Regulation of Wireless Stakeholders

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Abstract

The wireless communications sector is a heavily regulated industry area where regulatory authorities have remarkably much power in defining the market dynamics. It has been widely debated which amount of regulatory measures are necessary without having too much distorting effect on healthily working free markets. However, regulation is usually reasoned merely by economic arguments, overlooking entirely the social aspects involving. This may hamper the technological adoption and even prevent operators from creating user friendly handsets. The proceeding media convergence has also brought a new class of entrants, some of which hardly resemble conventional operators, which is making the regulatory crafting and enforcing gradually more challenging. This paper addresses a number of currently ongoing issues and gives a brief overview on the wireless telecommunications regulation, finally discussing about which kind of impact this may have on business, both on the EU and the US resolution.

Keywords: regulatory frameworks, handset subsidization, telecom wireless regulation

1 Introduction

Regulator takes the role of a social planner in welfare economics. This entity is almost without exceptions some governmental authority. Merely the scarcity of resources gives a well-rounded reason for regulation – this is the case especially when it comes to political questions such as spectrum allocation – but regulators also have a crucially important role in controlling the competition and technology base renewal.

Through regulation, societies aim at ensuring fair competition and reasonable customer pricing. From the regulator's point of view, the problem is to maintain healthy markets while keeping the number of direct interventions and operator incentives to get around the regulations minimal. Regulators are also needed for reducing the lock-in effects experienced by customers and assuring that markets stay open for new entrants.

Mobile services industry belongs into the category of high-clockspeed industries, where technology, markets and organizational structures are in constant change. In this light, making mistakes when introducing regulatory frameworks into national regulatory may have dangerous, long-time effects on the whole industry.[13]

The paper focuses on the current regulatory status of telecommunication industry both in the Europe and the United states. A few currently debated special regulatory issues such as handset bundling and provision of wireless services are being discussed.

The material presented has been gathered through a survey on recent reports and presentations in Telecommunications Forum 2006.

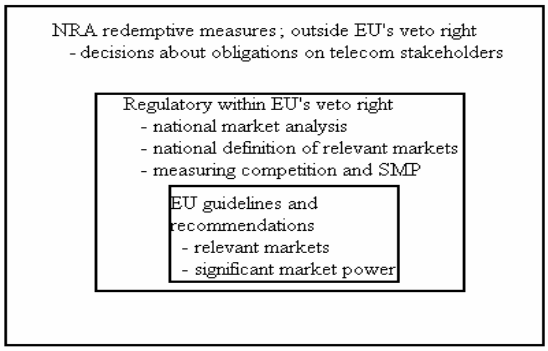

Figure 1: EU regulatory framework illustrated

2 Regulatory overview

2.1 Europe

In the European Union, the most central aim of regulation is at promoting fair competition, assuring consumer rights and driving technological neutrality.

The telecom policy creation works on the centralized basis and the enforcement of these policies has been empowered to national regulatory authorities (NRA). The Commission crafts and provides both recommendations about relevant markets and guidelines on performing market analysis and assessment of Significant Market Power (SMP). It can also use veto over the national authority, when it's necessary for bringing the local regulation into equilibrium with the definitions set by the Commission – this especially applies when analyzing competition and assessment of SMP, but actual redemptive maneuvers, such as imposing obligations on operators, is left to NRAs (see Figure 1). This way, NRAs convey the European level directives and modify those to better fit on the national level. The national conditions must naturally be taken into consideration.[6]

For instance, introducing some mobile peer-to-peer services may be impossible in Spain since outlawing the unauthorized p2p file sharing with intellectual property law in June 2006, making downloading content even for personal use a civil offense and forbidding service providers facilitating unauthorized downloading.[12] The typical situation in Europe is, however, that the telecommunication regulatory is lagging one step behind the technological pace.

2.2 Finland

Finland follows the legislative framework constituted by the European Union. The responsible organization and the local national regulatory agency is Ficora. It supervises all the local telecommunication activity in Finland and works as the enforcer of general European level directives.

The European regulation obliges those network operators characterized with Significant Market Power to share part of its network resources with other incumbent players for a fair price. Moreover, the roles of network and service operators are strictly separated and the operators need to take this into account by keeping separated accountings on all these operations. They are also required to provide updated public information on the network access prices.

Standardization and advancing technology are pushing consumer prices low, enabling new operator opportunities for service provision. According to Ficora forecasts, Finland is undergoing a transition towards the 'ubiquitous society' where one is able to live seamlessly connected to public information services, independently of time and space.[5]

Currently an important regulatory issue in Finland is related to 3G contracts and customer rights: in which conditions are operators obliged to end the contract with a customer? The legal status of customers is yet partially open in Finland, where the sales of 3G handsets have just launched. Authorities are still gathering user experiences, thus it is too early to make conclusions yet.

