2016/08/global-state-of-the-mobile-network/>
2. Global Entrepreneurship and Development Institute。(2016)。Global Entrepreneurship Index。美國：Global Entrepreneurship and Development Institute。網址：<https://thegedi.org/global-entrepreneurship-and-development-index/>
3. International Institute for Management Development (2016)。World Competitiveness Yearbook 2016。瑞士：International Institute for Management Development。網址：<http://www.imd.org/wcc/news-wcy-ranking/>
4. Ministry of Communications and Information (2015)。Infocomm Media 2025。新加坡：Ministry of Communications and Information。網址：<https://www.mci.gov.sg/infocomm-media-2025>
5. World Economic Forum (2015)。The Global Competitiveness Report 2015-2016。瑞士：World Economic Forum。網址：<http://www3.weforu>
6. World Economic Forum (2016)。The Global Information Technology Report 2016。瑞士：World Economic Forum。網址：http://www3.weforum.org/docs/WEF_GITR2015.pdf
7. Waseda University (2016)。2016 Waseda-IAC International e-Government Ranking Survey。日本：Waseda University。網址：<https://www.waseda.jp/top/en-news/43676>
8. 國家發展委員會 (2015)。104年個人家戶數位機會調查報告。臺灣：國家發展委員會。網址：<http://www.ndc.gov.tw/cp.aspx?n=55C8164714DFD9E9>
9. 國家通訊傳播委員 (2016)。NCC公布104年固網寬頻上網速率量測結果，我國固網寬頻服務速率已具穩定效能。臺灣：國家通訊傳播委員。http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&sn_f=35352
10. 國家通訊傳播委員 (2016)，105年第1階段4G上網速率量測結果出爐。臺灣：國家通訊傳播委員。網址：http://www.ncc.gov.tw/chinese/news_detail.aspx?site_content_sn=8&is_history=0&pages=1&sn_f=35671
11. 資策會FIND，2015，國際資通訊前瞻政策與應用案例研究報告。
12. 資策會FIND，2016，國際資通訊前瞻政策案例與指標改善研究報告。

國家圖書館出版品預行編目 (CIP) 資料

資訊國力年鑑. 2015-2016 / 郭耀煌總編輯.

-- 初版. -- 臺北市：行政院科技會報辦公室, 2016.12

面；公分

ISBN 978-986-05-1459-9 (平裝)

1. 資訊社會 2. 年鑑 3. 臺灣

541.415058

105024318

Taiwan e-Competitiveness Annual Report 2015-2016 資訊國力年鑑

Chief Editor 總編輯：Yau-Hwang Kuo 郭耀煌

Deputy Editor in Chief 副總編輯：Tien-Cheu Kao 高天助、Ted Ho 何文雄

Copy Editor 編審：Chien-Chiu Lin 林劍秋、Julia Liu 劉芳梅、Shun-Pin Chuang 莊順斌

Editor 編輯：Chih-Hao Chiang 江志浩、K.T.Lee 李國鼎、Hui-Ying Chen 陳慧榮、Ray Wu 吳瑄芮、
Evie Lin 林沂霏

Writer 撰稿：Pei-Ling Wu 吳佩玲、Karen Hsin-Ling Chang 張心玲、Chi-Chun Kao 高崎鈞、
Chien-Hong Chao 趙建宏、Wen-Chiang Chieng 簡文強、Joanne Wu 吳兆琰、
Wen-Chien Hung 洪文堅、Chien-Kuang Pan 潘建光

Publisher 出版機關：Office of Science and Technology, Executive Yuan 行政院科技會報辦公室

Address 地址：5F., No.106, Sec. 2, Heping E. Rd., Taipei 106, Taiwan, R.O.C
臺北市和平東路二段106號5樓

Tel 電話：886-2-2737-7470

Fax 傳真：886-2-2837-7469

Website 網址：<http://www.nici.ey.gov.tw/>

Date Published 出版日期：December 2016 中華民國105年12月

Edition 版次：First Published 初版

工本費：新臺幣1,800元

GPN：1010503007

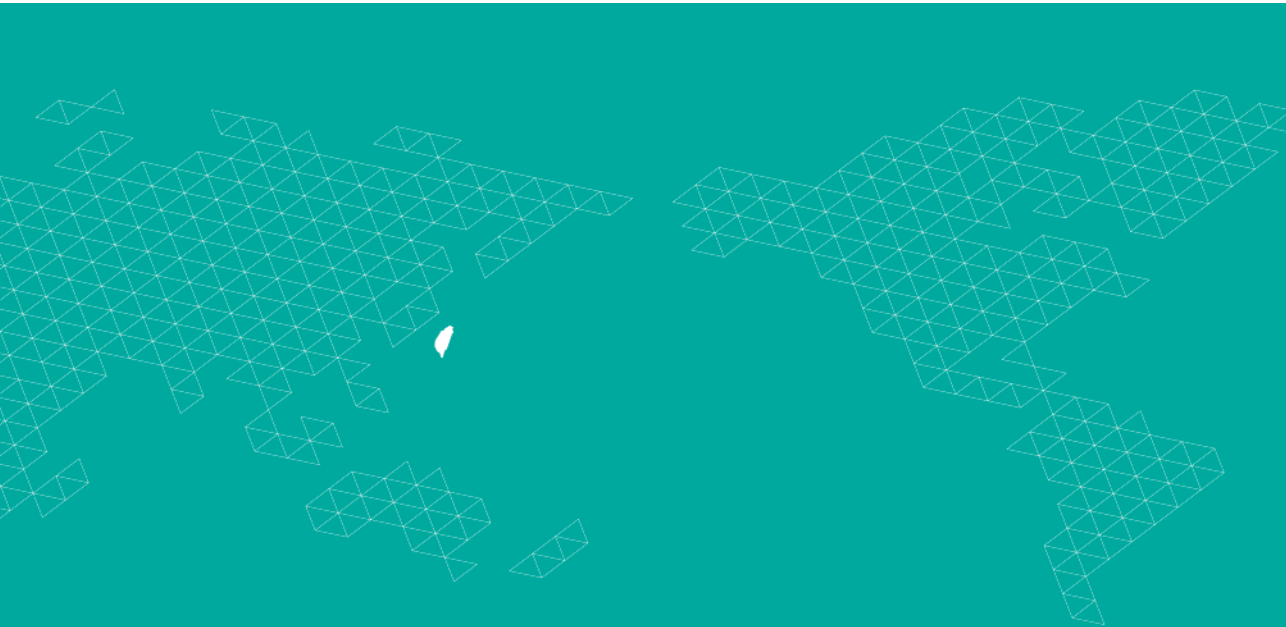
ISBN：978-986-05-1459-9

在此感謝所有參與年鑑的編撰人員

本年鑑之智慧財產權屬於財團法人資訊工業策進會所有，非經許可，不得以任何形式散布、轉載、複製或利用。
Copyright © 2016 by the Institute for Information Industry. All right reserved.

2015 ▸ 2016

TAIWAN E-COMPETITIVENESS ANNUAL REPORT



行政院科技會報辦公室

OFFICE OF SCIENCE AND TECHNOLOGY, EXECUTIVE YUAN

臺北市和平東路二段106號5樓
5F., No.106, Sec. 2, Heping E. Rd., Daan Dist.
Taipei City 106, Taiwan (R.O.C.)

電話 Tel: +886-2-2737-7470

傳真 Fax: +886-2-2837-7469

網址 Website: <http://www.nici.ey.gov.tw/>

ISBN : 978-986-05-1459-9



9 789860 514599

GPN: 1010503007

工本費：新台幣1,800元整