Body of European Regulators for Electronic Communications

BEREC

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BEREC report on convergent services

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1 Introduction and scope of the report

1. Convergence is becoming an increasingly prominent topic, with more and more convergent offerings being launched to the market by electronic communications operators. Convergence will increasingly have an impact on the way competition and regulation is understood, affecting a wide range of players (incumbent and alternative electronic communications operators, agents active in related sectors of the economy) as well as regulators.

2. Generally speaking, convergence can be described as the technological improvements by which a number of networks arise with enhanced capabilities to provide multiple services. This implies, at the same time, that one service may be provided over a number of different networks.

3. In the past, BEREC has dealt with issues arising from convergence, with a focus on fixed-mobile convergence[1]. The purpose of this report is to have a wider look at recent trends regarding convergence, and discuss potential implications for regulatory policy. This report does not consider the imposition of remedies in order to solve any possible problems resulting from convergence.

4. Convergent issues are closely intertwined with other prominent topics, such as bundling. On this specific issue, BEREC has carried out extensive work in the recent past[2], and is currently preparing a report on the impact of bundled offers in retail and wholesale market analysis. In order to delimit the scope of the latter report as compared to this report, for the purposes of this work it will be assumed that bundling is namely a commercial practice, whereby an economic agent sells two or more services together, as one combined offering, at a joint price[2]. Convergence is more closely related to the technological developments that are inherent to the provision of multiple services by the same economic agent.

5. It should in any event be acknowledged that there are no “bright lines” or “rules of thumb” between what may constitute bundling and what may be a convergent offering: a commercial offer can be both things at the same time. In fact, convergence brings better prices and innovative offers to consumers, a trend that is closely related to bundled offers. In some of the examples reviewed later in this report, convergence has enabled bundling of products.

6. Last, it is also worth noting that – as it is the case with other topics that have also been addressed by BEREC – the implications of convergence may be different for the residential segment and the business segment. In this regard, the focus of this report is on the implications of convergence for the residential segment, although when necessary reference will also be made to the implications of convergence for the business segment. In any event, reference is made to BEREC’s specific work on the provision of electronic communications services to the business segment[3].

[1] Report on fixed-mobile convergence: implications on competition and regulatory aspects, ERG (09) 06.
[2] See Report on the discussion of the application of Margin Squeeze tests to bundles, ERG (09) 07; Report on Technical Replicability of bundles, ERG (09) 49 Rev1.
[3] See in particular the recently launched Public Consultation on the BEREC Report on relevant market definition for business services, BoR (10) 46.

2 Evolution of communications services

7. This section intends to provide a descriptive overview, aside from market definition issues, of recent trends by describing convergent services that are currently available on the market.

8. The services are classified depending on whether (i) the services did already exist but they are now also provided through technologies that are distinct from the traditional ones; (ii) the services are enhanced versions of previously available services; or (iii) they are new services.

2.1 Existing services provided over different networks

9. Convergence has allowed economic agents to provide already existing services through different technologies. Fixed voice is probably the service that is most affected by this trend as mobile operators have entered in the market by using their own networks. In addition, broadband protocols are also being used to provide this service, especially in the business segment, while – depending on the countries – this feature may still be considered to be emerging in the residential segment.

10. Mobile broadband is increasing its penetration rapidly, in some cases substituting fixed broadband. At the same time fixed broadband is also being used as a complementary technology to achieve full coverage in households by mobile operators. Finally, television, either pay-TV or free to air, is suffering an important transformation as traditional technologies for broadcasting (terrestrial, cable and satellite), have been supplemented with broadband accesses. These connections ensure high quality TV channels, including high definition services.

11. In the paragraphs below, the services implementing the outlined trends are briefly described.

2.1.1 Convergent services for fixed voice services

12. Nowadays, fixed voice services are being provided over multiple technology platforms that are different from PSTN, mainly via the use of mobile networks or fixed broadband connections. This fact has allowed the emergence of new service providers, increasing the variety and quantity of fixed voice services as well as reducing prices. In addition, this technology has allowed customers and alternative operators to bypass the traditional access provided by incumbent operators.

