Convergence and its Rule Governance in the Ubiquitous Network Age

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1. Introduction

As electronic commerce through the Internet *(e-commerce)* has grown so too has recognition of the importance of the rules that govern e-commerce (*cyber rules*). Because most existing rules concerning commercial transactions do not take into account the specific nature of e-commerce, situations arise that the current system had not envisioned or in which the rules even impede the development of e-commerce.

It goes with out saying that the background of this change is the emergence of the Internet, which is a global communication network. The Internet is a *distributed communication system* created by the *convergence* of computer technology and communication technology. Since 1995, the performance of communications technology began evolving faster than the performance of computer technology. This evolution pushed forward the convergence of communications and computers. As these two technologies converged the regulatory framework, which governed each technology separately, became inappropriate. The convergence phenomenon is not limited to the telecommunications field. Every service and every industry has begun to converge, including for example, financial services and telecommunication services. Convergence is therefore an engine, which creates new services and industries and a key for development of e-commerce in the coming age. At the same time, convergence generates new-types of problems that old rules cannot cover. What kinds of problem are these? And, how should we design the new rules?

This paper examines the issue of convergence and its status and problems. It discusses the policy and regulatory framework in Japan, the United States, and Europe and the issue of governance in the age of convergence.

At the outset of the 21st century, we are facing the collapse of the *IT bubble* and the occurrence of terrorism. Both situations are affecting the rules and the governance of e-commerce, including for example the balance between privacy and national security. Besides, the recent collapse of the IT bubble in the

telecommunication sector is causing great uncertainties about broadband and 3G mobile deployment in many countries. It seems that the convergence process is not occurring as fast as we expected. We must also understand that development of e-commerce is just in a beginning stage and consider the evolution of the social system in a long-term perspective.

2. Technological Development and the Convergence Phenomenon

This chapter mainly discusses technological aspects of convergence and its impact.

2.1 The Emergence and Convergence of Communication, Broadcast, and Computer Technology

(1) Emergence of communications, broadcasting, and computer technology

Historically, communications, broadcasting, and computers emerged and developed independently. In communications technology, the telegram appeared in the 1830s and developed into a network covering the North American continent in the 1880s. The invention of the telephone in the 1870s began the age of individual communication technology. With wireless communication technology developed in the 1890s, inter-continental communication became practical.

In the field of broadcasting, radio broadcasting appeared in the 1920s and soon became an important and influential medium for propagating culture. Following the radio, television broadcasting emerged after a decade, spreading rapidly and having great influence.

Compared to communications and broadcasting technologies, the emergence of computer technology is relatively recent. The first computer was invented in 1946, but computer technology did not become an important tool for business until the mainframe computers of the 1960s. The spread of computer technology to the individual level occurred during the 1980s when the personal computer emerged in the market.

(2) Convergence of computer and communications technology

Since the 1960s, technology to permit remote use of computers over the communication network became practical and it was utilized by airline reservations and banking systems. This technological development made it possible to use the network originally dedicated to voice communication to transmit digital information. At

the same time, the communication network itself began to be digitalized; specifically transmission lines and exchanges were converted from an analog to a digital basis. This digitalization of communication and linking of computers with communications networks was not actually convergence, though. Real convergence between computer and communication technology did not occur until the Internet emerged.

The Internet was developed in the 1960s as a defense project in the United States. Its commercial use began early in the 1990s and explosive penetration occurred after 1995. The Internet can be said to be a convergent product of communication and computer. The key to the Internet's penetration is its *connectivity*, which is realized by its *autonomous architecture* and *flexible Internet Protocols (IPs)*. Another key to the expansion of the Internet network is its *distributed nature*, such that each user can dispatch information without relying on the facility of a central telecommunication carrier. In addition, the fact that Internet tariffs remained basically flat regardless of the volume of transactions stimulated the emergence of rich content such as pictures and movies. This would never have happened if charges were traffic-sensitive as was the case with telecommunications service. Now, the convergence of telephone communications into the Internet is destroying the existing business model of telecommunications operators. The phenomenon that every single device and service is available and compatible in IP is called "everything over IP."

(3) Convergence of communication and broadcasting technology

Convergence between communication and broadcasting is just beginning. As its power and bandwidth have increased, the Internet has become capable of distributing video content. New *CDN (Content Distribution Network)* technology allows the Internet to efficiently handle enormous volumes of distribution traffic. Broadcasting technology is evolving, as well, permitting transmission of digital content and providing various services combining with two-way communication systems and storage systems to cache content. These developments reflect the fact that users can now access digital content through various media including communications and broadcasting systems. This, in turn, has an impact on the regulatory structure. Up until now, regulators have treated broadcasting as a set comprising both content and transmission medium. This vertical regulation schema, however, is no longer effective, since the same content can now be transmitted through different means. Regulation should therefore become horizontal, treating content and transmission means separately.

A similar phenomenon happened in the computer industry. Until the mid

1980s, the computer industry was vertically integrated with companies such as IBM providing both hardware and software, but with the emergence of the microprocessor and open software by the mid 1990s, the computer industry took on a horizontal structure comprised of hardware, operating software, and applications producers.

