A REGULATORY ADAPTIVE FRAMEWORK FOR MEDIA AND MOBILE CONVERGENCE

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Abstract

The convergence of the media, internet and mobile networks will facilitate the emergence of a new economic feasible model characterized as user centric media creation and consumption environment. The new paradigm will be further pushed by standardization, major critical technological challenges, barriers and issues for the innovative services and devices. New value chains are in the process of emerging the convergence of media and mobile communication. Meanwhile, a new regulatory framework is necessary for the emerging cross-industrial sector. We need to incorporate these core elements and consider of disruptive innovation happens and how we can achieve the industrial transformation into a new emerging industrial institution. The paper argues that using the mobile convergent reference model concept to describe the framework for convergent mobile infrastructure can increase adoption of competing network technologies.

Keywords: Services, Devices, Convergence, New Value Chains, Technology Barriers, Regulatory Framework, Mobile Convergent Reference Model

I. INTRODUCTION

The explosive growth of mobile services over the last two decades has changed mobile communications from a struggling niche market to a fundamental constituent of the global telecommunication industry. However, despite the high adoption rate, mobile technology is still relatively young became a huge success globally, which demonstrates the viability and the demand for a mobile infrastructures.

There are significant benefits that can be realized from converging disparate mobile communication network technologies into a seamless service. Technologies such as fixed telecommunication, wireless fidelity, WiFi networks, Global System for Mobile Communications, GSM networks and space technologies are slowly being integrated to create the concept of a convergent mobile infrastructure with its own unique features becoming a pervasive element of modern society. Currently, the full potentials of communication networks are not being realized due to a lack of technical and economical integration of the various network technologies. After the main technical issues of mobile broadcasting are being solved, now regulatory frameworks and business models seem to be the most important issues to drive the market. Targeting to enable open markets for mobile broadcasting, we observe the frequency, platform, regulatory situation, the implementation of business models in the different markets and countries and analyze the specific approaches.

The study shows that each of the analyzed frameworks has its pros and cons. The regulatory frameworks which differ a lot from country to country have a huge influence on the business models and the implementation speed as they enable or delay the formation of the value chain among the players coming from different industries as media and telecommunications. In most of the countries spectrum available for mobile TV before digital switchover is limited, mainly to one multiplex. So, sharing of spectrum between players is the challenge. Under the analogue world, broadcasters used to have their dedicated spectrum – now they have to share a multiplex with others. Mobile operators enter the market as they own customers to target. The value chain may become much more complex than in terrestrial TV or 3G based mobile TV. After explaining general aspects of business models, this report describes the situation in the analyzed countries. This may help countries being in an initial phase of defining their framework not to run into some obstacles other countries have experienced. During the last years a lot of mobile operators have started streaming based mobile TV services. Although broadcast and streaming based mobile TV service may converge into a single service offer this report focuses on broadcast based mobile TV.

Convergence between broadcasting and telecommunications, which is rapidly transforming the current regulatory and market environment, is now on the way. Technology-wise, convergence of the two has been taking place. What seems to be a real significant barrier to

facilitating such convergence rests on regulatory conflict between the two sectors? Many questions arise concerning the traditionally cherished broadcasting concepts such as: "Has the audience's dependency on broadcasters' discretion to access information and entertainment services disappeared?" (Kim, 2002); and "Does it make sense to continue to view the television as particularly influential and pervasive?" (Arino, 2004). Policy makers along with industries in both telecommunications and broadcasting are concerned with these questions, which relate to dichotomy questions between "competitions vs. public interest". As broadcasting contents transmit over telecommunications networks, the issue is how to combine two different regulatory principles from the two different sectors. In these two different areas, the government role has been equally limited to ensuring a competitive environment with varying extents. Such traditions necessarily affect the way policy is enforced and framed concerning convergent service like digital multimedia broadcasting.