13. VoIP Services: traditionally, voice services have been offered over the PSTN in narrowband. The first signal of convergence appeared when cable networks and local loop disaggregation allowed to offer fixed voice services using VoIP technology over broadband connections on managed networks, allowing calls from and to E.164 addressed users[4]. Later, technical evolution and increasing broadband throughputs allowed voice services from and to E.164 addressed users on best effort networks like Internet.

14. Business VoIP services, offered by different economic providers, are mainly dedicated to establish data communications systems, using VLAN (Virtual Local

[4] E.164 is an ITU-T recommendation which defines the international public telecommunication numbering plan used in the PSTN and some other data networks.

Area Networks), traffic management, integrated voice and data communications, communications security systems, etc.

15. Home-zones allow the end-user to make and receive calls using a mobile network at a fixed location and being charged a fixed tariff[5]. The service is a fixed service at "home" and a mobile service outside the homezone area, that is, when the end-user is at home he can make and receive calls as if using a fixed network, while when the end-user is outside of the area drawn up by the BTS(s)[6] defined as "homezone", he is able to use the same terminal as a mobile phone, thus being charged a mobile tariff.
16. Another way of offering this type of convergent services is via a combination of Wifi access points to offer fixed voice services with reduced tariffs, with a mobile network with mobile tariffs being used outside such area.
17. Different examples of this type of services include:
    a. the creation, by means of the UMA architecture[7], of a homezone within the coverage of a Wifi access point (AP), so that when end-users are under coverage of this AP, they can make calls by means of a Wifi/GSM UMA dual terminal.
    b. the development of applications which allow to call via the Wifi-network and to switch to the GSM- or 3G-network depending on where the user is. In this scenario, WLAN is used to route calls via the internet as a primary function, and the wireless carrier network is employed if the WLAN is not present, as a secondary function[8].
    c. the use of a Wifi mobile phone, with specific software provided by the operator. Users have a nomadic numbering which allows them to make and receive calls in the Wifi zones (home, airports, etc.).

2.1.2 Convergent services for mobile services

18. Technological advances are providing new solutions, such as femtocell devices, that allow offering mobile services using whatever kind of broadband access, and improving, from the very first moment, mobile indoor coverage. Examples of this kind of services include – through use of the DSL line - installation of femtocell-kind devices which provide indoor 3G coverage both for business and residential clients. These services support a specific number of devices, and allow (up to a certain limit) for simultaneous access by various users.

2.1.3 Convergent services for Internet access service

19. Several products offer Internet access over different wireless technological platforms, increasing the variety and quantity of offers for consumers to browse without the need of a wired landline.
20. Different examples of this type of services include:
    a. provision of internet connections through a specific router, while offering mobile broadband connection (HSDPA) using a USB modem.

[5] Or a tariff that is similar to a fixed tariff.
[6] Base transceiver station.
[7] UMA (Unlicensed Mobile Access) is a technology that provides access to GSM and GPRS mobile services over unlicensed spectrum technologies such as Wifi.
[8] The service is based on the IMS/SIP protocol.

b. most of mobile providers in Europe offer broadband services via 3G dongles. With this service, customers can connect their devices (typically, laptops) anywhere under coverage.

c. another wireless technology deployed is Wifi access points, which are offered by Wifi providers and mobile operators (usually complementary to 3G dongles, some of them being provided via portable Wifi dongles).

2.1.4 Convergent services for TV services

21. TV services have been broadcast traditionally by several means: terrestrial air frequencies, cable and satellite networks. Nowadays, TV services are converging over broadband technologies using managed networks like DSL or mobile networks, and unmanaged networks like Internet. Also, TV providers are combining traditional TV reception with user's broadband connections to provide content over the Internet in an open or dedicated way.

22. Over DSL/FTTx networks, operators deploy a platform to offer IPTV services. These services are sold mainly as a bundle with broadband (DSL) services. Prices depend on the number and type of channels chosen; also VoD and PPV can be made available. End users have to use a set-top-box to watch content in their TV sets.