2.2 Broadband Technology Evolution

The power that drives the convergence of communications and computers is the progress in *broadband communication technology*. The performance of computers has doubled every 18 months since the early 1980s, in what is known as *Moore's Law*. Over the same period, the *digital-exchange* was introduced in the communications field and communications rates were falling due to price competition. The performance of communications technology did not improved as significantly as computer performance over this period, however. One reason is that telecommunications is a regulated industry. Another reason is that a large part of theinitial telecommunications cost consists of manpower and civil engineering costs, which are not sensitive to technological innovation. The remaining bulk of the industry's costs is for exchanges, which have a depreciation span of more than 10 years and therefore are not sensitive to technological evolution.

These conditions changed in about 1995, however, with the Internet boom. As already mentioned, with the Internet, a computer itself performs as an *exchange* or a *router* and it has a very short depreciation period. On theregulatory side, by its nature, the Internet has a non-regulated tariff structure, which has promoted the emergence of new service providers and competitors.

Coincidentally, a technological breakthrough in *telecommunications transmission technology* also took place around 1995. This particular innovation called *WDM (wave division multiplexing technology)* was an *optical transmission technology* that enabled passing multiple optical transmissions with different wavelengths through a single optical fiber. This evolution caused communication transmission performance to improve at a rate surpassing *Moore's Law*, doubling every 12 months according to what is called *Gilder's Law*. As a result, Internet routers, that are exchanges consisting of computers, could not catch up with the potential speed of transmission lines. This phenomenon implies that in the future photonic exchange might take the place of the convergence of all communication into the IP. Moreover, wireless communications also experienced a breakthrough around 1995 with digital wireless technology as second-generation mobile penetrated rapidly around the world. The decline in costs and evolution of technology are continuing with the emergence of a

third generation.

The significance of this emerging broadband technology is not limited to the fact that it permits transmitting moving images. Instead, broadband makes it possible to move such activities as financial services onto the network, making them easily accessible and combinable with many other services. Unbundling of financial services into separate financial service functions that can be bundled with communication services on the network thus creates new services and platforms. Indeed, every service industry has begun to converge and new services are emerging constantly.

2.3 Ubiquitous, Distributed Communication Technology

A fundamental change in the communication paradigm occurring in parallel with broadband is the transition to *ubiquitous networks* and *distributed communication architecture*. A ubiquitous network means that communications power exists everywhere and everything is connected. Dispersion of communication power has shifted from the state to enterprises and now to individuals. This phenomenon is the main source of problems with e-commerce rules and governance today.

At the same time, distributed communication technology allows individuals to communicate autonomously with each other in a peer-to-peer manner. As already mentioned, this capability is inherent in the Internet. And this is the very reason why Internet space has expanded so rapidly--each user can be an originator of information without going through a central computer. In addition, peer-to-peer capability has recently created *Napster* and *Gnutella,* which are applications that enable users to exchange music data directly with each other. These applications have also raised serious problems relating to infringement of intellectual property rights and thus have focused attention on the rules and governance of e-commerce.

Recent technological development has also created the possibility of distributed wireless communication systems. In the architecture of the existing mobile wireless communication system, every transaction basically goes through the exchange stations on the premises of a telecommunications operator. New types of wireless communication systems, such as *Wireless LAN* or *ad-hoc communication system*, have more Internet-oriented communication architecture, in which each terminal can communicate directly with every other one and a chain of such connections creates a network. It is significant that the capability and cost-performance of this distributed technology are evolving rapidly compared to the

centralized architecture of the existing wireless network. This phenomenon is breaking down the common assumption that communications must be carried out by telecom operators, and thus it is causing a change in paradigm from a *carrier model* to a *user model*. This change is again raising issues about the policy for allocating the *frequency spectrum*.

3. Convergence of Communications and Broadcasting

3.1 The Four Aspects of Convergence

As described by the Ministry of Posts and Telecommunications in its *Report on Information-Communication Policy in the Era of Communication and Broadcast Conversion* issued in December 2000, the convergence phenomenon generated by such technological developments can be divided into three categories.

(1) Convergence of Services

The first aspect of convergence is observed in the emergence of intermediate services that link communications and broadcasting. Private, one-to-one communication was the essential attribute of communications technology, but now the Internet Protocol permits using the communications network to deliver information to many people, such as replaying content on the Internet by means of streaming technology. The joining of Internet and communications technologies will realize communications of a public nature whereby voice and moving images are transmitted to a number of recipients. The types of 1-to-n information delivery already available over the communications network include electronic bulletin boards, email, facsimile transmissions, video teleconferencing systems, and homepages. On the other hand, in broadcasting—which was originally based on mass communications—BS (Broadcasting satellite) and CS (communications satellite) broadcasting also permit new services with a similar nature of specificity. These intermediate services that have the features of both communications and broadcasting are expected to expand in the future as well.