How an alternative way of looking at innovation, offered by the Cyclic Innovation Model (CIM), is capable of coping with the new challenges in innovation. CIM will be applied to a recent innovation called Lucio, a mobile data service offered by KPN Mobile. We emphasize the new insights the model offers, and we show how CIM can enhance the development of future innovations. Although broadcast and streaming based mobile TV service may converge into a single service offer this report focuses on broadcast based mobile TV.

This paper aims to use the business model concept to encourage the technological foresight of a convergent mobile infrastructure. The current business models exhibited by various telecommunication providers are focused on competition, ignoring the huge potential that can be achieved by convergence and co-operation. This problem is inherent in the business models created independently by various actors. There is no consideration for convergence opportunities. Most of the network providers, such as fixed, satellite and mobile network providers that provide communication technologies, are often competing in the same space rather than concentrating on their core capabilities and cooperating to generate sustainable business models in the current harsh economic environment.

This paper argues that the approach by which technical system builders those who design and overcome technical challenges and entrepreneurs those who solve the challenge of how to sell innovative services in the new market place cooperate during the development of wireless networks will make a difference in the diffusion of the innovation and ability of the innovation to survive. Using the business model concept to outline technical actors, pricing models, and technical capabilities provides the vision to design and build the wireless infrastructure with the option to link into similar and indirectly competing technological infrastructures. The literature offers various explanations for deriving business models on mobile networks in an ineffective manner, due to the evolution of the mobile value chain and market structure outpacing the research. This paper aims to address this confusion by providing an integrated view of the evolving convergent mobile markets, and uses the mobile business model framework to identify market actors in order to encourage the business actors to deliver on the full potential of a convergent mobile infrastructure, which incorporates space technologies.

II. RECENT STUDY & TRENDS OF CONVERGENCE AND THEIR INNOVATION IMPACT

Although World is at the forefront of digital convergence trends, there are some important challenges that must have been addressed. Issues like determining technology standard, frequency allocation, and licensing can be relatively simple ones. The more troubling issue may be the conflict between Ministry of Information and Communication and Broadcasting sector (broadcasters and regulatory board). The tension between the two agencies becomes heightening as more new convergence services emerge and as they take an initiative and control over convergence.

Many of the large media company owners are entertainment companies and have vertical integration (i.e. own operations and businesses) across various industries and vertical, such as distribution networks, content production, programming, etc. The broadcasting (and telecommunications market to some extent) structures are aligned with a vertical array with limited horizontal market integration. Four terrestrial television networks dominate and control the production, distribution, and consumption of a specific mass medium business. As a result of vertical integration, television companies control the process of the production and distribution of the industry.

This vertically-integrated media tends to exercise considerable influence at the service and content level and creates incentives for abusive access decisions as regards competitors' access to media markets As many media researchers indicate (Bang, 2004; Kim, 2003), such media within the vertical integrated market use public interest as the justification the cooperation with telecommunication industries.

The second barrier to convergence is the absence of consolidated regulatory authority. Currently there are four different regulatory entities in communications – the Telecommunication Commission, the Ministry of Information and Communication, the Broadcasting Commission, and the Ministry of Culture and Tourism – are competing with each other to take the initiative in convergence. While these regulatory authorities are arguing over DMB, its service on the market had been delayed over two years. The potential uncertain new convergence services straddle more than one regulatory regime. Not only are there multiple regulatory bodies, but also conflicting regulations and licensing authorities. The provision of service is being held back where market players are subject to a number of regulatory regimes or must deal with multiple regulatory bodies, for example, where a network is required to be licensed both as telecommunications infrastructure and as a broadcasting network.

The third factor is a confusing regulatory framework. Related to the multiple regulatory bodies, the absence of a consistent framework on new media adds complexity with the vertical framework, it will be increasingly difficult to handle emerging issues from convergence networks, content and economics to technology. Such issues would involve not only program content issues, but also other issues are interwoven with, for example, economic agenda of rates, technical issues of network interconnections, and regulatory concerns of effective competition and universal service. Reluctance to change regulatory models brings about ineffective legacy regulations and forces unproductive semantic distinction or a static definition-based approach towards emerging technologies. Thereby, multiple regulatory models apply to functionally equivalent services.