23. Over mobile networks, operators have reached agreements with TV platforms to offer TV services over 3G, thus including a set of channels. This service is not a DVB-H service, so the only requirement is to have a 3G mobile phone.

24. Over Internet networks, there are two models available: (i) TV sets that can be connected to the user's broadband, and (ii) configured set-top-boxes from IT companies. The following are examples of these type of services:

    a. TV set providers are offering equipment that can be connected to the user's broadband to select content on-demand such as video, music, and widgets[9] from several providers without any PC.

    b. Google TV combines traditional TV with Internet. The user has to connect its set-top-box for Internet to Google's set-top-box, which is connected to the TV set.

    c. Apple TV is a digital media receiver designed to play digital content from (i) some Internet sites such as iTunes Store or (ii) any Mac OS X or Windows computer running iTunes onto a TV set.

2.2 Enhanced services

25. Electronic communications is a dynamic technological industry which allows companies to improve rapidly their services in order to differentiate themselves on the market. Examples of recently developed enhanced services include:

26. Enhanced Voice: 3G "HD Voice" is an enhanced version of the basic mobile voice service. HD voice reduces background noise and decreases the perceived distance between callers by providing clearer calls. This service needs 3G coverage and only works on mobile phones that have installed HD voice codecs.

27. Enhanced Home-Zone: Such services use two different numbers: a fixed geographical number and a mobile one. Both numbers are joined by a permanent

[9] Widgets are small applications that provide users with news, weather and stock info, twitter updates, etc.

and automatic call forwarding from the fixed geographical number to the mobile number, so that all calls addressed to the fixed geographical number are routed to the mobile number. Likewise, all outgoing calls are forwarded by the mobile service with its own mobile numbering associated. The user can use whatever mobile handset for this service.

28. Enhanced IPTV:
    a. HD (High Definition) and multiroom are two functionalities that improve the IPTV user experience. With the multiroom functionality, in each home two TV sets can be used to watch different TV channels simultaneously[10].
    b. PC as set-top-box: with this service, subscribers are able to use their computer as a second set-top-box for an additional fee. This is not Internet TV, but affords to subscribers the possibility to use their computer screen as a second TV-set.

2.3 New services

29. New services are being offered over convergent networks, combining connectivity and specialized remote services for business and residential clients.
30. Cloud Computing: Cloud Computing is nowadays basically a way to externalize services that have usually been provided internally by companies themselves. The cloud environment allows for infrastructures, platforms, software, etc. to be provided from an external network where the services are deployed, as a kind of outsourcing. On the other hand, there are also cloud computing kind services for the residential segment.
31. Machine to machine (M2M) services: M2M is a generic concept that indicates the exchange of information in data format between two remote machines, through a mobile or fixed network, without human intervention. These services are used as means of payment (terminal point of sale), tele-management and tele-measurement in the distribution of utilities (water, power supply, etc.), safety and management of alarms, management of fleets, tele-medicine, automotive and emergencies and tele-maintenance of vending machines.
32. E-Wallet is a service based on NFC (Near Field Communications) technology for mobile payments directly at the point of sale terminals (POS) which are installed in stores. The customer has to bring its mobile phone close to this device and the payment takes place and is recorded. Bank cards are housed in an application, which is the user's interface to manage all the cards and usage information.

3 Potential impact on wholesale regulated services

33. The previous section has considered the evolution of communication services towards convergence. Albeit a wider survey should be conducted to legitimate any universal conclusions about convergent services in the EU, the current research results highlight some interesting trends. In the light of these, it is useful to consider the potential impact that these trends might have in the competitive situation of affected markets, in particular regulated wholesale markets.
34. It will first be considered how convergence might affect opportunities for competition and new entry. Then the issue of how traditional regulated bottlenecks infrastructures are affected by convergence will be analysed. This

[10] An extra set top box is needed.

has potentially implications for the setting of regulatory policies aimed at promoting retail competition in Member States.