(2) Convergence of Terminals

The second aspect of convergence is "terminal convergence", a phenomenon in which terminals, or information appliances, are being developed to use for both communications and broadcasting. Recently, PCs with built-in TV tuners have appeared on the market. With these terminals one can not only view terrestrial wave broadcasts, but also record and compile programs. A Korean Internet site that permits on-demand access to already broadcast terrestrial wave programs is enjoying

growing popularity. Also, an electrical appliance manufacturer has come to market with a set-top box that enables Internet access through a TV set. These trends all demonstrate the active promotion of terminal convergence, offering both communications and broadcast services over a single terminal.

(3) Convergence in Provision

The third aspect of convergence is in the provision of services, whereby a single provider operates both communications and broadcast services. In the early years, regulation and management problems kept broadcasters and telecommunications carriers from stepping into each other's territory. For example, communications carriers lacked know-how in the content-production business, whereas broadcasters knew little about the communications business.

This situation has been changing over the past several years, however, as global players move into new business areas through M&A. The satellite communication provider, JSAT, provides CS broadcasting service as well as international satellite communication service. Moreover, the case in which a CATV provider penetrates into the first-class electronic communication business and gives Internet-provider service is gaining attention. Therefore, as convergence proceeds, distinctions such as between a broadcasting band and a communications band or that communication refers to wire and broadcast refers to wireless are technically obsolete. Existing regulations that do not reflect such technological developments are becoming meaningless, as noted before.

3.2 Convergence and Changes in Industrial Structure

(1) Diversification of Content-Delivery Structure

As the demand for content increases in the wake of expanding broadband capabilities in access loops and the spread of digital broadcasting, mechanisms are being developed that allow general users stress-free access to content. They will enable the delivery of all kinds of content such as publications, video, music, and games through a variety of terminals.

Content-delivery models between providers and consumers and among companies are also diversifying as content-delivery markets continue to expand. For example, a fee-based service providing video within the Internet using *streaming technology* has been started.

At the same time, however, these developments have opened up a new and serious social problem that has rapidly expanded in recent years – the peer-to-peer

exchange of content. For example, huge communities such as Fast Track and Gnutella, which consist of more than 40 million people, have emerged for the purpose of exchanging content over the Internet. As the source code or software on which they are based has already been made public, peer-to-peer content exchanges are likely to continue even if content producers prevail in pending litigation.

According to a survey by Gartner Group in August of 2001, only six percent of Internet users who downloaded music files from the Internet within the past three months paid the required fees. Governments and private industry must take concrete steps to establish appropriate copyright-handling systems and transaction rules if a healthy content distribution structure is to survive. Of course, the formulation of global rules is made even more problematic by the existence of those who refuse to recognize copyrights for such content.

(2) Expansion of the Platform Business

Many types of network infrastructure must be developed to support the full-scale deployment of BS, digital CS, and Internet broadcasting and the proliferation of providers of music and video content through the Internet. The required infrastructure includes stable transmission, rate-charging, and payment, authentication, copyright protection (i.e., CAS, Conditional Access System), and management services, all of which will utilize high-speed backbone circuits. For instance, e-commerce, where anybody can easily buy or sell products using high-quality video images, presents a number of credit risks ranging from whether purchasers actually receive the products they expect to whether sellers get paid for what they sell. Reflecting that, new services are being designed to reduce such credit risks and they are expanding as expected. As a matter of fact, *escrow services* (intermediate services to guarantee the safety of transactions) by financial institutions and trading companies as well as other credit-related businesses have emerged within the past several years.

Moreover, there is an increasing demand for *Content Delivery Network (CDN)* services. CDN services provide a better environment for the distribution of large-capacity content (such as animated programming) that relies on broadband access. They deploy content-servers capable of handling accelerated speeds on networks located close to data distributors and consumers. Such platform markets are expected to grow even more rapidly under the current environment in which the convergence of communications and broadcasting is picking up speed.

(3) Convergence throughout Industry

The expansion of IT-related business centered on the Internet in the late 1990s was promoted by: (1) the growing proportion of the Internet community that was using mobile and (2) the construction of LANs (Local Area Networks) within industrial firms and the involvement of individual users in the broadband network. As a matter of fact, the possibility that convergence generates of being able to deliver high-quality images and sound is having an effect in many other industries in addition to broadcast and communication. For example, in the medical and nursing care industries, networks linking hospitals, pharmaceutical companies, and testing companies enables the sharing of share massive amounts of patient information such as test results and diagnostic images. In the case of the education industry, technology that enables delivery of high-quality images promotes distance learning. In the publication and newspaper business, e-documents and e-newspaper delivery services are expected to proliferate with the full-scale development of PDA or e-paper technology exploiting prime quality images.

This phenomenon enables consumers to access any type of content at anytime and anywhere. Such inconveniences as finding a document out-of-stock would not occur anymore under such environment. It would also become much easier to enlarge the typeface or transfer the written content to a digital voice recording. Suppliers as well as consumers benefit from this technological development. For example, book and newspaper publishers will face much less inventory risk. Thus, it is expected that paper-medium will slowly become extinct.

Moreover, the banking business is expected to shift from office-based operations to net-based operations. This shift will enable banks to distribute the same or even better services to customers located anywhere at anytime through devices such as high-definition-type mobiles. Or, as Wells Fargo Bank of the U.S. is doing, they may install television monitors at various office sites and offer such teleconferencing services as customer consulting.

