

Abstract

Keywords: emerging technologies, 5G business models, vertical applications, telecom regulatory policies

Background

With the establishment of 5G technical standards and the launch of 5G commercial services in various countries, international telecom operators have used the features of 5G to emphasize cross-field cooperation between telecom operators and non-telecom operators, and launched a new business model which is different from 4G.

This project aims to study the potential and successful 5G business models around the globe, the development of the industrial ecosystem driven by the business models, and the regulatory and legal innovations and challenges arising from the business models, and to propose the adaptation and regulatory framework for the relevant regulatory environment so as to promote the steady development of the communications industry in Taiwan.

Methodology

This study adopts methods of literature analysis, case analysis, and regulation comparison to summarize the adjustments to regulations and supervision system made by the competent authorities of various countries aiming at the 5G business models, to organize seminars and collect opinions of scholars and experts, and to propose suggestions on supervision policies for emerging digital technologies for competent authorities.

Main Findings

1. Analysis of the development trend of international satellite communications

In view of the active development of low earth orbit (LEO) satellite constellations, booming satellite communication, and geostationary satellites (GSO) and LEO with their own advantage, international satellite

operators have adopted strategic alliances, joint cooperation, or even mergers to accelerate cross-satellite constellations, which leads to the gradual formation of cross-orbit space network, in order to face the strong challenge of SpaceX's Starlink constellations.

Currently, there are already a number of collaboration cases between satellite operators and telecom operators. For example, SpaceX and KDDI have partnered to use the Starlink network as a backhaul network for terrestrial networks to improve coverage in remote areas of Japan. T-Mobile and SpaceX announced a new program called "Coverage Above and Beyond", which will use T-Mobile's nationwide medium-band spectrum to provide subscribers with complete coverage via Starlink satellites, leveraging satellite-to-cellular service technology.

2. Analysis of the current status of international mobile broadband development

Each competent authority formulates the goal of 5G construction, while telecom operators build 5G network, promoting the development of a new business model. Besides providing existing telecommunications services, telecom operators will also benefit from expanding the scope of enterprise services and total solutions, including B2X and B2B2X business models.

At this stage, the main development is B2B. Meanwhile, the use cases in countries are mostly in the fields of smart factories, smart offices, and smart ports, etc. The application of 5G in smart cities will improve the efficiency of public affairs and the quality of lives. In terms of B2C services, most are concentrated on eMBB, most of which are provided for free to improve 5G users' interest, such as sports rebroadcast, smart entertainment, etc. The application field of B2B2X is mainly in the fields where telecom operators collaborate with emerging technology industries like IoT, AI, Big Data, i.e., high value-added business activities, including smart computer games, smart education, smart traveling, etc.

Most of the 5G applications are trial and are actively developed mainly in vertical applications. The vertical applications of 5G in benchmarking countries are different, so are their developing industries and services provided. In principle, enterprises (e.g., factories, hospitals) and network providers (e.g., telecom operators, SIs) are to collaborate on trial or R&D new technologies, and 5G private network construction and application content are supported by national policies.

In the comparison of the way that telecom operator and system integrator build 5G private network, the categorizing method is based on frequency band, 5G equipment, information security, upstream and downstream transmission, and investment costs. The main commercial frequency band for telecom operators is 3.5GHz or 28GHz, while system integrators are using 3.7-3.8GHz or 4.8-4.9GHz experimental frequency bands. Telecom operators primarily utilize 5G equipment of international providers to have quality ensured, while system integrators can control information security risks and have more flexibility in adjusting upstream and downstream transmission; while telecom operators have low initial investment costs, system integrators have higher initial investment costs, but they can master maintenance technologies in the long run.

3. Mobile broadband and emerging digital technology applications and business models

5G network is a key infrastructure that needs to be combined with emerging digital technologies such as AI, IoT, big data, wearable devices, machine vision, etc. Based on the three characteristics of 5G, i.e., large bandwidth, large connection and low latency, applications that have not been achieved in past generations of mobile communications technology can be realized with the support of 5G network.

