

# Analysis on the key factors of the network separation in china in the era of telecommunications 4.0

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**Abstract.** The era of telecommunications 4.0 is a challenge to regulators and operators insofar as external environment, technology and consumers' requirements have changed. This paper's main objective is to introduce and discuss several issues around the implementation of network separation as a regulatory remedy. The paper discusses network separation practice in several countries and summarizes their advantages, disadvantages, process as well as effects. All findings are rendered in tabular form according to different separation modes. Moreover, this paper discusses the main elements of a possible test for the adequacy of network separation. A sequential decision tree procedure with three questions is proposed: (1) Is there significant market power in China in the era of Telecommunications 4.0? (2) Are there little vertical complementarities between services along the supply chain? (3) Is network separation a better regulatory tool than any other alternative remedy? By answering these three questions, the paper concludes that network separation is not suitable for China under the current situation.

**Key words.** telecommunications regulation, network separation, telecommunications 4.0.

## 1. Introduction

After the evolutions of analog telecommunication, digital telecommunication, and IP telecommunication, the telecommunications industry will enter the era of telecommunications 4.0 which is not only merged IT and CT, but also taken DT (Data Technology) as the core of this era. This era is characterized by a strong demand for

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rich information access and consumption, likewise for diversification and flexibility of communication methods [1]. During the era of telecommunications 4.0, traditionally separated businesses such as cable TV, media and entertainment, telephone and broadband services will be offered through more flexible and unique infrastructures. The era of telecommunications 4.0 is a challenge to regulators and operators when external environment, technology and consumers' requirements have all changed. Telecommunications industry has formed strong market barriers in China affected by various factors, such as natural monopoly and politics. Structural contradictions between institution and mechanism have existed for multiple years which need to be adjusted and reconstructed immediately. Long-term distortion of competition based on infrastructure has led to repeat construction, frequent price war, high entrance barriers and low openness. To reconcile these problems, the government has made various efforts. For example, changing tax type from business tax to value-added tax, granting virtual operator licenses and establishing a tower company (which offers construction, maintenance and operation of the tower). In addition, the discussion about network separation of domestic and foreign telecommunications regulators and operators has become a hotspots issue in the world.

As a regulatory remedy, vertical separation is an extreme measure designed to prevent market power, open the telecommunication market and reduce price discrimination as well as non-price discrimination by separating infrastructure network from operators. Whereas, it may discourage the introduction of new entrants, which will cause the decline of economic welfare. Many governments care about the potential for such damage to the economy and realize that some extreme forms of separation are irreversible, like ownership separation. So as a result, most regulators would not consider network separation and view it as the "last resort", which would be used only in cases of extreme and irremediable discrimination.

## 2. Separation modes in other countries

Network separation in foreign countries has already started for a long time. Since 2002, Australia (2005), Italy (2002 & 2008), New Zealand (2007), Sweden (2008), England (2005) etc. have taken certain separation modes.

To simplify the classification, this paper introduces four network separation modes: accounting separation, functional separation, operational separation and ownership separation [2]. The greater the separation, the greater the independence between the network and retail operations [3]. The network operator may lose the incentive to discriminate downstream competitors. Based on the vertically integrated economic theory, increased separation reduces the ability to capture vertical economies.

As the mildest form, "accounting separation" may simply require the firm to maintain separate records for its upstream and downstream divisions, then report critical data to regulators, thus facilitating regulators' efforts to monitor compliance. Functional separation and operational separation require the establishment of independent departments or subsidiaries which are still affiliated with the dominant operators. The departments or subsidiaries have a certain degree of autonomy,

provide equivalence entry to the competitive enterprises. Ownership separation, as the most intense separation model, requires stripping the bottleneck facilities into a separate firm. All vertical efficiencies, which depend upon joint ownership and control, are eliminated.

Besides, there are some countries against the separation, like France, Spanish and the Netherlands. Table 1 provides an overview of four network separation modes in some countries. means the degree of separation, and is the lightest, is the heaviest.

