

Convergence and its Regulation, Social and Policy Implications

Lin, Li

PhD candidate, Jesus College, University of Cambridge, CB5 8BL, UK

E-mail: ll309@cam.ac.uk

Abstract

With the rapid development in technology, deregulation and globalization, telecommunication, IT, broadcast and consumer electronic industries are converging together with unprecedented speed and scale. While Internet is progressively at the centre of our daily communication and entertainment, the traditional industry boundaries are being blurred and the former closed, separately vertical structures are being transformed into a converged horizontal structure, with services independent from networks and terminals/devices. Besides the great opportunities brought by convergence that we could communicate anytime, anywhere with any device we choose, we are also facing unprecedented challenges in regulation, trust and security, diversity, accessibility, capacity building and openness issues in an increasing convergent world. In this paper, we will explore the intricate relationships between industry convergence and these regulation, social and policy issues which has gradually penetrated into every aspects of our societies. Furthermore, convergence will not be limited within any industry boundaries. It is like a swirling, powerful vortex, sucking any industries nearby and therefore expanding progressively. In the whirling motion, the traditional industries, services, networks, terminals and business models will be stirred, melted, mingled, reorganized and re-innovated according to customers' updating but unpredictable demand. Although the existence of convergence might be forgotten by us in the end because it will deeply penetrate into every part of our daily lives and become gradually "invisible", it will not stop at any point and the debate and discussion of convergence and its regulation, social and policy implications will last for decades.

Key words: Convergence, regulation, social, policy, implications.

I. Introduction

Traditionally, in telecommunication, Information Technology (IT) and broadcast/media industry, each “service providers have used different types of network to deliver voice, video and data offerings, and end users typically used different equipment to receive those services” [1]. For example, telephony operators (e.g., BT, China Telecom) provided voice service over Public Switched Telephone Network (PSTN) to subscribers using fixed-line handsets; Internet Service Providers (ISP) provided Internet access on top of the data network consists of routers and switches, and their customers used computers to surf Internet; broadcast providers used airwave, cable and even satellite network to deliver video programming to television set. Observed from the value chain perspective, all these industries are vertically integrated and separated with each other.

With the rapid development in technology, deregulation and globalization, telecommunication, IT, broadcast and consumer electronic industries are converging together with unprecedented speed and scale. While Internet is progressively at the centre of our daily communication and entertainment, the traditional industry boundaries are being blurred and the former closed, separately vertical structures are being transformed into a converged horizontal structure, with services independent from networks and terminals/devices. For instance, with 3G mobile, we could make a video call, watch movie and TV program, play on-line game, surf Internet and even locate ourselves with the navigation system embedded in the handset.

Besides the great opportunities brought by convergence that we could communicate anytime, anywhere with any device we choose, we are also facing the unprecedented challenges in regulation, trust and security, diversity, accessibility, capacity building and openness issues in an increasing convergent world. In this paper, we will explore the intricate relationships between industry convergence and these regulations, social and policy issues which has gradually penetrated into every aspects of our societies.

II. Convergence and its regulation, social and policy implications

2.1 Convergence and Telecom Regulation

As technology convergence has happened along every level of the convergent Information and Communication Technology (ICT) value chains, inevitably, it will bring along the convergence of the regulatory framework. Essentially, there are several purposes for the convergence of regulations. First, as various technologies are converging together, a converging regulation framework could guarantee the technology and service neutrality. Secondly, the

convergent regulation system could bring greater flexibility, simplicity and efficiency to the converging industries compared with former multi-sector regulations. Thirdly, it could build a synergy when different regulation frameworks are converging together. For example, a convergent regulation framework could integrate the infrastructure and access regulation from traditional telecom industry, access and content regulation from broadcast industry, privacy and security regulation from IT industry and could even integrate some new regulation issue such as Intellectual Property Right (IPR) and e-commerce.

To implement a converging regulatory framework, the traditional separate service/technology based licensing regimes need to be transformed into a set of unified ones for all the converging technologies and services. Technology convergence brings big challenges for the converging regulation systems, e.g., in interconnection, numbering, universal service, etc.