Securities business can use this technological capability of high-quality image or voice delivery to convey Investor Relations information or video comments of their financial analysts and economists, for example, as Nomura and Merrill Lynch are doing. They can also use it to transmit such information to the sales staff.

Within the distribution industry, the technology enables firms to take on the role of delivering promotional images for new products or they can use it to create powerful communication campaigns.

For the real estate industry, the capability of delivering high-quality images over a network to potential buyers will enable firms to promote properties or even to

execute entire transactions without taking prospective buyers to visit each alternative property.

Finally, the advertising industry will also experience the shift from paper-based to network-based medium along with the newspaper and publishing industry. The shift may have an even stronger impact on the structure of the advertising industry, as existing mass paper-based advertisements give way to more individualized, private delivery through moving images or voice.

These convergence phenomena point to the coming of vertical-integration through cross-industry alliances that extend far beyond the domain of individual industries. Moreover, applying this new technology with high-quality moving images and sound in each industry can create new businesses opportunities. On the other hand, firms that cannot adapt to the speed of these changes are likely to disappear in the near future.

4. The Regulatory Structure and Communication/Broadcast Convergence

This section discusses the regulatory framework in each selected nation against the background of the convergence of communications and broadcasting.

4.1 Japan

(1) Characteristics

The communications system in Japan is regulated by a group of business laws and more recently by the Electronic Communication Business Law. On the other hand, the broadcast system is regulated comprehensively by a single broadcasting law or radio law applying to all divisions or media applications. In order to operate a communications or broadcast business in Japan, business owners must obtain an operating license or permit from the Ministry of Public Management, Home Affairs, Posts and Telecommunications. Also, to operate both communications and broadcast business requires a permit and license in both business fields. Thus, even though the Ministry has a positive attitude toward mutual entry, it is considered quite difficult to penetrate from one business territory into the other under such condition. It is especially difficult for broadcasting businesses to start up a new business or use the frequency in a different field because broadcasting frequency is priced moderately and exploitation rights and broadcasting licenses are renewed automatically.

(2) Content of Key Regulations

The *Telecommunications Business Law*, which is the central regulation in the

telecommunications field in Japan, regulates the operating range of every business unit under one of two categories (Type I & Type II carrier) depending on the quality of the equipment. In addition, the Law defines the requirements for business notification and permission for new entrants. This law came into effect in 2001 to comply with the deregulation of the telecommunications field, the change from public interest protection to free competition, and the *e-Japan Plan* proposed by the national government by adding 1) asymmetry regulation, 2) carriers' career, 3) a dispute-settlement entity, and 4) universal service aid arm. At the same time, the NTT Law was amended, permitting NTT-East and NTT-West to advance into business fields other than universal service and eliminating unnecessary regulations on foreign-capital firms. These changes did not address the issue of unbundling network elements, which can be a key to promoting free competition. In addition, the amendment covered only conventional telecommunications and thus did not correspond to the revolution in business structure that is promoted by the convergence of communication and broadcasting with the spread of broadband.

(3) Governance

The distinctive characteristic of Japanese telecommunication and broadcasting policy is that the entire policy process including planning, execution, and dispute settlement is under the sole authorization of the Ministry of Public Management, Home Affairs, Posts and Telecommunications. The Ministry therefore has strong influence over various fields of interest through the process of approving permits and business licenses or the allocation of resources such as frequencies. In addition, with the adoption of asymmetry regulation and unfair competition regulation in the amended Telecommunication Business Law, the Ministry gained influence over competition in the telecommunications field, which is a central issue of discussion. Such centralization of power results in efficient public administration, but it has been pointed out that it also brings a lack of transparency and fairness in the administrative process. It has limitations in case of mistaken policy as well.

4.2 United States

(1) Characteristics

The Telecommunications Act of 1996 was the first time the United States amended its telecommunications law in 60 years. The Act aims to promote competition in the telecommunication market. It regulates unbundled and open access of the local telephone circuits, it promotes resale of communication circuits by

establishing wholesale prices as well as the mutual entry of local telephone and CATV companies, and it also regulates frequency auctions. Therefore, we could say that the Act was ahead of communication and broadcast convergence. However, it could not handle problems such as lack of competition in the local telephone market or objections to large-scale M&As with the convergence of communication and broadcasting because it did not mention anything about the regulatory aspect of competition in both electronic communication and broadcast markets. As a result, oligopoly is progressing mainly based on local telephone companies and major media conglomerates.

(2) Content of Key Regulations

As mentioned in (1), the Telecommunications Act of 1996 includes the following provisions: 1) to allow mutual entry of local and long distance telephone companies under certain rules, 2) to prevent unreasonable or discriminatory restrictions of circuit resale, 3) to allow mutual entry of local telephone and CATV companies, 4) to improve administration of universal service, and 5) to improve administration of frequency auctions. Thus, the main aim of new legislation was to promote formation of a business structure that reflects the convergence of communication and broadcasting and free competition among the participants. In addition, the provisions related to frequency auction were amended the next year and almost all the frequency allocations were to be carried out, with some exceptions, by auction. However, the progress of oligopoly among the local telephone companies and major media conglomerates had an adverse effect on competition in the high-speed communication services market.