Table 1. Properties of raw materials

Separation model	Definition	Degree of separation	Countries	Pros	Cons
Accounting separation	Independent financial statements		Nation: Early Sweden	Limit the price discrimination	Cannot to limit non-price discrimination
			Effect: The broadband market competition was still inadequate		
Functional or operational separation	Independent departments or subsidiaries		Nation: the United Kingdom	Increase the transparency, limit non-price discrimination, reduce the incentive of discriminatory and encourage the market competition	Irreversible, lack incentive to invest, low quality of service, costly and difficult regulatory
			Effect: Broadband penetration doubled, insufficient investment incentives, slow network upgrade, the lack of flexibility to provide network access products [4]		
			Nation: Sweden		

### 3. Discussion about network separation in China

The inspiration from the experience of foreign countries is that the network separation helps some countries to solve the problem of monopoly, openness and discrimination in a certain extent. However, the network separation is not a panacea, and sometimes it even damages social welfare. So, whether to take the network separation and what separation model should be taken, we will get different answers in different backgrounds.

The era of telecommunications 4.0 has put forward a higher level of demand – multi-service platform, personalization and quick response—for Chinese telecommunications operators. In this background, whether China is suitable for conditions about network separation or not, according to the Ricardo Gon?alves's point [7], we need to discuss the following three problems:

#### *3.1. Is there significant market power in China in the era of telecommunications 4.0*

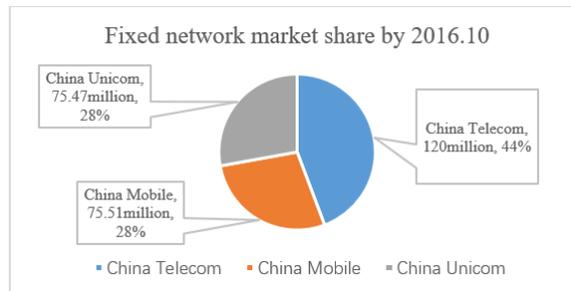


Fig. 1. Fixed network market share by 2016.10

The existence of market power is the premise of the market reform. If there is an obvious market power in the industry, which cannot be regulated by natural competition, this market needs to be adjusted. In fact, market power exists in Chinese telecommunications industry. By the effect of natural monopoly property and political factors, high cost and a long period of infrastructure construction causes the entry barrier is too high. So small and medium-sized enterprises cannot afford the cost, and only a few companies have the strength to complete the construction of infrastructure. China Telecom is in a monopoly dominant position in the broadband access market, so if it sets price in a different way to the subordinate enterprises and other competitors, this will lead to discrimination of the service quality in the downstream broadband market [8]. However, this market power is transmitted vertically, from upstream to downstream, producing price and non-price discrimination, such as unequal access, deliberately prolonging the waiting time and installing the low version operating system, to crush competitors and monopoly the market.

### 3.2. Are there little vertical complementarities between services along the supply chain

Vertical complementarities refer to the fact that the services along the supply chain are not independent, but there is a close interrelationship between them. Traditional supply chain for telecommunications is shown in figure 2, it contains: equipment manufacturers, system integrators, base operators, value-added service providers, and agency distributors. More importantly, Chinese rural land area is much larger than the urban area. In the past few decades, based on the principle of universal service of telecommunications, the primary task has been the construction of infrastructure all over the nation. Network separation will lead to increased transaction costs and low efficiency. The main operators will transfer the focal points of work from constructing the infrastructure to endless competition with each other. Taking the example of the ownership separation in Australia, the pace of telecom universal service to promote will be far lower than expected.