The operators who had monopolistic status before market early 1990's market liberalization seem to have a competitive advantage now; seemingly the vast size and existing network infrastructures with existing customer base have been benefits, facilitating the vertical integration. However, in the end, competition seems to favor large international telecompanies, which are attaining foothold also in Finland. Economy of scale is clearly visible in future telecom business. It is regulators task to ensure that the new entrants will have a fair chance to share the area with already incumbent players.

According to Ficora forecast, by the year 2010, the main access technologies utilized will be IEEE 802.11 (WLAN) and 802.16 (WiMAX), but they will form the primary access technology merely in scarcely inhabited frontier areas since their customer efficiency is not able to match wired lines in high data transfer rates. However, WiMAX is expected to play a substantial role as a backhaul technology and a substitute to long customer access lines.[5]

The existing data access technologies will be complemented by UMTS, Digita 450 and UMA (Unlicensed Mobile Access) along with various PAN- and UWB-solutions, rendering the circuit-switched network gradually insignificant.

2.3 The United States

The most prominent feature in the US regulation lies in fact that there are clearly separated regulations on different technologies. Telecommunications Act revision from the year 1996 makes a clear distinction between conventional voice telecom and data communication networks. For instance, while Federal Communications Commission (FCC) applies layered regulation hierarchy – that is, federal level, state level, municipal level – on most technologies (such as PSTN), Internet is considered to be under federal control.[6]

The responsibility for law creation has been centralized upon one federal organization. Given the vastness of local markets, this may lead to inflexibility in law creation and prolonged reaction times during times of change.

Comparing to Europe, there is also a huge cultural difference in overall trust on government and authorities. In the United States people tend to be generally more suspecting towards government than corporations. For this reason, collecting personal data for usage statistics tends to be challenging.[6, p. 24]

3 Operator definition

What is an 'operator' by definition? In the days of analog communications the question had an easy answer, but nowadays the sector is undergoing the convergence of different media.

The quick commoditization of IEEE 802.11x based technologies and service concepts – this is concerning especially wireless broad-bands – is now forcing the regulators to move their focus on them. Especially relevant is the question: which of these emerging services belong to the public services category and which do not?[8]

An entirely new class of incumbents and third party operators has emerged and gained foothold in the sector. This also concerns digital television operators plus those operators willing to stream their digital media on various new generation wireless platforms.

In the first place, the matter of consideration is whether the deployed service fulfills the criteria of public telecommunications or not – for instance, public city

WLAN hotspots clearly fall into this category since they can be accessed by anybody; wireless connection offered by a café to its customers certainly does not belong into this class because of its restricted user domain. Therefore, very often the case is that regulations must be devised case-by-case. While applying the license, a stakeholder must be able to guarantee the efficient usage of spectrum usage, without environment disturbing effects.[3]

In regards of national communications regulation Finland is a pioneer; unlike many other European countries where the regulation is targeted at a few major players, Ficora currently supervises more than 60 operators and other entities.

This can be actually seen as the reason why Finnish regulation has been criticized for its heavy foot of bureaucracy; in the March 2004 the investment bank Credit Suisse First Boston gave a recommendation in their report not to invest in TeliaSonera due to the over-zealous attitude of the regulatory authorities in Finland. [9, p. 13]

4 Handset bundling

The European handset market has conventionally been heterogeneous when it comes to the telecom consumer market legislation. The prohibition of subsidization was earlier justified by preventing any big operator getting unfair advantage in competition.

When discussing about handset subsidiaries, the objections usually arise from the mouths of anti-monopolists and concerning economical questions; under the fire are without exception either the market distorting effect or tying or bundling being as an instrument of market monopolization by inducing churn from other operators customer bases.

Tying or bundling issues are conventionally seen as a tool of competition, ignoring the social effectors completely. However, since the handset always functions partially as a complement to the network it's connected with, it has been suggested that the beneficial effect which handset bundling can have over the social utility function may be much larger than earlier thought and thus subsidization can actually work as a driver of common welfare instead of serving merely operator interests. Because the investments put into handsets can substantially lower the required investments into the rest of the network, the operators have a well-reasoned incentive to seek to affect the technology used in handsets. Pre-configuration of the sold handsets could also have a beneficial effect on customer experience.[7]

After legislation of handset bundling, the mobile industry in Finland is probably undergoing a transition from horizontal market-driven markets towards vertical, integrated configuration markets, bringing Finland much closer to other European countries.[13]

The handset bundling may be a crucial driver for data services adoption, given that the handset penetration is large enough, customer profile distribution appropriate and the offered services exhibit network externalities of significant scale. Also the multi-access technologies such as UMA (3GPP GAN), which enables dual access into both GSM and 802.11 networks, may bring the data adoption forward and help to foster mobile-Internet usage.

