

Regulation Impact on Convergence of Services and Technologies

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Abstract—This paper considers global trends in both sectors of telecommunications and broadcast as well as how the regulation of these two sectors affects processes of convergence of technologies and services. The research has been conducted over entities of various profiles such as International Telecommunications Union, European Commission, international universities, domestic industry and license holders. The results of the research give some interesting conclusions.

Keywords: Convergence, information and communication technology (ICT), Next-Generation Networks (NGNs), Fixed-Mobile Convergence (FMc), Voice - Data Convergence (VDC), Telecom - Broadcasting convergence (TBC).

I. INTRODUCTION

After years of build up, converged services are finally here and they're not just transforming the way information is shared, but they're rewriting the rules in a host of policy-related areas. The main three categories that are subject to convergence are devices, networks and applications, i.e. technology and services.[1]

Converged next-generation networks (NGNs) encompass a range of technological platforms that will support the emerging wave of converged services

Convergence is shaped by the choices made by users, scientists, industry and governments, making it difficult to foresee the details of future developments. However, many challenges could already be seen.

For policy makers, the main challenge is to ensure that the set of legislation and regulations impacting converging sectors complement each other and provide legal certainty. This aims to respond to rapid technological changes in a way that promotes competition, consolidates the internal market and benefits users and citizens. The Convergence paper reviews the various policy issues at stake.[2]

II. CONVERGENCE OF TECHNOLOGIES

A. General Considerations

Many challenges and developments connected to convergence could already be seen or reasonably safely predicted.

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There will be challenges for infrastructure, for innovation, content and management of rights, and there will be challenges connected to competition and business environment, to security, consumer issues and interoperability.

Next-generation network (NGN) technologies are replacing traditional circuit-switched phone networks with a new packet-switched architecture capable of delivering a host of once-separate services – from broadband Internet to fixed, wireless and mobile voice and data, even broadcast television – over a single high-capacity, centrally-managed platform.

For the moment, the answers to these questions are still far from clear. The clearly defined regulation that has traditionally characterized the telecommunication and broadcasting spheres is coming into conflict with the Internet community's values of self-regulation, where content and applications are judged on their own merit and utility to users, and control is viewed as anathema.

The driving sources of technological convergence include: increased connectivity and bandwidth capabilities, advanced software and intelligence embedded in networks and equipment and the increasing use of IP technology.

Most importantly, the digitization of various forms of communications has enabled ICT infrastructure owners to provide voice, data and broadcasting (including video downloads) over multiple types of networks.

Future trends of convergence will reflect in the consolidation of the standards (network protocols, data formats, media types) as well as in systems and companies (industry alliances and mergers) and at the end result in the converged offerings (products and services) on the market place.[3]

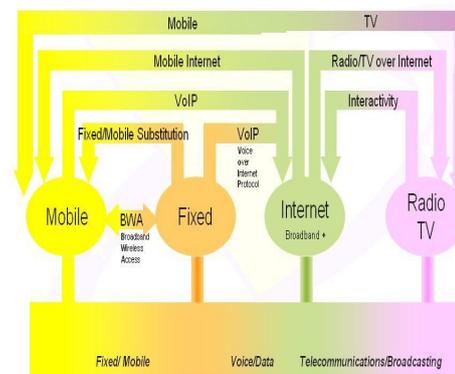


Figure 1. The illustration of trends in communication technologies convergence

The convergence process in information and communication technologies occur on several different levels. Communication categories as fixed and mobile telephony, Internet, radio and TV distribution provide three general types of convergences: Fixed Mobile convergence (FMc), Voice Data convergence (VDc) and Telecommunication Broadcasting convergence (TBc). Therefore in the frame of those convergence processes, the miscellaneous sorts of convergence are taking place. The Figure 1. shows the trends of technologies convergence.[4] The main characteristics and fields of implementation of all three general types of convergence, mentioned above (FMc, VDc and TBc) will be described in more details.

B. Fixed-Mobile Convergence (FMc)

Fixed - Mobile convergence (FMc) is a broad concept that covers various ways of integration of mobile and fixed (wired/wireless) technologies and services.