3.1 Opportunities to increase competition

35. The development of convergence and convergent services can be an opportunity to effectively increase competition in the provision of more traditional services. In some cases, considering the examples provided above, this opportunity is not a mere hypothesis and it can be seen as a recognized fact.

36. The provision of services on alternative networks or platforms has led, in some cases, to a decrease in barriers to entry. The use of mobile networks and terminals for the provision of fixed like services is an undeniable example of this situation. The use of PSTN for the provision of IPTV services or the provision of voice on cable networks – using VoIP – are other important examples of the described situation.

37. Moreover, convergence is solving problems which were preventing agents from other sectors, such as the IT sector, from entering the electronic communications sector. As noted above, “convergent operators” could come from other electronic communications markets or even from outside those markets.

38. If the operator is present in other electronic communications markets, the “convergent operators” could use a network that was already deployed to provide services that could compete with alternative services already available. This use of an “old network” for a “new convergent service” may decrease significantly the necessary investment and the incremental cost of providing these services. This is relevant for the decrease of barriers to market entry, especially because usually services that require a high level of investment are considered. Therefore, these operators become potential competitors which could impact in the competitive situation of the relevant market.

39. When the convergent services are rendered available using alternative networks it is important to consider that the “convergent operators” may have the entire control over the services they provide. This reduces the dependence of alternative operators over the SMP’s network, as there are alternative technologies and infrastructures in place to provide the service. Moreover, this feature diminishes possible discrimination concerns, increasing the competitive conditions for these operators and decreasing the regulatory costs related with the provision of services.

40. In addition, convergence creates links between traditional markets and other markets. For instance, convergence developments created some relevant relations between electronic communications markets (broadband or data services) and the markets for usable applications in the former markets. These relations are leading companies that work in related markets to create services that can be seen as substitute or complementary of traditional electronic communication services.

41. As an example of this situation it might be mentioned the Google TV service or other services with similar features. It can be discussed whether this kind of services are substitute or complementary of traditional TV services. Notwithstanding, there is no doubt that the availability of this kind of service increases significantly the bridges between applications and traditional services. It is also certain that the entrance of new players in electronic communications markets, as competitors or as enablers of solutions and innovation, can lead to improvements in the end users’ experience of services. Undertakings of related

markets outside the electronic communications sector could enjoy important advantages such as an important customer base or a well known brand.

42. Besides the possible entry of new players on traditional markets it is also possible to use convergent services as an “entrance door” in national electronic communications markets for non national operators. After entering in national markets using convergent services it may be easier for these operators to invest in other services that may require a higher investment level or a more significant customer base.

43. It has been seen that convergence may lead to the decrease of entry barriers and contribute to the entrance of new players in electronic communications services markets. The consequences of these situations may depend of the specific competitive situation in each country or market. It can also be argued that these developments may not directly influence the relevant wholesale markets in all cases. Notwithstanding, it is a recognized fact, as shown in the examples provided in this document, that convergence leads to significant benefits for end users: availability of alternative or complementary services, additional tariff options that can be chosen thus generating savings to the consumer, innovative applications that can appear or service terminals that can be rendered available. In these situations, convergence can promote end users’ interests.

3.2 Relevance of convergence for market entry and competition

44. The first part of this Section has set out how convergence is creating new opportunities for competition and market entry. Underpinning all of them is the exploitation of new technologies or improved old ones.

45. Convergence underpins more efficient and economic bundling of products and services, although convergence could also arise in a standalone service offer. A common trend in Member States, as identified in the 2009 ERG Report on the discussion of the application of margin squeeze tests to bundles[2], is the increasing preference of consumers for buying products in bundles which convergence makes more economical and easier. As consumers buy multiple offerings from one provider, the number of services required to compete effectively in retail markets increases. On the other hand, as described above, convergence could lead to enhanced products which could easily replace traditional ones.

