

英文摘要

With the aim of establishing a conducive environment for digital innovation and ICT infrastructure, the Executive Yuan has been promoting the Digital Nation and Innovative Economic Development Program (DIGI+) since 2017 and designated the National Communications Commission (NCC) as the responsible authority for the infrastructure division within the DIGI+ program. Its main tasks include ensuring the deployment of broadband infrastructure, planning spectrum policy, and facilitating a fair environment for market competition and innovative applications. Following the DIGI+ of 2017, the Executive Yuan has been planned an updated version in 2020 known as DIGI+ 2.0, which places greater emphasis on digital infrastructure, digital innovation, digital governance and digital inclusion with the aim of enabling Taiwan to become a ‘smart nation’ by 2030.

In order to realize these goals, as well as determine future policy and guidelines for ICT, this study has been conducted by the Digital Convergence Project Office (the Project Office) and consists of four working items: (1) Policy Analysis and Project Management of DIGI+, (2) Digital Transformation Concerning Communications Infrastructure, (3) Harmonized Regulations for Innovative Services within a Digital Economy, and (4) Facilitation of Exchange among Stakeholders.

Thus, this study can assist NCC in implementing the DIGI+ policy of the Executive Yuan and planning subsidiary working items for DIGI+2.0.

The key results of this study have been outlined as follows:

I. Policy Analysis and Project Management of DIGI+

The Project Office has coordinated and held discussions with both international organizations and relevant ministries in Taiwan. Thus, with view to upgrading ICT infrastructure, the Project Office has concluded that

there are several issues that require attention, such as the deployment of the last mile, bridging the newest technology and services, and digital inclusion and advises that with view to the goal of high speed, high efficiency, high reliability and high access for all citizens, the following items should be implemented within the draft of DIGI+ 2.0: acceleration of 5G broadband deployment, completion of advanced internet deployment, promotion of B5G satellite communications, reinforcement of cybersecurity policy, spectrum allocation plan, and enhanced regulations for convergence, more details of which are provided here forth:

- 5G broadband deployment: telecom operators should be assisted in undertaking deployment of 5G infrastructure and base stations of mobile broadband in remote areas, enhancing broadband access in rural areas, improving the quality of mobile communications, and enhancing the mobile infrastructure of PPDR.
- Advanced internet deployment: the internet service for public sectors should be expanded, infrastructure of cloud computing strengthened, domestic fiber construction should be accelerated, submarine cable and the 5G cloud center be established, and cybersecurity policy and actions for submarine cable and the internet should be promoted.
- B5G satellite communications: the development of B5G low-Earth orbit should be promoted.
- Cybersecurity policy: cybersecurity for 5G and IoT should be promoted and a protective system for 5G cybersecurity should be developed.
- Spectrum allocation plan: 5G spectrum allocation should be planned, spectrum refarming for the first responders' microwave internet system and ST-2 satellite should be promoted, and

available telecom resources for 5G and B5G communication network should be listed.

- Regulations for convergence: the digital economy and convergence policy should be promoted and the research of harmonized regulation concerning 5G vertical use and cybersecurity should be accelerated.

Since the draft of DIGI+ 2.0 is still within the stage of planning, the Project Office shall continue to observe global trends and domestic industry development adhering to the requirements of the Executive Yuan with view to undertaking amendments to the draft of DIGI+ 2.0.

II. Digital Transformation Concerning Communications

Infrastructure

As the foundation of digital convergence, broadband deployment is key to the sound development of communications. Thus, this working item observes global broadband policy with particular focus on deployment policies and relative regulations pertaining to both fixed broadband and 5G mobile broadband and also includes observations on public consultations and amendments of regulations. For example, the Japanese authority has adopted data management and domestic 5G as key policies to promote industry development; such perspective can serve as a valuable reference for the future policy planning and regulations.

Secondly, it can be noted that the digital transformation has led to certain ramifications that are cause for concern, such as issues pertaining to social inequality, and privacy of personal information. The research team conducted further research referring to not only the regulations in the EU,

the UK, the US, and Singapore, but also expert opinions attained from various symposiums locally; hence, suggestions on policy regarding cybersecurity, personal privacy protection, and broadband accessibility for minorities has been provided.