The European Commission is currently imposing a heavy pressure on operators to decrease roaming prices, which currently consist as much as 10-15% of total operator revenues, still corresponding ~2% of aggregated traffic in operator networks. This drives operators to seek alternative sources of revenue from, among others, data services (which in part are crucial for adoption of 3G services).

Handset bundling is now a common practice almost everywhere in the European area. Finland opened the markets for focused bundling on 3G handsets in the March 2006. According to Ficora, the act is not expected to cause a dramatic effect in the handset markets, but besides giving an alternative to customers, it gives a huge boost to telecommunication services markets. The experience has shown that end-users are willingly adopting the new services when bundled together with terminal equipment.

This leaves Italy as the only member country in the European Union still prohibiting handset bundling. Though SIM-locked handset sales are usual there, no contractual customer commitment to subscription is required and therefore the criteria of bundling is not met.

In the United States, the Federal Communications Commission affects the service providers by imposing regulations that cannot be met without directly affecting to the technical characteristics of handsets.

Data adoption in Finland is growing slowly, but still lags far behind other countries (see Table 1). The main reason for this has probably been the lack of services. Finland is currently allowing 3G focused bundling, in contrast for instance with Japan, where so called *strong bundling* is prevailing. Strong bundling means that a mobile operator has full control of both handset and service markets. Subsidization of heavily discounted or even free handsets to the customers is expensive to the operators, but probably pays off by lower churn rate due to the contractual subscriber commitment for a fixed period.[8]

Much could be perhaps learned from Japan, which has significantly wider adoption of data services, mostly because of successful services provision: i-mode from DoCoMo, complemented with EZWeb provided by its main competitor KDDI and J-Sky from J-Phone are used by over 80 million people (as of June 2006).[9]

The strong popularity of data services in South-Korea, however, cannot be explained by subsidization: the

handset bundling was banned in year 2000. Despite this, the penetration of mobile Internet ranks top of the world.[11]

The wireless Internet usage seems to be growing remarkably fast in the USA, jumping 75% from the end of year 2005, likely to exceeding $15 billion by the end of this year.

Table 1: Subsidization types and data usage by countries

Country	Bundling	SIM lock	Data usage
Finland	3G	3G	low
Italy	banned	yes	low
Japan	strong	yes	high
South-Korea	banned*	CDMA	High
USA	yes	yes	medium**

* Subsidization with obligatory subscription allowed until 2000

** Strong +75% growth in usage from the year 2005

Concluding the details presented in [Table 1], a single factor that would explain the great difference in data usage cannot be found.

5 Business impact

What kind of effect regulator has on existing business models? Could some business models be dependent of the operator definition? Could permitting of handset bundling predict some new novel ways of usage in 802.11 technologies?

Under the legislation allowing handset subsidization, the operators have now a possibility to equip the sold user terminals with their own software, to facilitate usability and greatly enhance the user experience. The fresh statistics from Finland tells that by the September 2006, the total fraction of sold mobile terminals has climbed to 30%, indicating that handset bundling has indeed accelerated the sales of 3G terminals as predicted.[3]

Since WLAN capability is a commoditizing feature in handsets, handset bundling may enable interesting opportunities like Voice on WLAN (VoWLAN). Given a terminal with multi-access feature, it is easy to see that some operators might be keen to provide customized hotspots with Internet-voice property. At least two proposals exist, 3GPP GAN using its own UMA (Unlicensed Mobile Access) protocol and a SIP-based alternative, Alcatel IMR (Intelligent Mobile Redirection). Alongside WLAN, the access point can also utilize Bluetooth.[1]

From network operators' point of view, here is an incentive problem: why to deploy a technology that could potentially cannibalize revenues by allowing customers to connect more cheaply?

For customers and service providers the situation will be good. Bundling multi-access technologies will bring new interesting business models, such as providing on-line dating with voice connectivity. Also, commoditizing WLAN could benefit hotspot aggregators and those companies wishing to build larger hotspot networks. For smaller operators, the question whether or not to belong into the category of public service providers is crucial. In the European area, being classified as such would mean imposed obligations reserved on normal network operators.