46. This has potentially two types of implications for policy making:

    a. In a competitive market scenario where bundles are prominent, there could be a risk of leveraging of market power from existing networks/platforms providers into new markets/services; this issue is tied with the analysis of how bundling impacts competition when SMP services are bundled with non SMP services; and

    b. More generally new barriers to entry could emerge alongside traditional ones in electronic communications markets if the new platforms and applications required for convergent offerings are not provided in well functioning competitive markets or even if classic electronic communications services necessary to offer seamless services are not available.

3.2.1 Leverage of market power from existing to new platforms/networks

47. This issue was considered in the previous ERG work in 2009 on the impact of bundling[11], where it was found that Member States are dealing with the risk of bundling creating barriers to competition with a variety of approaches. Therefore this issue will not be further discussed in this report.

48. In addition to pure commercial practices related with bundling, the emergence of new platforms/services alongside traditional ones raises the issue of how this affects competition and new entry in electronic communications markets. The ability of new technologies/platforms to disrupt competition depends on, on the one hand, how important is the competition on bundles or the impact of the enhanced convergent product and, on the other hand, how easy it is for competitors to acquire the building blocks underpinning convergent services.

49. Most convergent services today make use of one or more of the following building blocks:

    a. Spectrum;

    b. Content; and/or

    c. New equipment/devices.

50. The issue of access to these essential building blocks for convergent services will now be considered.

Access to spectrum

51. Spectrum is becoming more and more essential to competition for new services consumers demand. Consumers see mobility and the ability to stay connected as progressively more crucial to their everyday lives. The majority of the convergent services analysed in Section 2 above are based on mobile technologies, and therefore, require the use of spectrum. Therefore, this input is becoming more important not just in the context of mobile markets but also in fixed markets as they are essential to provide enhanced and substitute services.

52. However, spectrum is a scarce resource. Traditionally, spectrum has been subject to a command and control approach in most countries: access to spectrum was regulated and licences were given by specific services. Today the EU Framework and Member States are moving towards freeing up spectrum for commercial use. Some of this spectrum is destined for free, contended access by multiple unlicensed providers. This is for example the case of the spectrum used for WiFi (2.4 GHz) and GSM UMA connections. Barriers to entry to this spectrum are therefore low.

53. Some of the convergent services mentioned in Section 2 (WiFi/GSM dual terminal, WiFi mobile with a nomadic number) utilise this free spectrum and hence face no additional entry barriers. Since the use of WiFi devices is widespread and the technology is well developed the spectrum band destined for free WiFi access provides an opportunity for new providers to enter the market in the future, although this will naturally depend upon the specific conditions existing in each Member State.

54. The unlicensed spectrum usage may have a positive impact on the possibility of decreasing the barriers to entry but at the same time poses some problems to the new convergent service providers. The biggest disadvantage of this chunk of

[11] Replicability of bundles from the perspective of the availability of wholesale inputs and access to content, ERG (09) 49rev1.

spectrum derives from its success, meaning that an increasing number of substantially different services use the same unlicensed spectrum. This in turn results in interference and quality degradation issues which may disadvantage the new entrant's convergent product.

55. Another chunk of spectrum is instead reserved for licensed use. Terrestrial broadcasters, mobile operators and satellite providers all use licensed spectrum. As spectrum is scarce given its demand, licenses are usually assigned by auctions, where competing providers bid for the licences. In addition to the limited number of players, the possibility to be in this part of the market requires scale to enter, as national coverage is often a requirement.

56. Spectrum with licensed use imposes some constraints on entrants willing to enter the market of convergent services. Compared to the WiFi solutions the number of possible entrants is limited by the current spectrum assignments. This confines the number of potential new entrants to the 2-6 MNOs ("legacy" GSM operators in 900 MHz and 1800 MHz) in each Member State with individual rights to use a particular spectrum band. In some countries, some of these operators belong to incumbent fixed operators therefore further decreasing the potential number of new entrants in new convergent services. Although this number is significantly smaller than in the case of unlicensed spectrum, given the characteristic of the electronic communications market (high investments required) there seems to be no reason to define new types of serious bottlenecks at this stage. In addition, the liberalisation of 2G and, in the future, 3G spectrum across Europe will create a secondary market for spectrum which could attract new entrants.