Thirdly, as communications technology progresses, satellite communications seems to be the next area of focus for communications policy. The section regarding regulations for 5G low-Earth orbit satellite' covers technical trends, regulatory mechanisms, and market analysis around the world. In general, the developed countries in Europe, Asia and America hold a positive outlook towards the technology and commercialization development of low-Earth orbit satellite; thus, it is recommended that the authority consider this item as one of the key areas for future planning and policy.

The summary of this working item can be concluded as below,

- 5G mobile broadband deployment: in spite of the reference to US policy, such as CAF, in the field of universal broadband service, specific challenges still exist.
- Deployment of ultra-high speed broadband has been hindered in Taiwan. The research team recommends referring to the 'symmetry' conducted in the EU concerning sharing infrastructure and public construction, as well as the Fiber-to-the-Home policy in Singapore, in order to improve broadband infrastructure. In addition, since Taiwan is striving to be a part of the integration for CPTPP, one area of concern is the issue of service discrimination led by the assigned service provider. This issue should be reconsidered, since the authority may offer fiscal subsidies in the national project to promote the construction in rural and remote areas.
- Competition of data: referring to the policy guide issued in 2019

by the Japanese government, data is included as part of the analysis of concretely restrictive competition. The focus recognizes that if the data has the character of specificity, then it can be included into the analysis model of structural review.

- Enhance cybersecurity and personal privacy: in light of the recent progress of 5G network, IoT and AI, cybersecurity policy and privacy protection measures from other nations should be considered. Industry can be assisted to establish quick self-disciplinary principles to protect personal information, and ethical regulations for AI. Such policies can encompass right to consent, anonymous information, and authorization to users to withdraw, in order to guarantee the digital human rights.
- Reduce the digital divide: the coverage of 5G service should be emphasized, since the accessibility of broadband network is the key for people to empower themselves with the potential of digital life. The policy focus may stress on the learning and cultivation of digital literacy, solutions for minority groups with the perspective of social welfare, and the necessity of subsidies for certain situations.
- 5G low-Earth orbit satellite policy: the technology of low-Earth orbit satellite is currently considered as a supplementary broadband infrastructure, since the density of deployment can be more customized to remote areas, and it can offer high speed network for PPDR, forest patrolling, and other innovative applications. The research team suggests that the authority continue to observe market trends and technology developments, as well as the regulations and policy with regard to spectrum management.

III. Harmonized Regulations for Innovative Services within a Digital Economy

This section observes the business models within the communications industry, as well as regulatory frameworks and relative policy measures, in terms of data applications and regulations applicable to digital platform services during the digital transformation.

This working item includes two sections: analyzing the trend and development of smart lives, and analyzing the vertical applications within the communications industry and relative amendments on regulations.

Regarding the first section, there are two subsidiary areas of focus. The first, international trend analysis concerning smart lives services, offers analysis concerning recent developments and trends concerning smart live services and applications deployed globally, especially 5G, AI and IoT. The second focuses more on the domestic perspective, with regard to innovative service mentioned from the previous areas, with particular emphasis on business models and benefits generated by new services, products, markets and channels, in addition to the value-added revenue brought by digitization and digital assets. The summary of the first section is as follows:

- The Digital economy has become the new driving force: market trends are developing diverse applications and innovative services, especially for the post-COVID era; innovation is required more than ever.
- Telecom operators create value through diverse cooperation: in addition to the deployment of 5G service, operators should seek to optimize the service process and increase service capacity. These goals can be interpreted as promoting operation efficiency and improving customer experience. As competition

becomes fiercer, constructing 5G-X ecosystems has become a priority. In addition, while top-tier international telecom operators have established AI capacity, domestic operators have tended to coordinate externally. Thus, the government and operators should explore more possibilities to enable AI as built-in for various enterprises.