FMc is being developed massively due to many reasons. However, the efficient provision of FMc is connected to the maturing technologies deployed in backbone and is highly connected to development of NGN.[5]

C. Voice - Data Convergence (VDc)

Voice-Data convergence is based on the service provision using IP technology for data transport through different types of networks.

Consequently, there is occurrence of VOIP over fixed or mobile network, radio and TV programs distribution over Internet (IP radio and IPTV) and finally mobile Internet as very interesting convergence.

Multi play is marketing term describing the provision of different services by organizations that traditionally offered one or two of these services.

A *dual play* is term for the provisioning of the two services: high-speed Internet (ADSL) and telephone service over a single broadband connection in the case of telephone companies or high-speed Internet (cable modem) and TV service over a single broadband connection for cable TV companies.

Quadruple play combines the triple play service of broadband Internet access, TV and telephone with wireless/mobile service provision.

D. Telecom - Broadcasting convergence (TBc)

Telecom - Broadcasting convergence (TBc) integrates radio and TV services over telecommunication IP based networks (fixed and mobile). Particularly significant services in this field are mobile TV and digital TV.

Mobile TV is one of the main challenges that mobile industry faces with demand for increased broadband capacity. That is necessary to distribute video, music, games and other digital content optimally to many mobile users at the same time. In this case mobile terminals can be used for telecommunication and broadcast services everywhere.

Several technological options are available to broadcasters and mobile operators implementing broadcast or multicast technologies. Their choice will be determined by the type of application, development and deployment costs, availability and decisions from regulatory bodies. [6]

Digital TV heralds a seamless convergence of media, telecommunications, and information technology, offering viewers increasingly exciting, informative interactive programming.

Digital TV also permits special services such as multiplexing (more than one program on the same channel), electronic program guides and additional languages, spoken or subtitled.

III. OTHER TYPES OF CONVERGENCE

The convergence may also mean the combination and integration of previously separate end-user equipment, such as telephones, television and personal computer, into a single device. Because of that, following convergences could be defined:

Service provider convergence: multiple types of providers develop capabilities to offer a service that previously could be offered by one type of provider (e.g. cable TV operators employ VoIP to offer voice telephony)

Terminal equipment convergence: Integrated customer premises equipment (CPE) is developed and marketed to allow end users to receive a variety of services that previously required separated terminals (e.g. use of PS to receive broadcast content over the Internet or development of a 3G mobile handset to make cellular voice calls and access to Internet.)

Convergence of modes of delivery: illustrates convergence of transmission platforms or delivery modes, allowing the use of various last mile technologies to offer a variety of ICT services (e.g. using DSL, cable modem or satellite platforms to provide Internet access).



Figure 2. The fields of the convergence impact

Convergence also refers to consumer's perception that one service is substitutable for another.

The potential for change as a result of the phenomenon of convergence can be seen at the three different levels: technology, industry, services and markets. Also, convergence denotes certain regulatory trends such as the creation of converged regulatory bodies responsible for telecommunications, information technologies and broadcasting.

The different fields of the convergence impact to changes are shown on the Figure2.[7]

Convergence creates more competition and generates more consumer choice. It leads to many new business models and impose new regulatory challenges.

IV. CONVERGENCE OF REGULATION

In order to identify the impact of regulation in the area of convergence between telecommunications and broadcasting, and especially in order to assess the effectiveness of establishing convergent regulators, authors conducted survey of the large number of relevant subjects, such as regulatory institutions, operators in telecommunications and broadcasting, as well as a considerable number of major international figures in the field of electronic communications such as ITU, EC, worldwide regulatory bodies (OFCOM, AGCOM, CSA ...), communications consultancy companies (NENA, INA Academy) and relevant universities. This paper presents the results of these studies.

Based on a strategic standpoint of different countries, telecommunications and broadcasting industries have been deployed and developed for completely separate purposes. Hence, the regulation of these two sectors was oriented to different goals and approaches. Goals of media regulation were mainly achieved by protecting the socio-cultural values such as freedom of expression, cultural differences and political pluralism. On the other hand regulation of telecommunications, in essence, achieved goals of economical nature and was based on principles of governing the national telecommunication infrastructure. At glance, it deemed very difficult to tie these two kinds of regulation. However, telecommunications and broadcasting have several mutual features. Both sectors abandoned monopolistic nature and became open for private investments.