Facing this situation, Congress began discussing another way to activate high-speed communication service nationwide that did not rely on the initiative of new entrants. That approach, found in the *Internet Freedom Act* is to allow local telephone companies to enter the long-distance communication market for high-speed communication service only and to make them take a role in activating the market. On the opposite side, the FCC's position seems to be to support the spread of high-speed communication through competition between newcomers and existing business units. Thus, in July 2001 it instituted *co-location rules* for the equipment of existing local telephone companies.

(3) Governance

Congress is involved in policy planning for both communication and broadcasting through its legislative function. The FCC is also involved in the policy

planning process through its rule-setting function. Thus, Congress and the FCC share power over policy planning. In the case of policy execution, the FCC holds jurisdiction over inter-state communication, and other intra-state communication is under the jurisdiction of state public utility service committees. However, there is still a discussion between the FCC and state public utility commissions concerning jurisdiction of regulation. A system such as this that has various parties involved in administration might be less efficient, but it also has the advantages that it is more likely to respond to consumers and that mutual surveillance makes it easier to review policy.

The presence of the FCC in the U.S. regulatory framework is noteworthy. The FCC is in charge of most layers of the telecommunication and broadcast fields including infrastructure, application, and contents. Thus, the FCC substantially bears most of functions from policy planning, policy execution, to dispute-settlement. In addition, the FCC retains the right of joint-inquiry in telecommunication and broadcast fields. It also sets the regulation describing the form of competition likely to be taken and thus conducts competition policy.

It may appear that the function of the FCC in the United States is similar to that of the Ministry of Public Management, Home Affairs, Posts and Telecommunications in Japan. However, the FCC is not a government ministry but a completely independent administrative agency that must compete with other agencies in its various fields of activity. For example, it competes with Congress in policy planning, with state public utility commissions in policy execution, and with courts in dispute settlement. Thus, the structure does not lead to over-concentration of judicial power.

4.3 United Kingdom

(1) Characteristics

The United Kingdom was the first within the Europe area to achieve liberalization of telecommunication policy through the great commitment of the Thatcher Administration's public utility service reform. The reform of British Telecom as a state enterprise was at the center of such liberalization, followed by price capping, the mandatory interconnection agreement, and accounting separation. Thus, the reform clearly aimed to adopt systems that would promote the liberalization and fair competition elements in the telecommunication market. Recently, the focus is on the improvement of fair-competition-related rules since liberalization has been settled for the time being. The Office of Fair Trading (OFT) and the Office of Telecommunication

(OFTEL) published guideline, *The Application of the Competition Act in the Telecommunications Sector*, in 1998 following the 1997 telecommunication regulatory reform, which drastically simplified entry procedures and introduced asymmetry regulation against SMP (Significant Market Power) by directive of the EU. Furthermore, the revision of PTO (Public Telecommunication Operator) license, the regulatory development for SMP interests, and the adoption of Market Influence Regulation took place in 1999. In the very next year, the publication of Market Influence Guidelines and distribution of a statement proposing the adoption of open-access in telephone, CATV, wireless communication, and payTV regarding the convergence of communication and broadcast were executed one after another.

(2) Content of Key Regulations

Observation of recent telecommunication and broadcast policy in the UK makes clear that the emphasis is on policies that induce fair competition among market participants. Within such policies, the Competition Act of 1998 and Market Influence Guideline of 2000 are critically influential. The Competition Act of 1998 prohibits anticompetitive agreements and abuse of dominant market position in the field of telecommunication, as well as giving the Director General of OFTEL the concurrent power to regulate telecommunication market competition. Thus, the implementation of competition policies ensured discipline of the telecommunication field. On the other hand, the main aim of the Market Influence Guideline of 2000 was to define the significant market power (SMP) of dominant operators that are considered the subject of asymmetry regulation through the Market Influence Determination Process and consequently to reflect such determination in competition policies for the telecommunications field. The Guideline clarifies the determination process of relevant markets as well as indicators of major market influence in relevant markets. In addition, aside from the Competition Act, to promote competition, OFTEL announced one after another rules and statements dealing with unbundling and openness of the local-loop or open access of all data transmission paths that relate to telecommunications and broadcast convergence.

(3) Governance

Since the execution of the Communication Act in 1984, the segregation of functions is relatively clear, with (the Department of Trade and Industry (DTI) dealing with policy planning while OFTEL regulates the Act. Also, OFTEL's influence has increased with the 1998 Competition Act for it is now able to plan competition policy in

its own sector independently and has been granted an accompanying supervisory function.

With the recent convergence between communication and broadcast, the regulatory agency consists of affiliated organizations such as OFTEL, the Broadcasting Standard Commission (BSC), the Independent Television Commission (ITC), and the Radio-communications Agency (RA), while the Office of Communications (OFCOM) was established as a comprehensive policy planning agency. OFCOM is in charge of planning policies relating to promoting competition in the convergent field, consumer protection, content regulation, universal service, and the like.