We give a broad view encompassing not only product-innovation but also process-innovation, as well as changes in the way new products and services are offered to the market. Altogether, this will lead to new business models.

Increase of bandwidth:

Extending today's bandwidth can be considered as the thread through almost all new developments in the mobile telecom industry. The growing bandwidth largely follows Gilder's law which states that every 12 months the capacity of broadband triples. This trend is illustrated in successive mobile communication standards, starting with 1G for analogue mobile communication (NMT) through to 2G which is the standard for mobile communication today (GSM). We are currently in the 2.5G era, an extension of 2G, having a bandwidth of approximately 25 kbps. Mobile services that fall into this category are GPRS-type of services and 'i-mode'. The forthcoming standard will be UMTS-technology (i.e. 3G). At the start it will have a bandwidth of approximately 380 kbps, growing up to 2Mbps. UMTS will enable to view real video via the mobile phone (Lehr & McKnight, 2003). It is expected that technology beyond UMTS will exceed 10 Mbps. UMTS and beyond are technology push. The trend of growing bandwidth represents new technological capabilities of the communication channel which again facilitates new applications, together defining a range of innovation opportunities.

Unbundling of the industry:

The telecom industry is being restructured, generally coined by the term 'unbundling'. Unbundling has also a close relationship with the decision of firm's to focus on their core business, and to out source all those activities that are to be considered as non-core. The trend of sectoral unbundling shows that innovation in the (mobile) telecom industry is increasingly occurring between different companies that are occupying different positions within the telecom value chain. The combination of different players within the telecom value chain has an important influence on innovation in the sector: innovations are created by external partnerships.

Convergence with other businesses:

The telecommunication sector in general and the mobile industry in particular, is no longer a business on its own but has mixed in many ways with other businesses outside the sector. Particularly, it has developed close ties with the information technology business and the media business. This is reflected in alliances, mergers and take-over between companies from these different sectors, such as the buying of Indian broadcasting company Edema by Spanish telecom operator Telefonica. Another, more recent example is the decision of Dutch grocery Albert Heijn, part of global food company A hold, to sell pre-paid mobile phones in their stores making them a retailer in the mobile communications industry.

Wirtz (2001) mentions three drivers for this convergence-development:

- "Technological drivers such as digitalization, development of intelligent networks, and the technical convergence of media platforms".

- "Deregulation that is cross-sector competition spurred by the liberalization of vertical integration and privatization of former state-owned PTT's".

- "Demand-related drivers as expressed in changing customer preferences such as individualization of customer relations and systematic solutions".

The convergence of mobile communication and Internet also takes place at an individual level where users consult the Internet via their mobile phone. However, the precise course and consequences of this development with regard to the use of the mobile phone in everyday life are still ambivalent and uncertain (Fortunati & Contarello, 2002; Van de Kar & Van der Duin, 2004). The trend of cross-sectoral convergence forces mobile firm's to cooperate with companies outside their own industry to ensure crosssectoral innovation. This type of innovation can be well identified in the Cyclic Innovation Model.

III. ADAPTIVE REGULATORY FRAMEWORK

In most of the countries the regulatory framework for broadcasting is well established. Normally two types of licenses will be granted:

Media license

A media license is granted by national administrations to a broadcasting company. It specifies the regulatory framework for broadcasting the licensed TV channel regarding content and responsibilities. One broadcasting company can obtain several media licenses for different TV channels.

Frequency license

A frequency license is granted by national administrations for providing a broadcast service over a dedicated frequency range. It specifies the regulatory framework for operating and managing the network but also such aspects as coverage obligations. The frequency license can be granted to a single broadcasting company, a consortium of broadcasting companies, a broadcast network operator or any other player. Under licensing aspects, two roles can be identified in the broadcast business model:

- Content aggregation for a TV channel
- Broadcast network operation

In the past with analogue terrestrial TV there was a one-to-one relationship, one TV channel using a broadcast frequency dedicated to the broadcaster or the broadcast network operator. With digitalization the same frequency can be used to broadcast more than one TV channel in a multiplex. Here regulation comes into forces. The question is how to dedicate the capacity of a multiplex to the broadcasters.