Traditionally, the regulation for interconnection is only about the interconnection among different PSTN networks. As convergence is providing a common platform for all the services of all kinds of operators, the interconnection issues would be widely expanded to any type of networks provided by any operators (e.g., traditional telecom operators, cable providers, satellite TV providers, ISPs, etc.). Moreover, since convergence makes the service layer separate from the network layer in the ICT value chain, interconnection issues could increasingly happen in the different vertical levels of the network (e.g., issues like Local loop Unbundling (LLU), Virtual Network Operator (VNO), etc.)

Similarly, convergence has broadly expanded the numbering regulation issue from PSTN to any relevant services on the IP based common platform. As common critical resource for converging industries, numbering could be provided to any service providers with various styles (geographic, specific numbering rage, etc.), and work as a bridge for the substantial network convergence (e.g., with Telephone Number Mapping (ENUM)).

In the old PSTN days, Universal Service was only about telephony voice service. However, world widely, convergence is increasingly providing a deep need for broadband access as an essential part of the universal service. Moreover, technology convergence also provides such an opportunity for universal service on a more cost effective and more efficient basis. Therefore, from the regulation perspective, it is important to indiscriminately encourage the application of the new converging technologies from all the different service providers to achieve the challenging new goals of the universal service.

In a converging environment, the concept of consumer protection is increasingly wider. In the long term, it includes the guarantee of different end-to-end Quality of Service (QoS) in the new bundled

converging services, minimizing the service disruption during the migration from traditional networks to the converging network, providing consumers enough information of the new converging services and guaranteeing the access to emergency services from the convergent network, etc.

Although it is a prevalent trend of a horizontal convergent regulation framework for different industries, there are controversial debates on whether a convergent regulation framework should also be integrated vertically, i.e., converging the regulations of the infrastructure as well as content. Although traditionally, there are rather different fields that are under different regulation systems, as the development of convergence could increase the need for the vertical integration along the value chain, the regulation framework might also need to be adapted accordingly.

Although there is no “one size fits all” regulation recommendation for all the different countries, as a general principle, the technology development is normally faster than the development of the regulation system (although an effective regulation system could greatly stimulate the technology development). Therefore, it is important that the regulation system could be fully flexible, dynamic and future-proof in the rapidly changing convergent environment, and is able to be pro-competition, pro-growth, pro-innovation and pro-end user for both market and technology in both developing and developed countries.

2.2 Convergence and Trust and Security

Convergence not only provides a ubiquitous, persistent and flexible way for always-on communication and entertainment, but also breaks the previously logical, physical, geographical and temporal security perimeters that have existed for decades. The unprecedented transparency and openness brought by convergence is a double-edged knife that could hugely increase the vulnerabilities of the whole society and could lead to loss of confidence and trust both in the cyberspace and also in the real world.

Convergence provides numerous access ways and a convenient common platform for information collection, integration, exchange, replication and distribution across different people, regions and industries. Its ubiquitous feature seems to be in contradiction with the principle of protecting intellectual property rights and the personal privacy. Therefore, how to make a good balance between the protection of intellectual property rights and the personal privacy and the promotion of new convergent services is a big challenge for all the service providers, regulators and governments.

As the real and virtual world is increasingly converging, when people think they are physically “invisible” and anonymous in the cyberspace, it is

much easier to lose the self-discipline and accountabilities that they could have in the real world. Therefore, without proper guidance and supervision in the converging environment, people’s misuse of convergent technologies could have hugely negative effect on themselves as well as on the others. Children and young people are particularly vulnerable in such a converging environment and therefore, the protection of minors should receive a great deal of attention.

Convergence brings together the top-down, heavily regulated telecom industry and the widely distributed, much less regulated Internet industry. As convergence is happening rapidly in every layer along ICT value chain, the previous security zones protected by the separations of the different industries are vanishing. The increasing complexity of the converging network makes the whole system much more vulnerable than before. The vulnerabilities could come from not only any hardware/software layers or functional modules in the converging network, but also could come from any individual in any place in the world who is connected in the common convergent network. As the convergent network becomes increasingly ubiquitous and the devices/terminals become more software based and intelligent, in the long term future, the security attacks could be initiated by anyone at anytime anywhere in the world using any device/terminals, targeting any part of the convergent network and any individual connected.