4.4 Germany

German policy for telecommunications regulation has basically been deployed in line with the integrated deregulation policy in telecommunications, which is aimed at the coming integration of the EU market. In 1989, the postal savings and telecommunications operations of Deutsche Bundespost were spun off from purely postal operations under a new policy of promoting the separation of administrative supervision and business operations. In addition a 1994 secondary reform amended the Basic Act regarding the 1998 liberalization of basic voice service that will be implemented throughout the EU. After the privatization of Deutsche Telecom in 1995, the Federal Posts and Telecommunications Authority was established at the end of 1997 as an independent regulatory agency under the German Ministry for Economy and Technology to carry out all supervisory matters concerning telecommunications, including the granting of licenses. In 2000, Deutsche Telecom lost some 30 percent of its share of the long-distance and international markets as a result of severe competition from new entrants. At this moment, competition in Germany is the most intense in Europe.

With regard to the assignment of radio frequencies, auctions for 3G licenses were held in July of 2000, four months after the UK auctions. Seven carriers joined the bidding for twelve licenses. As a result of Deutsche Telecom policy of applying for multiple licenses, the total brought in by the tenders was DM98.8 billion—topping even the previous record set in the UK auctions—and generating arguments over whether or not a bidding system was appropriate.

4.5 France

France also has pursued deregulation policies for its overall telecommunications market in line with the coming EU market integration, and trends

towards liberalization have been rapidly spreading. In 1996, the *Postal and Telecommunications Act* was substantially revised to liberalize the installation of public telephone networks and the provision of fundamental telephone services. Under the revised act, the Ministry of the Economy, Finance and Industry becomes responsible for planning the regulatory framework and the supervision of FT's (France Telecom) domestic and international operations. In 1997, a new *Telecommunications Regulation Authority* was established as an independent agency responsible for supervising markets, maintaining competitive conditions, mediating conflicts among operators, initiating sanctions, and calculating interconnection charges. This authority has been playing an important role as the regulatory organization for the telecommunications industry.

As for new market-entry conditions, operations are authorized for a period of 15 years as in the United States and an upper limit of 20 percent is set for foreign capital ownership. Although the government decided to privatize France Telecom in 1993, strong opposition by the trade unions has prevented the implementation of this decision and privatization is still pending.

In an attempt to avoid the auction system that resulted in the high bid prices in the UK and Germany, the French government adopted a system that includes a comparative review process for its 3G frequency assignments. As bidders were obviously influenced by thecontract prices in the UK bidding, however, the total tender amounts reached a high of 130 billion francs. Evaluating their service content, deployment speed, and operational reliability determined the final winners. In the end, incumbent operators won the available licenses, andcompetition in the market has not been effective.

4.6 Leadership of the European Union in Convergence

Europe has been successful in developing its economy through moves towards market integration inaugurated in 1993 and the subsequent course of monetary and economic integration. These efforts have been made with the aim of restoring economic activities to a level matching those in the United States and Japan by strengthening networks throughout the EU. As intra-Europe communications networks are essential to the efficient functioning of an enormous European market, *pan-European communications networks* are now being built. In addition, liberalization policies designed to reduce regulations in individual countries as well as the development of European standards to adopt common services and regulatory content in each country are being pursued.

EU legislative organizations include the *European Commission (EC)*, the *European Council* and the *European Parliament*. In particular, the EC plays a core legislative role including submitting bills andissuing directives. A number of directives have been issued relating to the liberalization and harmonization of telecommunications policy. Although the binding power of such legislation is strong, the issue of how to implement these directives is left to the discretion of individual member countries. With the aim of complete liberalization in the union, member countries announced in July 2000 *Legislative Proposal for a new Regulatory Framework for Electronic Communications and Associated Services.*

The purpose of this proposal is to construct aunified regulatory framework for electronic communications networks and services in Europe. The proposal has been attracting attention from the United States, Asia and Oceania, as it represents a regulatory reform that offers the most focused approach in the world in dealing with the convergence issue. Approximately 20 rules and decisions adopted in the past have been integrated into the following six directives. (Fig. 3.3)

(a) Directive on a common regulatory framework. This directive promotes the establishment of new regulations that manage fixed and mobile communications, CATV networks and diverse other communications services under the framework of electronic communications designed to promote future convergence, create new businesses and establish competitive markets. In order to manage the radio spectrum, a *Senior Radio Spectrum Policy Group* will be set up to make proposals to the European Commission on the harmonized use of radio spectrum frequencies in consideration of the economic, public policy, cultural, scientific, technological and social implications related to EU policies.

(b) Directive for full competition. With regard to basic services, the*Full Competition Directive* adopted in 1996 required that the special rights of member countries to limit the number of carriers be abolished by January 1998 with the aim of reforming market entry regulations. The directive further requires that regulations on charging policies embrace greater flexibility following liberalization to reduce cost levels by requiring carriers to set cost-based charges.

(c) Directive on authorizations and licensing. Since 1997, authorizations to provide electronic communications networks and services are granted on the basis of approvals through notification or registration. Carriers are ensured their rights to offer electronic communications services, to negotiate with other carriers for interconnection, and to submit applications for rights-of- way. Measures will be taken to unify the rules for license requirements and license handling fees that differ depending on member

countries.