A multiplex can broadcast:

Only channels of one broadcasting: company having several media licenses. As in the analogue case the broadcasting company can operate also the broadcast network.

Channels of different broadcasters: In this case the frequency license can be hold either by one of the broadcasters providing broadcast network service to the other broadcasters, by a joint company of them or by a dedicated broadcast network operator. The assignment of TV channels to the multiplex normally is influenced by the regulator. The mobile operator business is coupled to a corresponding telecommunications license bundled with dedication of frequencies for the mobile network operation. Although the mobile operators provide mobile TV services based on their 3G networks, media licenses for the streamed TV channels are not necessary in most of the countries as streaming is not considered as broadcasting and consequently not falling under the jurisdiction of media regulation.

IV. GENERIC MOBILE BROADCAST BUSINESS MODELS

In the literature and in practice, a large number of different approaches to describe mobile TV business models can be found, differing in abstraction level or type of value chain presentation.

Roles and players of the value chain: The following main roles of the value chain have been identified:

- *Content aggregation:* aggregating content into TV channels based on a broadcast license if necessary. This role can be performed by anyone owning a broadcast license, including traditional broadcasters, new mobile TV specific broadcasters or mobile operators.

- *Broadcast network operation:* operating the broadcast network this role can be performed by a broadcast network operator either based on an own frequency license or providing the service for a third party which owns the frequency license. Examples of mobile network operators are TDF in France or Swiss COM Broadcast.

- Mobile broadcast service provision: providing the mobile broadcast service based on a platform license if necessary. The role of the mobile broadcast service provider is taken here to define a service consisting of channels broadcasted for mobile reception. It is a new role in mobile broadcast business and one which did not exist in the classical mobile and broadcast businesses so far. To some extent it can be compared to a cable operator, packaging channels and other packets as well.

- Distribution: providing the mobile TV service to customers and billing/ charging them. This role can be performed by anyone having access to customers. Examples are electronic retail stores selling devices to customers as Media Market, mobile network operators as Orange or Vodafone, access network providers as cable network or satellite operators and pay TV service providers as Canal+ or BSkyB.

- Mobile network operation: providing a mobile communication channel for interactive services as well as for service purchase and protection. This role is performed by mobile network operators as KPN T-Mobile, Telecom Italia Mobile or Swiss COM Mobile.

- Users/customers: Players in the value chain can take over one or more roles.

Digital and mobile convergence research being a multiple level highly intertwined with social, legal, economic elements is shown in figure 1. The key issues covered in road mapping life-cycle include:

• Services

• Devices

• Value chains

• Technology barriers and issues

• Change of regulatory framework

V. CYCLIC INNOVATION MODEL

We have seen that developments in the mobile telecom industry have generated a new commercial environment with (business) processes that cross traditional company boundaries and make

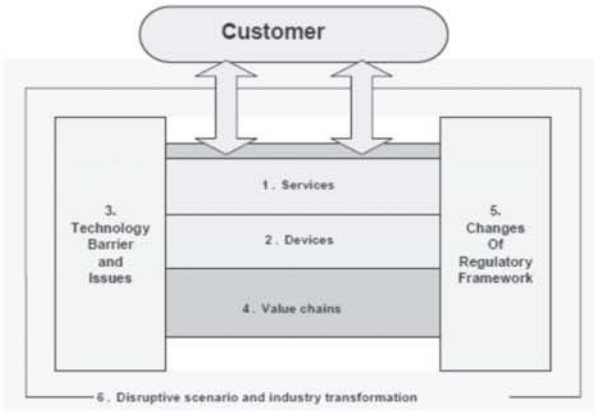

Fig. 1. Roadmap of Digital and Mobile Convergence

combinations across industrial sectors. This means that innovation is developing in a new direction, requiring new concepts. These concepts belong to the fourth generation of innovation models (Niosi, 1999).