The sales model for 5G private network applications can be divided into two models: the buy-out model and the lease model. The buy-out model is suitable for large enterprises with sufficient capital and will pay a higher initial fee to construct a private network. Lease model refers to the supply of total solution of the telecommunications industry or system integrator. It is more suitable for small-scale enterprises or those with less capital.

Research on use cases shows that telecom operators are gradually becoming network enablers working with 5G and IoT ecosystem service providers to integrate digital functions into their operations. Telecom operators can further become network creators to provide innovative digital platform infrastructure services.

4. Mobile Broadband Network and Emerging Digital Technology Application Promotion and Supervision Policy

The combined development of Mobile broadband network and emerging digital technology will have great shock to the existing supervision

framework and regulations. The prevailing of new communication technology and digital platforms (such as Line, Facebook Messenger, etc.) which have caused a significant decline in domestic telecom operators revenue and accelerated the merger of telecom operators. In the 5G era, the development trend of domestic and international telecom industry will further promote the mergers among telecom operators. Ranked by the subscribers, the telecom operators in Taiwan are Chunghwa, Taiwan Mobile, FarEasTone, T Star, and GT. Taiwan Mobile and T Star, Far EasTone and GT have successively announced their merger events, and Taiwan's telecom market may return to the situation of the top three. The two cases are being heard by the NCC and the FTC.

In terms of data application and data governance, various governments have upgraded their data economic policies to national strategies, such as Germany's "Digital Strategy 2025", the U.S. "Federal Data Strategy 2020 Action Plan", and the U.K. "National Data Strategy". On the one hand, the government strengthens data policies, releases the value of data, enhances the overall competitiveness of the country, and transforms into a digital government; on the other hand, enterprises must draw support from the easing of regulations, deepen data application at all levels, and provide customized product services. Through policy promotion and regulation adjustment, the governments of various countries release the capacity of "data" to create the development of the data economy.

Main Suggestions

1. Short to medium-term proposals

(1) International satellite communication issues

- The LEO satellite subscriber terminal license can be issued in the form of blanket license in the United States.
- If the government allows LEO satellites to enter the market through PoC, the cooperation model between Japan's KDDI and SpaceX could be a reference.

(2) Issues of emerging technologies and mobile broadband applications

- The government should assist telecom operators in the construction of 5G infrastructure policies and expanding subsidies to promote 5G vertical applications.
- In order to improve the quality of medical care in rural areas, it is necessary to make regulatory adjustments.
- Create a typical case of 5G private network to highlight the specific benefits of private network and lead the application trend.

(3) Data application and data governance issues

- Adjust “Personal Data Protection Act” or formulate “Data Privacy Act” to protect consumers rights.
- For international LEO satellite operators to participate in the domestic market, the international data transmission laws and regulations should be adjusted.

(4) Issues of mergers and mutual investments

- It is recommended to grasp the cases of international telecom mergers and consider Taiwan’s market conditions and appropriate remedy conditions.
- The existing spectrum resource control should be adjusted to meet the actual needs of the market.
- The review of telecommunications mergers should consider balancing fair competition in the market and protecting consumer rights.
- Establish a tracking mechanism for the remedial plan for the merger of telecom operators.

(5) Telecommunications charges and market definition issues

- The competent authorities may encourage telecom operators to propose promotion plans for disadvantaged groups to protect their basic communication requirements.
- The competent authority should continuously monitor the charge level of the future telecom operators.

(6) The relationship between rights and obligations among cooperators

- It is suggested that the rights and obligations of both parties should be stipulated by the cooperation contract for the cross-industry cooperation of the 5G business model.

2. Long-term proposals

- Continuously track the supervision and regulation of competent authority of each country of future development of inter-satellite links by LEO satellites or the regulation of gateways set up outside the country.
- Continuously observe the changes in international market definition and competition regulation practices for emerging digital services.
- It is suggested that the government should establish an independent supervision agency for personal data protection, which is responsible for the formulation and implementation of personal data protection laws and regulations.