- Diversified investment and deployment for smart life applications: From a strategic perspective, there are three areas of focus: optimizing operation procedure, cloudifying data access, and creating value-added entertainment services. Thus, interdisciplinary coordination with various industries should be enhanced.
- Value-added service rather than dump pipes: the content provided by domestic cable service providers should be improved so as not to be substituted by international streaming platforms.
- Develop relative policy and regulation: the value of 5G market is remarkable, however, in order to avoid a negative impact brought by digital tax, such as the market withdrawal of foreign enterprises and price lifting applied to products, a framework of relative tax item for the stakeholders should be clarified and established.

For the second section with regard to analyzing vertical applications within the communications industry and relative amendments on regulations, there are several noteworthy points of interest. Firstly, the competition brought by digital platforms can impact other markets, such as e-commerce, data application and digital advertising. According to observations, it seems that the core area of interest should be regulations pertaining to digital platforms. Moreover, considering data application has

become the core of digital market, from optimizing quality of service to precision marketing, how to use the data has become an area of interest for both enterprises and regulators. Hence, this section takes the US, Singapore, the UK, the EU and Australia as examples for regulatory study, especially pertaining to the promotion of digital transformation and innovative services, which also include differing scenarios of regulations on digital platforms, harmonized regulations with digital convergence, and data application. The summary of the second section is as follows:

- Planning customized regulations for the domestic digital market: although the domestic market of digital services is currently occupied by large international enterprises, direct interference by the authority should be avoided. The regulator should consider adjusting relations within the incumbent regulatory framework, taking data application and data analysis as the critical point to develop understanding and analysis among several market powers. In addition, demands from domestic digital market, adopting a light touch regulations based on transparency and open data should all be considered.
- Planning regulations regarding data portability to stimulate market competition: By referring to practices from other nations, it is advised to consider data portability for future amendment of personal data protection to protect consumers' rights and facilitate a more dynamic market.
- A mindset of accountability of digital service providers should be instilled, particularly by means of future harmonized regulations for personal data applications.
- Facilitate innovative data applications with reference to the sandbox mechanism from Singapore and the UK: In the

Singaporean case, a mindset of accountability to review the amendment of personal data protection law has been adopted. A more active response to the need from domestic enterprises, in terms of data application, should therefore be adopted.

- Enhance data exchange policies: In order to facilitate data portability and data interoperability, a united format and standard should be adopted as a priority to promote data exchange policies. For example, the UK regulator adopts interference measures to reinforce data exchange determining the status and relations among the giant digital platforms and other internet service providers.

IV. Facilitation of Exchange among Stakeholders

In light of the fact that 2020 is the transition year between the two DIGI+ programs, the Project Office held the international forum, Living the Vision 2020, inviting experts across the digital economy to exchange opinions with view to determining future policy. Experts included representatives from Boston Consulting Group (BCG), NTT DATA, Verizon, Line and Microsoft. The forum discussed accelerating the ICT applications based on the advantage of 5G, facilitating digital transformation, and developing competency by adopting new technology, such as satellite, etc.

In addition, with the objective deepening understanding of the digital economy by evaluating international trends, several symposiums with representatives from the communications industry and experts in digital convergence were organized. With the feedback from these meetings, further recommendations for regulators can be provided as references to draft DIGI+2.0 and amend the future policy if necessary, as outlined below:

- 5G: Taiwan completed the spectrum allocation for 5G in 2020. Thus, prior to the next release of spectrum for 5G, the authority

should list available spectrum, supervise 5G deployment, and cooperate with relative ministries on potential uses for 5G. In addition, the authority should also conduct research of the 5G ecosystem, business models and talents to ensure the future 5G environment has been well prepared.

- Low-Earth orbit: Low-Earth orbit has been one of the key technologies that global telecom operators have been developing. The cross-country broadband service based on low-earth orbit satellite communications is expected to become an innovative business model. From a regulatory perspective, this relatively new area of international enterprise should affect market competition, including the potential of security risks. Hence, relative ministries, such as NCC, MOTC and MoEA should revise current regulations on the Low-Earth orbit service.
- Digital equality: the authority should promote digital equality with a two-pronged approach; first, is the deployment of infrastructure in rural or remote areas or universal broadband; the other is broadband accessibility for minorities and socially disadvantaged. Only by achieving in both areas can total digital inclusion be ensured.