Due to technical and economical reasons the existing telecommunications networks were developed separately in the past or in certain exceptions together for some services only. Modern information infrastructure covered traditional voice and data world and broadcast as well. This evolution leads us to linked, i.e. converged networks and integration of services. It is very difficult to distinguish telecommunications and broadcasting nowadays.

All of abovementioned had a great impact on governmental decisions worldwide to consider possibility of merging regulatory authorities in both sectors telecommunications and broadcasting.

USA and Canada established combined regulatory agencies decades ago. It is far more efficient for a state to finance and maintain one instead of two and more agencies. In last fifteen years other countries commenced to establish joined and unique regulatory agencies for regulation of telecommunications and broadcast. It is obvious that more and more countries decide to accept this institutional form of state regulatory body which has the jurisdiction over all forms of communications technologies, including both sectors: telecommunications and broadcast. [9]

In the convergent environment, the non-existence of a convergent regulator enables existence of an unequal regulatory treatment of different platforms in which the content services are overlapping or different regulatory treatment of content provided through any platform. Convergence can respond to challenges of regulator structures and its means of operation.

Especially important is the advantage of a convergent regulator in terms of frequency resources management.

Solutions where a broadcasting regulator manages a part of the spectrum designated for radio-diffusion and a telecom regulator manages a part of the spectrum designated for fixed and mobile telephony, GPRS, 3G and other associated services.

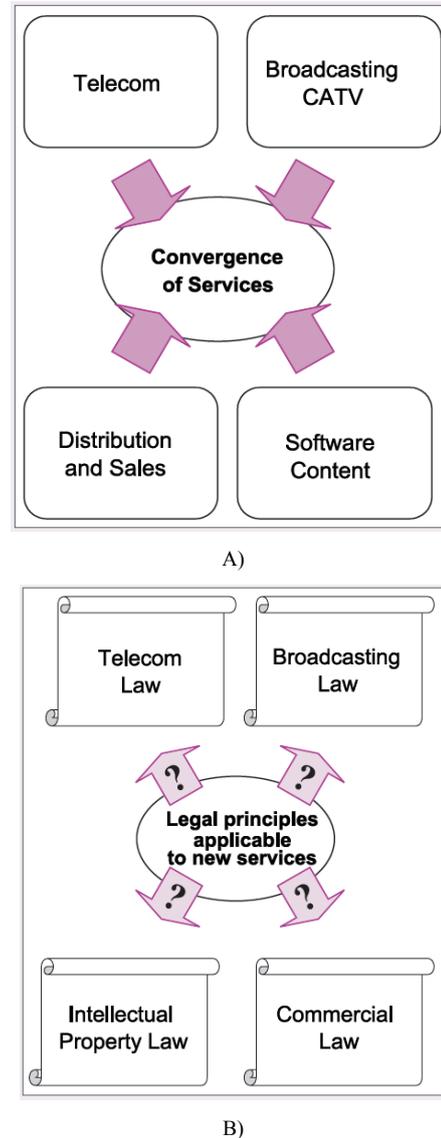


Figure 3. A) The convergence of services B) The adaptation of the regulatory framework.[8]

The Figure 3. A) shows interrelations between services and Figure 3. B) illustrates the link between services in regulatory environment. Thus, in this case the role of the regulator is very significant and may contribute to the successful introduction of the services.

As it has been mentioned before the significance of the converged regulator existence is surveyed over three groups of different subjects.

The first research encompasses the answers from European regulatory bodies on the question: “Whether convergent form of organization of a regulatory body is affecting more positively the development of fields of telecom and broadcasting than separate regulatory bodies?” The result of this survey has shown that 31 regulator have responded positively, 16 of them have responded that the influence is equal for both separate and

convergent regulators, while 14 regulators were in favour of separate regulators. (Figure 4.)