57. The possible number of new entrants may be increased when considering MVNO operators. Depending on the particular national market some of them may act as a new entrant even without having access to the particular spectrum required. This may in turn further reduce the barriers to entry in a market where operators compete on convergent services.

58. An increasingly important convergent service for consumers is mobile broadband access. This is the case in the majority of Member States where 900 and 1800 MHz spectrum was already made available for UMTS services. The number of possible new entrants is roughly similar to the GSM operators mentioned above. Considering the current developments in spectrum management the entry barriers may further decrease in the near future (e.g. the proposals to open up the 800 MHz band - 790-862 MHz, the cleared digital dividend spectrum - for wireless broadband services[12]).

3.2.2 Access to content

59. Access to content is becoming more important as convergent offerings of broadband and TV compete for customers. In the Report on Technical Replicability of bundles, it was considered how this issue is approached in different Member States.

60. Without restating the results of the analysis set out therein, it is worth recalling that only in a handful of Member States access to content has been reviewed as a potential bottleneck, and in fewer countries NRAs have taken action to open access to content. On the other hand content or application providers who

[12] See in particular Proposal for a Decision of the European Parliament and of the Council establishing the first radio spectrum policy programme, available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0471:FIN:EN:PDF

became widely successful may have an impact on the current situation mentioned above. Content or applications sought after by many users may influence their choice of electronic communication services, therefore creating an incentive for communications providers to take content into account when designing their offers for the end users. Further information on these issues is already available from the BEREC work done in response to the European Commission's consultation on the open Internet[13].

3.2.3 Access to new devices/platforms

61. It has been seen in Section 2 how much of today's convergence is driven by new wireless devices. The ability to offer such devices is therefore potentially important for competition and market entry, and may raise well known competition law issues such as those related to exclusivity agreements.

62. New smartphones are now being offered. Providers of electronic communications have a wider supply of such products than they had before. Similarly, new tablet computers are entering the market, giving consumers more choice. However, past experiences in some Member States have shown that access to this kind of devices could become a relevant factor affecting competition conditions in electronic communications markets[14].

63. The market for the supply of wireless devices requires high R&D investments, and therefore scale is important to be a credible competitor. However, it is also attracting players from a variety of backgrounds, bringing together providers of content, consumer devices, business devices, PCs and mobile phones.

64. So far, this flourish of different, competing devices has given providers of electronic communications a good choice of products to choose from and differentiate themselves. In this context, competition law intervention to address potential issues regarding foreclosure remains the main instrument available.

4 Conclusion

65. The past few years have witnessed the advent of new convergent services that are firmly gaining importance in the market leading to significant benefits for end users. Examples seen above are the Home-zone and mobile broadband offers, while we are also witnessing the emergence of more and more enhanced services (like HDTV) and new ones (e.g. cloud computing). This trend will undoubtedly continue in the coming years, and poses important challenges for the economic agents involved, as well as for regulators worldwide.

66. Convergence is likely to fundamentally change the competition paradigm in the electronic communications sector. On the one hand, it may lead to an important shift in the competitive dynamics of traditional electronic communications markets, decreasing entry barriers by enabling new players to provide products and services that could traditionally be only provided through traditional electronic communications networks using new platforms. This shift may, on the other hand, also pose new (or at least, different) challenges. Such issues are likely to be broader than those purely derived from the availability and prospects of access to the traditional electronic communications markets by means of (*ex ante*)

[13] BoR (10) 42 BEREC Response to the European Commission's consultation on the open Internet and net neutrality in Europe.
[14] See for instance the Decision of the French Competition Authority of 11 January 2010 regarding iPhone distribution, Décision nº 10-D-01 relative à des pratiques mises en oeuvre dans la distribution des iPhones.

regulation, and may be for example related to factors such as spectrum scarcity or the role of access to content, among others.