Problems also reside in fitting together several different authentication, authorization and accounting (AAA) protocols and billing systems. Different privacy and security issues, not to mention the distinctions in used protocols (WEP, WPA, 802.11i) also raise concern.

5.1 Subsidization enabled service models

Apart from giving the operators relatively free hands to affect to the software in handsets and thus improving customer experience, handset bundling also allows the handsets to be subsidized with different compositions of services. Below is presented one possible service composition classification.[2]

1. *Portal focused service bundling*

   Enables access to wide collection of information, entertainment and transaction services. The content providers may be third party content providers.

2. *Community focused service bundling*

   Enables chatting, gaming and profile matching, as well as on-line dating and presence sharing services.

3. *Transaction focused service bundling*

   Enables varying kind of monetary transaction services, such as: mobile banking, stock managing, mobile insurances and quick loans.

4. *Content focused service bundling*

   Enables information, location, reporting on tasks, audio-based tours, newscasts services

5. *Interaction focused service bundling*

   Enables user access to professional information of some area: mobile doctor consultation services, different emergency services

The core offering concept, as well as pricing and value chains may greatly differ in all above mentioned cases. The general idea here is to provide customers with the services which have conventionally been accessible merely outside the mobile world.

5.2 Operator definition enabled models

Alongside with the declining prices in wireless technology, new business models are likely to enter the market. As noted earlier, there is a substantial significance whether the operator is considered as network or service operator. For municipalities and non-profit organizations it is comfortable to belong into the latter category. Shubar & Lechner (2004) have recognized 14 interesting major business models which may be enabled by public WLAN business.[10]

1. *Fully Integrated Operator*
2. *WLAN Service Provider*
3. *Relationship Management ASP*
4. *Access Provider*
5. *WLAN content provider*
6. *Network Planning*
7. *Reseller*
8. *Internet Service Provider (ISP)*
9. *Small Local Operator*
10. *Venue Access Provider*
11. *Venue Access Provider w/o sales force*
12. *Point-of-Sales Reseller*
13. *Private Access Provider*
14. *Site Rental*

The fully integrated operators seek to control whole value chain, starting from the infrastructure building. Such a model favors large companies. Also business models targeting at network planning and deploying deal with infrastructure building, but these models are not in parallel with actual operator activity. Owning an infrastructure could also optionally come into a question for entities providing internet access.[10]

Smaller players usually belong into the service provider category, unless they are considered also to fall into the class of public service providers by the regulator. Alongside with the most obvious models, the small player category may also contain POS resellers which sell e.g. pre-paid cards or service contracts for integrated operators or WLAN service providers at point-of-service, private access providers which either offer a free access or access based on a roaming agreement, and finally there may be private actors that make their revenue by renting their sites to bigger service providers.

The nature of WLAN business is such that recognizing single companies' business model may be problematic. Regulators are already aware of this fact, especially in Finland.

6 Conclusions and future work

This paper delved into issues concerning contemporary wireless stakeholder regulation and its long-term effect on business, as well as the impact which it (sometimes inadvertently) has on the escalating 3G/WLAN business.

Under the constantly increasing pressure exerted by the European Union and by steadily dwindling average revenues per user (ARPU), the operators have now a good incentive to substitute the declining roaming incomes. Indeed, they are zealous in seeking new sources of revenue and business models from value-added services business.

A major observation is that regulator has remarkable power in defining the market behavior. In Finland handset bundling has proved to be an effective driver of 3G adoption. Thus, one could claim that the decision to permit focused 3G subsidization was a successful move. It has opened doors for services markets as many economists anticipated. Moreover, commoditizing WLAN is giving room for completely new business models, some of which are yet neither easily recognizable nor applicable.

There is no single explaining factor why data usage has been adopted much widely in South-Korea and Japan than in the European countries. The reason might be found after solving the complex interdependence of various factors relating to mobile penetration, network externalities and flexible regulation combined with handset bundling and carefully designed services.

By the commoditizing WLAN hotspots and media convergence, the functioning of different regulatory-setting organizations is becoming one magnitude more challenging – there is no general recipe to apply, the national regulatory agencies must proceed case-by-case when granting licenses.[8]

On the European level, the Commission is seeking ways to make regulation more efficient; currently a substantial amount of time and resources is bound in the work of national supervision. The most important goals in near-future are in bringing the national regulations more close to those defined in Lisbon Summit, both by removing the specific bottlenecks of legislation and promoting fair competition and innovation on a national level. This will be obviously remarkably challenging task due to the non-homogeneity of European markets in regards of culture and geography.[4]

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