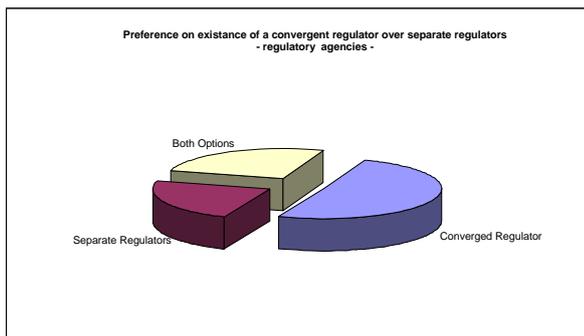


Figure 4. Analysis of answers – regulatory agencies

The second research has been also conducted over 298 licensed telecom and broadcast operators in Bosnia-Herzegovina. When asked if they preferred the existence of a convergent regulator over separate regulators“, 141 licensees have responded affirmatively, 124 responded negatively and 23 subjects have responded that they have no opinion on this matter. (Figure 5.)

The previous results based on answers given by license holders from Bosnia and Herzegovina shows that there is a slight reluctance from these operators towards new trends since they are not ready for the “triple play”.

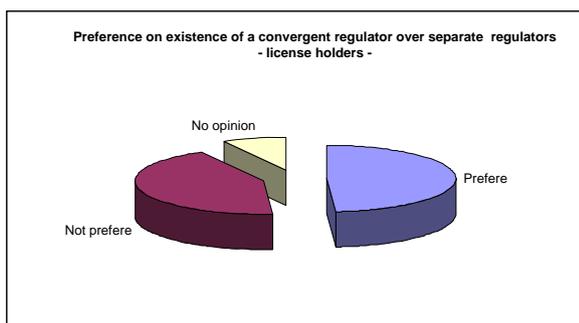


Figure 5. Analysis of answers – license holders

On the question “Which structure of regulator is more efficient for the introduction of European Directives referring to sectors of telecommunication and broadcasting regulation?”, out of 51 prominent experts from the field of telecommunications and broadcasting, IT industry and regulators, 31 have responded that the convergent structure of a regulatory body is more efficient, 5 bodies have had no stand on the issue and 15 of them stated that the form of regulator does not have any significance. (Figure 6.)

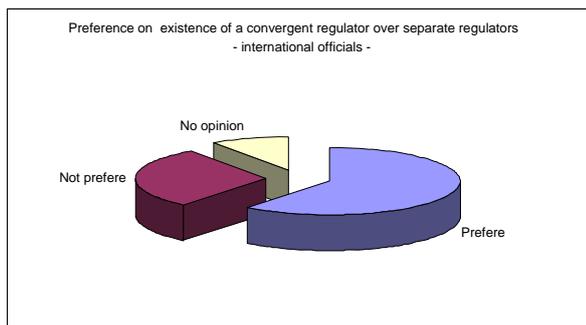


Figure 6. Analysis of answers – International officials

V. CONCLUSIONS

The paper illustrates appearance of the process of the convergence in different areas especially in services and technologies of the electronic communications (telecommunications and broadcast). There is a significant impact of the regulation on the communications market as one of the powers for the national and economic growth. Previously two separate regulatory bodies were responsible for each area but the development of the technologies enabled convergence of the existing services and combining them into several new services (for instance mobile TV).

Studies that are presented in this paper aim to give an overview of the regulation impact of the on convergence of services and technologies and to estimate which form of the regulator is the most efficient and best fits to the market requirements. The results clearly show that the processes of the services and technologies convergence i communications reflect into the structure of the regulator that tends to converge as well. Remarks and experience of the operators on one side and regulators on the other side of the electronic communications market show that converged structure regulators have more advantages and can more efficiently respond to the market requirements in terms of regulation and implementation of the converged services and technologies.

All of that is achieved by common planning and managing of the frequency spectrum, more efficient human resource usage [10] and by better understanding new operators who deliver complex services such as triple play, mobile TV etc. Also, the goal of globalisation is easier achievable by the regulation based on technological neutrality and market orientation, and with the purpose of protection of consumers, strengthening the competition, support for participation of new players and positive influence on economic growth. So, the converged regulators better match to the trends that modern technology and services require and more efficiently follow the implementation of all processes of the convergence.

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