(d) Directive on access and interconnection. In order to promote the opening of monopolistic networks, carriers are required to provide access and interconnection to other carriers for their respective voice and PSTN services in the EU on non-discriminative, fair and transparent conditions and based on objective standards. For example, carriers providing access to digital TV operators are required to provide fair and impartial services. With regard to the opening of local loops connecting subscriber lines with the nearest exchange, competitive carriers are obligated to provide network access in order to reduce the costs of using broadband communications. Such requirements also extend to the authority over issues related to the separation of accounting practices and price controls.

(e) Directive on universal service. All people in EU member countries have the right to universal service at the same level and the same price. Carriers are required to provide connections to public fixed telephone networks to enable users to access domestic and international telephones, facsimile communications and the Internet. Proposals submitted for ensuring financial resources include the creation of a universal service fund.

(f) Directive on the protection of telecommunications data. The protection of personal data and privacy is expanded from the telecommunications field to also include electronic communications, such as packet data communications, mobile phone numbers, email addresses, and *GPS (Global Positioning System)* locations.

As described above, EU member countries have changed their policy directions from control-oriented regulatory systems to rule setting for building better competitive environments with the purpose of achieving complete liberalization in info-communications systems. The United Kingdom in particular has been rapidly developing market opening measures, thus leading the way in advance of other member countries, including France and Germany. As of this writing, the EU regulatory system reforms for info-communications are at the most advanced stage in the world. However, the EU directive will not become operative unless it is legislated by each individual member country. Thus, it is still unclear what effect it will have, for example, on access to high-speed communication like ADSL, which is not universal throughout the EU community.

5 Frequency spectrum policy issue

5.1 Frequency spectrum

The radio frequency spectrum is a scarce resource. Radio frequencies are used for broadcasting, communication, radar, microwave ovens, and many other things. Traditionally, broadcasting is assigned a broad frequency range due to its cultural and political role. Recently, as new media such as satellite and cable have been used for broadcasting, the demand on the radio frequency spectrum for this purpose has diminished somewhat. On the other hand, mobile telephones have been penetrating very rapidly and are facing shortage of frequencies. Thus, a new policy issue has been emerged whereby the frequency spectrum must be reassigned to meet the new requirements of the information age.

5.2 Market mechanism for frequency allocation

Introduction of the market mechanism has been considered as a way to make effective use of frequency spectrum to cope with the emerging new applications. In the United States, the Radio Law was amended in 1993 to enable government to assign spectrum licenses to operators by means of auction. A series of actions for mobile phone operating licenses was successfully carried out. The market became active and the government benefited financially.

In 2001, the UK and Germany held auctions for the third-generation mobile phone licenses. In this auction, however, prices skyrocketed because every operator fears that without sufficient frequency spectrum, it will not be able to enter the business at all. Both British Telecom and Deutsche Telecom are now burdened by heavy debt incurred in bidding for 3G licenses. At the same time the IT bubble collapsed and capital markets are forcing both companies to severely severe restructure. In the same period, the governments of Finland and Japan assigned frequency spectrum for 3G operators by examination so called "*beauty contest*".

There is much discussion of the relative advantages and disadvantages of both systems for assigning licenses, including a modified auction mechanism to prevent price jumps. This debate shows the difficulty of reassigning the frequency spectrum resources to meet the new industry requirements. However, the spectrum auction policy adopted by the EU is considered to be mistaken to the extent that the price inflation it generated consequently contributed to the decline in telecommunications and promoted the stagnation in broadband and 3-G.

5.3 Digitalization of broadcasting

Digitalization of terrestrial broadcast radio waves is underway as a means to

increase the efficiency of the radio spectrum and allow leeway to increase the allocation to mobile communications. In the United States, digitalization started in 1998 and it is scheduled to be completed in 2006 when analog broadcasting will terminate. Japan should finish digitalization of terrestrial broadcasting by 2011. The technical merit of digitalization is that it will triple the efficiency of frequency spectrum use because digitalized broadcast requires only one third of the spectrum of analog broadcast.

However, in the case of the United States, plans for digitalization seem doomed to fail because of the heavy expenditures required. Broadcast operators have little incentive to make the outlays to transform from analog to digital broadcasting systems since they already enjoy their assigned frequency spectrum. Another reason is the standard for digital broadcasts. Governments initially promoted High-Definition TV as a national industrial strategy, but consumers have not shown much interest. The market remains small and receivers remain expensive.

5.4 New technological solution

Evolution of new technology and emergence of new uses create new obstacles in the existing regularly framework but we must consider the possibility of using new technologies to solve these problems as well.

For example, *spectrum-scattered communication systems* can transmit many communications over the same frequency. *Software-Defined Radio technology* uses a dynamically fragmented frequency spectrum so that frequency spectrum re-assignment is not required. This new technology requires reexamining existing regulations that base equipment approval and licenses on a fixed frequency. The U.S. government offered another approach by for consideration. Licenses would not be based on dedicated bandwidth and all licensees would be obliged to carry IP (Internet Protocol) to enable them to integrate any spectrum for any purpose. We cannot predict what other new technologies might emerge in the future to address these problems.