Horizontally, as a convergent, unified platform is increasingly connecting and transforming various isolated systems and networks together, and is increasingly penetrating into every aspect of our daily lives (e.g., communication, entertainment, finance, etc.), even if the attack targets only one single part of the convergent network (e.g., one common software program), it could cause enormous chaos in various aspects of people’s lives globally. Vertically, the security attack could be initiated from any weakness at any layer of the value chain (content, application, service, network, terminal, etc.), and then be spread to any other layers and make huge damage in the whole value chain.

As we are at the early stage of convergence, a mature and dynamic cybersecurity framework is still under construction. However, the fundamental principle will always be the same that tackling the ubiquitous threat needs cooperative effort from all sides. Horizontally, it needs the close cooperation among different industries (telecom, IT, broadcast, consumer electronics, etc.), regulators and governments. Vertically, the close cooperation should include all the elements along the value chain (content providers, service providers, network providers, equipment vendors, terminal suppliers, end customers, etc.).

Furthermore, the complexity of convergent network

makes it difficult for everyone involved to have the necessary integrated security knowledge needed in a convergent world. Especially, when devices/terminals are increasingly software based and intelligent, the security knowledge required by end customers is escalating dramatically, and that brings much more challenges to the human capacity building - not only to the professionals in the industries but also to the end customers.

2.3 Convergence and Diversity

Born in the United States, Internet was originally intended only for research and academic users, and the terminals for Internet were mainly limited in computers before convergence. Therefore, American Standard Code for Information Interchange (ASCII) characters have dominated Internet in terms of domain name, email address and content. However, with the development of convergence, globally, Internet is increasingly available everywhere and is penetrating into every aspect of our lives. In the long term future, almost everything (e.g., consumer electronics, key, wallet, etc.) could be always connected to the Internet, which could provide the always-on communication, interconnectivity and interoperability. While the barriers to access the Internet are increasingly lower, people could access Internet with all kinds of devices/terminals in their daily lives around the world. Since English is not the only language in the world, the single language framework of Internet makes it difficult to be accessed by the majority of population in the world, and therefore, is progressively becoming an obstacle for the development of convergence and for bridging the digital divide. Therefore, the need to build a compatible, scalable and interoperable global multilingual Internet framework is imperative.

2.4 Convergence and Accessibility

Convergence of different industries could tremendously increase the Internet accessibility. First, the convergence of networks and terminals could provide much more paths and devices for Internet access, especially for the developing countries where normally, the penetration rates of TV and mobile are much higher than that of computer and fixed line. Secondly, although the accessibility of Internet is increasing dramatically, it is difficult to have substantial improvement unless we can bridge the Internet domain name system with the traditional telephone numbering system, which has been widely accepted around the world for decades. Therefore, a seamless unified system (e.g., ENUM) is crucial for the accessibility in a converging world. Thirdly, convergence dramatically speeds up the exhaustion of IPv4 address, and the shortage of IP address is gradually becoming one of the major obstacles of improving accessibility. Therefore, the deployment of a global, scalable and compatible IPv6 framework across all the converging industries is imperative. Fourthly, although convergence could bring some

temporary problems for accessibility because it breaks up the traditional vertical integration between services and networks (e.g., emergency call on PSTN), taking advantage of its ubiquitous and multimedia features, convergence could become a great advantage (e.g., with Total Conversation Service) rather than disadvantage for the accessibility and universal services, especially for disabled and elder people. In order to realize that, promoting the international standardization in this area and building a globally compatible and interoperable convergent framework which could facilitate the accessibility for all are very essential.