The Cyclic Innovation Model (CIM) was developed in the nineties as an instrument for continuous reform that is at the base of ongoing change in public and private organizations. The model describes the innovation arena by a 'circle of change'. It links together changes in scientific insights, changes in technological capabilities, changes in product design and manufacturing, and changes in markets. To this end, the model moves away from the traditional chain concept and represents a circle with four 'nodes of change', connected by four interacting 'cycles of change'. Collectively, they may be seen as the fundament of complex, boundary crossing innovation processes as they occur in open innovation nowadays.

Figure 2 shows the Cyclic Innovation Model visualizes the 'circle of change', linking changes in science (left-hand side) with business (right-hand side) as well as changes in technology (upper part) and markets (lower part) in a cyclic manner.

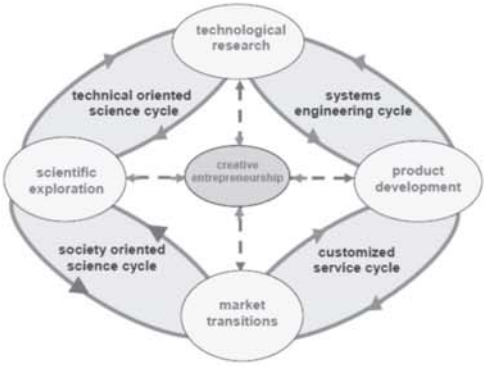

Fig. 2. Cyclic Innovation Model

In the technical-oriented sciences cycle (upper left part of the model) interaction processes occur that relate to the developing of new technology, and input from different scientific disciplines is required to provide a broad range of specialist knowledge in fields such as mechanics, physics, chemistry, biology and informatics (disciplines of the 'hard' sciences): technological research is a multidisciplinary activity. Next, in the systems engineering cycle (upper right part of the model) interaction processes take place which relate to the developing of new products and input from different technological areas is required to provide smart methods and tools for new designs and new ways of manufacturing. These two cycles of change border on each other, having technological research in common.

Today, the engineering cycle is not just directed towards the developing of material products in the traditional fabrication and process industries. In modern engineering the focus is also upon biotechnical products, information products, financial products, logistic products, content in the media industry, games in the recreation industry, etc. Note that material and non-material products may represent components in a complex system, such as a telecom infrastructure. Finally, in the soft sciences cycle (lower left part of the model) new scientific insight is gained into the needs and concerns of society. Input from different scientific disciplines is required to provide a broad range of specialist knowledge in fields such as economics, sociology, anthropology, psychology and law (disciplines of the 'soft' sciences): improved insight in market transitions requires multidisciplinary research. This particularly applies to today's complex commercial processes which aim at creating economic value with new product-service combinations. Since today's markets form a melting pot of technical, economic, social and cultural change, the traditional disciplinary models are not very appropriate in such cases. The Cyclic Innovation Model highlights the dual function of science in innovation: technical and social society.

A fundamental characteristic of the proposed innovation model is that it describes a full circle and not a chain. Science is not to be found at the beginning of a chain and the market is not to be found at the end of a chain; both are part of a perpetual learning process along a dynamic path that has no fixed starting or finishing point. Innovation may start anywhere and anytime. The result is an endless building up of value creation that is realized by the reinforcing cycles of the full circle. In CIM, new technologies (e.g. by the origination of new scientific discoveries) and changes in the market (e.g. by the origination of new life styles) continually influence each other in a cyclic manner. This dual nature of innovation will shape the future.

VI. MOBILE CONVERGENT REFERENCE MODEL

An important element in research of mobile computing is the production of a reference model. Using a reference model in the definition of the business model allows for a consistent discussion of the potential initiatives attributes and features. It structures the discussion in a way that characterizes the view of the system as seen by the user and the view of the user as seen by the system. The dimensions of this reference model _ include the following layers: Application layer, Program layer, Network layer and Device layer. The purpose of the reference model was to provide the ability to describe, with consistency, each proposition from both a business and technical perspective.