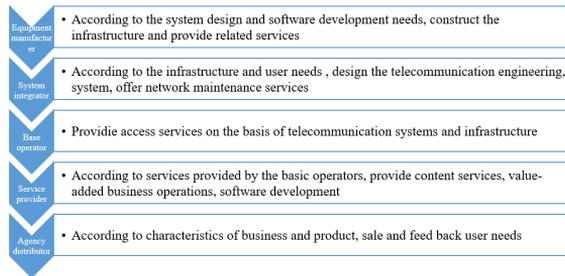


Fig. 2. Traditional supply chain for telecommunications

Under the era of telecommunications 4.0, based on SDN, NFV and other new technologies, traditional telecommunications industry is facing industrial restructuring of a multi-industry to form a new ecology. Kirsch and Hirschhausen [9] believe that a new generation of telecommunications networks will be a flexible multi-service platform. So learning from the cloud computing layers, as shown in figure 3, the telecommunications industry ecology can be divided into three layers: the infrastructure layer, the platform layer and the application layer. Telecommunications with SDN makes the network programmable and more flexible. The platform layer provides a unified northbound interface to the application layer, thus the open application layer will be able to meet the demand of personalization and rapid response to business or users.

In the era of telecommunications 4.0, the separation of the infrastructure layer and the platform layer will lead the following three issues. Firstly, SDN cannot play its role of the controller in a splitting structure. Secondly, after the three operators were stripped off the infrastructure, the original differentiation competition will turn into a homogeneous competition. The operators will carry out a vicious price war causing the loss of profits, as a result, they will lose the strength to support the follow-up technology evolution, innovation and upgrading. Thirdly, the divestiture of infrastructure causes the loss of competitive environment and incentive for

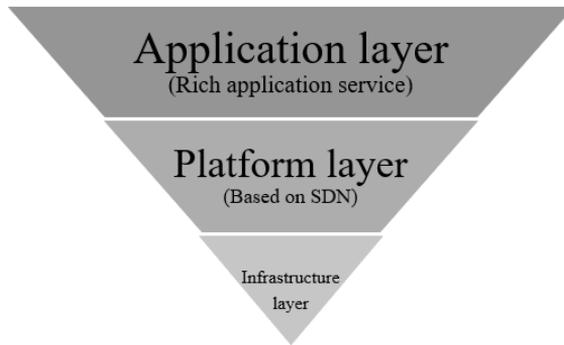


Fig. 3. A multi-tier model of telecommunications ecology

innovation. Heeb [10] considers that there are incentives for internal innovation in vertically integrated enterprises. And the key differentiation competition of operators is based on the innovation of the telecommunications network and making the network as the core assets. Whether it is the traditional era or the era of telecommunications 4.0, the existence of the vertical complementarity along the supply chain services determines that the network separation is not the best choice for the Chinese government.

### ***3.3. Is network separation a better regulatory tool than any other alternative remedy***

In recent years, Chinese telecommunication regulator has rolled out policies to solve the problem of insufficient market openness. For example, in 2015, the notice “Notice on the pilot work on universal service of telecommunications” is about to promote the construction of a new generation of information infrastructure, to solve the problems of telecommunication universal service mechanism and grant funds. In 2013 regulators actively promoted the opening of the telecommunications market and the diversification of market competition, carried out the pilot work of mobile communications resale business and established dynamic coordination mechanism of wholesale price. By the end of 2016, a total of 42 resale companies has developed more than 40 million users. These regulatory moves in a certain extent have promoted the competition, at the same time gained satisfactory change. As an irreversible regulation measure, network separation has the risk of harming the scope economy, the integration efficiency and the investments. So it is better to view the network separation as the “last resort” to solve the monopoly problem which is difficult to be solved by other regulatory measures.

## **4. Conclusion**

Thereby, in the era of telecommunications 4.0, the external environment of the telecommunication industry and market customers’ demand have changed. This

era is a transition period from the information era, sense era to the intelligence era finally. In the transition process, the change of industrial ecosystem determines that Chinese government cannot easily choose network separation as the market regulation way to avoid harming the economies of scope, causing irreversible damage to the integrated business. Conversely, we should keep the efficiency advantage of integration and set up rapid response and personalization service system. And the government should continue to play the key role in regulation, such as the charge policy, universal service, competition and scale economy, service quality standard and interconnection between different business.

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