6 The Proposal for Global Issues of Convergence and Governance

6.1 New regulatory framework for convergence age

Convergence brings *diversification* and *unification* simultaneously. With convergence, operators and business models will diversify while transmission media and regulation of communication and broadcasting will unify. As convergence means convergence creates broader services and industries, the regulatory framework must define industries more broadly. Governance must also include a wide representation of industry interests including finance, transportation, and other industries. UK and EU

have set up various committees consist of different industry sector in the process of policy making. This is one practical way to make policy in the age of convergence.

At the same time, regulation requires greater transparency and accountability because of unbundling and the introduction of the market mechanism. This means consequently the regulation process itself must be unbundled into policy-making, enforcement, supervision, and dispute-resolution, and there must be a mechanism for crosschecking. It implies that diversification of governance is the key feature in the era of convergence. It also indicates that convergence brings new players into existing market.

In another words, the above description indicates the importance of exploiting antitrust law instead of leaning on sector-specific laws. The time it takes to amend specific laws would not allow the system to catch up and undo the bottleneck of competition where converged services and platforms are emerging one after another. Antitrust law has a universal characteristic that makes it applicable to all industries. In addition, the premise of requiring functional-unbundling for governance supports this notion.

6.2 Power shift to users and implications for governance

The previous section pointed out the importance of having various industries participate in the policy making process. It is equally important to include end-users of existing communication services because of the trends toward *network ubiquity* and *distributed technology*. The emergence of a distributed ubiquitous network, such as wireless LAN and peer-to-peer networks, transforms communications from a carrier-model to user- or vendor model. Since the potential of distributed network communications is best developed by users, it is important to have the governance structure include end-users, so that new technology and markets will emerge. Since we cannot fully anticipate the direction of technological development, we must rely on the market mechanism for the selection. Moreover, for the proper development of the market, accession of various new members is required in addition to existing members. One example is the idea of a *Free Frequency District*. This refers to the liberalization of frequency use at the limited layer of the frequency or the district. I believe that this will promote the invention of convergent devices and applications that will realize the ubiquitous-society as well as spread universal service into rural areas just by distributing a frequency that enables approval and usage of equipment to be liberalized.

6.3 Private platform for public use

Through convergence, many platforms will emerge for the information society. As computers and communications converge, these platforms are likely to become de facto standards as well as to be owned and provided by private-sector monopolies. The EU report pointed out that these platforms might become the bottlenecks of the future Information Society instead of such already known bottlenecks as the *CAS (conditional access system)*. Once a platform becomes dominant, it has the character of a public good and this raises such questions as what is the obligation as a public good and how can we judge whether the platform complies with these obligations. These questions remain to be answered in the future. In the process of reaching consensus within such issues, agile and flexible correspondence along with antitrust law are considered the most effective.

6.4 Vertical integration of global firms

Through convergence, the structure of industry will become less vertical and more horizontal, but a better way to describe what happens is a movement toward vertical integration, or re-bundling. Examples of such re-bundling are AOL-Time Warner and Vivendi-Universal. Such re-bundling is to be promoted as far as it creates new value for the consumer, but it also raises the threat that in the long run increasing monopoly power could impede the market. The EU is focusing on this issue as a matter of competition policy.

The new administration in the United States emphasizes a *hands-off policy*, that seeks not to fetter powerful existing enterprises too much and prefers using the power of those enterprises to create new markets. These two policy stances, anti-monopoly and hands-off, seem to be different approaches aimed at the same target, which is to create new markets in the convergence age.

On the other hand, mergers and acquisitions across jurisdiction by global enterprises often create conflicts over the content policy and industrial policy over which each government has control. We currently lack the mechanisms to handle these issues globally. There have been some proposals that developing countries should create a global anti-trust mechanism dedicated developed countries circles.

6.5 The possibility of technological approach

Emergence of new technologies and uses challenges the existing rules and creates new problems, but we must also understand the possibilities that new technology in the same time could even solve the problems as is stated in the previously.

National governments and international bodies have a relatively great inertia and require stability; therefore they can adopt only stable and old technologies. This is one source of many problems in the regulation of E-commerce. We have already described the development of new technologies affecting frequency spectrum policy assignment.

We also must understand the emergence of new technology is not easily predictable and contrivable. How we solve then the problems created by the new technologies, while getting full benefit from new technology? One approach would be to adopt un-regulate policy to a certain extent and another approach would be to experiment approach as much as possible.

7. Conclusion

This chapter dealt with convergence, which will give a great impact on e-commerce. The convergence phenomenon does is not limited only to technology but affects the whole industry. When consider the possibilities of technology, we understand that we are just in an initial stage of convergence and the impact is enormous. Through convergence, various services and industries will emerge to make our lives affluent, but regulation and rules must be reexamined to make it possible.

Our experience shows that we cannot predict the emergence of new technologies and industries. Therefore, a market-oriented regulatory framework is necessary. Governance of the regulation and rule-making system is even more important. The convergence phenomenon tells us that we should have more diversified governance structures and calls for a new global antitrust framework as well as sharing the principles and idea concerning the technological approach.

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