Device Layer : The device layer is the first layer of the reference model, all interactions with the voice or data services are through this interface. This layer deals with the issues such as the user interface, navigation and device software. Some example devices are: Voice Centric VC devices: The primary purpose of these devices are voice services, they may also have radio or music players. Smart phones: These devices have voice, data along with Personal Information Management PIM capabilities.

Network layer : The second layer of the reference model is the transmission backbone involved in communications, including transportation, transmission and switching for voice and data. The GSM 2.5G,3G, satellite and WiFi networks have the bandwidth to support wireless data applications and provide mobile internet access. This is fueling the demand for innovative mobile internet data applications and services.

Program Layer: This layer deals with the issues of security, business logic, systems logic, data management issues and integration of the devices from the applications.

Payment Layer: This layer describes the payment model to be applied for the service. The method for collecting the payment from the subscriber should be explicitly stated when defining the proposition by all parties to allow the revenue share model to be agreed. This layer will feed into the financial part of the framework. Examples of payment models include: terminating short message service, subscription, premium short code, pre payment model and event billing.

Application Layer: In today's environment of wireless applications systems most of a system's components are acquired ready to be installed via systems configuration. The applications layer represents the explanation of what services will be available to the user.

The portion of the framework concentrates on describing the complexity of the innovation required to fulfill the initiative. This task is very subjective and only provides an indication of what needs to be done on a technical level. The next element in the framework asks the business owners to consider how the work should be coordinated and managed. Using the technological infrastructure to provide business value, sustain competitive advantage and enable novel and adaptive organizational forms is well recognized by practitioners and academics. The management of end-to-end processes for acquiring suitable products and partners and identification of the skills and competencies that are required is the role of the lead firm in the value chain. The co-ordination of the various actors means the broker in the chain must have a full view of all the activities performed by the independent actors. For example, a location sensing application can potentially incorporate the following actors: mobile network infrastructure, content providers, content developers, content aggregators, hosting providers and application platforms. The role of a broker in the value chain is a colossal task, which is normally carried on by the actor responsible for managing the customer relationship.

A few key features and functionalities of Wireless Integration solution: A single number is used for both desk phone and mobile phone, regardless of which number is called. A common dialing plan and feature set for both office and mobile environments creates a more cohesive experience for the end user. Dialing is simple. It doesn't require calling an enterprise access number first or setting up a data session. Calls can be seamlessly and transparently moved between mobile phone and desk phone. All messages go to a unified voicemail, regardless of whether a mobile phone or desk phone is called. All mobile call tracking and logging is done with Unified Communications Manager. If an employee leaves the company, the phone number; a valuable but often unappreciated resource remains tied to the business.

With the seamless integration between the wireline and wireless environments, workers were able to provide only one number, thereby simplifying the process of reaching a representative as well as protecting a corporate asset the phone number from leaving the company when a representative resigns. The integrated voicemail, simplified extension dialing, and ability to be available for calls with the flexibility of using either desk or mobile phones improved worker satisfaction.

VII. CONCLUSION

Convergence has changed the way in which news is made. Digitization and technological convergence mean that the boundaries of media platforms are easier to cross. Content can easily be shared between journalists making news for television, radio and the Web. Media organizations increasingly integrate production for different media platforms, in order to encourage cooperation between desks. The main purpose of the present article has been to identify gaps in media studies as regards cross media production and presented a vision of the future of mobile communication, which is a convergence of mobile, fixed and satellite technologies to create a truly convergent mobile infrastructure. The environment creates new business opportunities, which can be realized by using appropriate business modeling techniques to identify viable propositions. The vision of a mobile convergent infrastructure is simultaneously a social and technical concept in that the success of the technology depends both on understanding how the system can be built how the disparate wireless networks can be integrated to harness the technological potential. The social aspect deals with how to make the proposition attractive to new customers creating viable business models beneficial to the various business actors and customers.

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