2.5 Convergence and Capacity Building

With the development of convergence, the traditional boundary of telecommunication industry is being broken and that brings much more challenges to the capacity building, especially in the developing countries. On the one hand, under the impact of convergence, the whole telecom market is changing considerably. Facing various ambitious competitors from different industries (e.g., cable providers, satellite TV providers, ISP, etc.), telecom companies are under growing pressure to reduce the work force to cut the overall cost. On the other hand, convergence provides a deep need for telecom companies to have much broader and comprehensive knowledge than in the old PSTN days. Therefore, under the impact of convergence, the capacity building is facing unprecedented challenges. First, with the separation of the service layer and network layer in the convergent network, capacity building needs to be more marketing and customer oriented, instead of technology oriented; secondly, capacity building needs to cover a broader range of industries than in old PSTN days. It not only includes much wider range of technical knowledge from all the converging industries (e.g., telecom, broadcast, IT, etc.), but also consists of marketing, financial, legal, regulatory and network security knowledge which are ever more important in the converging environment. Thirdly, with the convergence of the technologies, the capacity needed is also converging. In the old PSTN days, the demand for skills was very specialized. For example, in the vertically integrated networks, we need specialized optical transmission engineers, switch system engineers, data communication engineers, etc. However, with the convergence of the various technologies, the specialized capacity alone is not capable of coping with an increasing convergent network where all the knowledge are integrated together and cannot be separated. Therefore, it brings big challenges to the capacity building to increase both the breadth and depth of knowledge of each individual employee. Because of the increasing difficulties and challenges in the capacity building, each qualified employee is becoming a critical resource for telecom companies in a convergent world. Fourthly, with the knowledge demand in the convergent environment increasing exponentially, it is

more and more unlikely that one company could have all the knowledge it needs in-house. Therefore, building and managing strong external relationships with a tremendous broad range of partners (e.g., suppliers, academic institutes, customers, etc.) is crucial for the capacity building in the long term.

2.6 Convergence and Openness

Convergence along the value chain (e.g., content, service, network, terminals, etc.) not only could provide abundant multi-medium information, but also could provide an open platform and various means for people to distribute and access information easier. From this sense, it could significantly broaden the scope and scale of freedom of expression, increase people's participation and bring many new forms of "free speech" to the whole society.

Traditionally, telecommunication and broadcast industry were subject to strict regulation while Internet, with its inherent transparency and openness attributes, is relatively unregulated with less interference from all sides. While Internet increasingly becomes the centre of distribution and access for all the information, it is becoming controversial that if and to what extent, the openness provided by the convergent technologies should be regulated.

It should be a fundamental principle that convergence should become an opportunity to promote openness, transparency and freedom of expression around the world. However, since freedom is not absolute, it is crucial to make a balance between guaranteeing freedom of expression and prohibiting the inappropriate, illegal or unauthorized behavior (e.g., distributing harmful content or piracy). Because of the huge culture, social, religious and economic difference among all the nations, it is unlikely to establish a general "one size fits all" standard and rule around the world, and keeping a well balanced openness in the convergent environment needs the close cooperation among governments, regulators, industries, research institutes, civil societies, private sectors and individuals of all the countries.

With the development of convergence, huge Merger and Acquisition (M&A) is happening rapidly not only horizontally across industries, but also vertically along the value chains. On the one hand, huge economies of scale and scope greatly amplify the affordability and accessibility of the convergent services and therefore noticeably improve the openness of the society, but on the other hand, giant international media firms increasingly have the potential dominant power in the converging environment, and without proper regulation, that dominance could become a huge threat to the openness and freedom of expression around the world in the long term.

III. Conclusion

In January 2008, Ericsson expected that the converging industries will develop from ICT single value chain to TIME (Telecom, Internet, Media and Entertainment) complicated ecosystem [2]. However, with the rapid development of convergence, even this bold prediction seems to be too conservative.

Convergence will not be limited within any industry boundaries. It is like a swirling, powerful vortex, sucking any industries nearby and therefore expanding progressively. In the whirling motion, the traditional industries, services, networks, terminals and business models will be stirred, melted, mingled, reorganized and re-innovated according to customers' updating but unpredictable demand. Although the existence of convergence might be forgotten by us in the end because it will deeply penetrate into every part of our daily lives and become gradually "invisible", it will not stop at any point and the debate and discussion of convergence and its regulation, social and policy implications will last for decades.

IV. References

- 1 Narayan Ashish, et al, 2004, Licensing Approaches in An Era Of Convergence, Trends in Telecommunication reform 2004/05 Licensing in an era of convergence, Geneva, ITU (International Telecommunication Union)
- 2 Ericsson prospects five big trends of global telecom industry in 2008. Available: <http://www.ericsson.com/cn/ericsson/press/2008/0104-1.shtml>, accessed in June, 2008.