

ANNEX 2 - TRENDS

Introduction

The goal of regulation is to maximise the level of competition. In delivering our objectives, we must anticipate and react to emerging trends ensuring that we respond appropriately to new developments in telecommunications and media. This convergence of carriage mechanism and content provision has significant implications for regulation.

There are changes emerging in the ICT industry that may have implications for service providers, networks providers, consumers, the regulator and ultimately the economy. This trend analysis was developed in consultation with key stakeholders and the ComReg ECEAP (Electronic Communications Expert Advisory Panel). Understanding these trends aids resource planning and helps to inform decision-making, and identify issues that may have a direct impact on ComReg's strategy.

The trends have been identified under the groupings of Consumer, Regulation, Industry and Technology trends. Naturally, there is some overlap between the areas identified. The following sections provide some detailed information on the trends, and attempt to draw out the policy implications for ComReg. In some cases the trends have implications for a wide range of bodies (including, for example, the Department of Communications, Energy and Natural Resources; the Data Protection Commissioner; and the Broadcasting Authority of Ireland); in such instances the need for co-operation between ComReg and the other bodies is noted. These trends are summarised below with the policy impacts identified.

The key trends we have identified, through market analysis and stakeholder consultation, are below under the following headings:

Consumer Trends

- Mobility/Wireless everything
- Video Preference
- User Generated Content

Industry Trends

- Convergence
- Globalisation
- Consolidation and Cooperation

Technology Trends

- An Internet Protocol (IP) World
- High Capacity Networks/Carriers
- Network / Service Separation

Regulation Trends

- Harmonised Telecommunications Regulation
- Market Orientation/Deregulation
- Defining Minimum Standards

1.1 CONSUMER TRENDS

1.1.1 Mobility/Wireless everything

In recent years there has been a steady growth in mobile voice minute usage and an exponential growth in mobile broadband users and traffic. Mobile services have been less affected by the recession than most other industries. Wireless connections continue to multiply vis-à-vis wired connections globally, driven by the growing demand for enhanced mobile applications and M-Commerce, along with the proliferation and increased sophistication of wireless-enabled devices. The implications of this trend are increased fixed/mobile convergence and requirements for more spectrum to meet the growing demand. A related trend is the increase in wireless distribution from fixed network access points.

As a result of this, mobile operators may increasingly align some of their services with those of fixed operators, although it remains to be seen how issues associated with consistency and reliability of some services (for example, wireless networks are shared in the access layer which can impact the quality of some services provided to consumers; wireless networks can be more vulnerable to interference or jamming than fixed networks etc.) may be addressed.

Consumer demand for access to services is evolving, for example with the growth in wired and wireless broadband connections, the trend is indicating a preference for access to services at any location. This will continue the pressure for greater availability of radio frequency spectrum, especially at those frequencies (below 3GHz, and preferably below 1GHz) most suitable for mobile use. The emerging trend of radio-based sensor networks is another factor that will place pressure on available spectrum.

Efficient and cost-effective spectrum management centres on facilitating early availability, stimulating competition, minimising bureaucracy and ensuring technology neutrality. Spectrum has an important role in addressing the digital divide. Allocation of spectrum can drive competition when determined by market-orientated principles, with greater reliance placed on operators and consumers to decide on the best use of spectrum (for instance, through the use of the auction mechanism for assignments). A policy of technology neutrality can enhance competition and investment. Spectrum management also requires coordination at an international level.

A downside to the trends highlighted above is that the energy demands of mobile networks are much higher than those of fixed networks. As a result the rapid rise of the former may become a more prominent factor in assessments

of our national energy consumption. Conversely, however, wireless technologies can enable “smart networks” to reduce energy consumption and to increase the efficiency of generation and transmission.

Impact:

- The resilience of wireless and mobile networks, particularly when they are being used as a replacement service to a fixed network, needs to be monitored as they can be inherently susceptible to problems such as interference.
- ComReg should continue to minimise barriers to entry for spectrum users, to maximise its availability and promote its efficient use.
- ComReg should participate actively in the co-ordination at international level of spectrum management.
- ComReg should maintain a technology neutral approach to spectrum assignment when considering how the anticipated increase in demand for spectrum can be addressed.
- ComReg should work with the appropriate bodies (e.g. Department of Communications, Energy and Natural Resources, DCENR) to build a digital economy, including policies on access, speed and reliance of telecommunications infrastructure in Ireland.

1.1.2 Video Preference

There is a growing amount of video content online, driven by the growth of user-generated video content, increased delivery of television over the internet such as the BBC iPlayer and the RTE Player, along with the growth in video capture and higher definition devices. This results in a greater need for higher bandwidths from providers with possible impact on revenues for television networks as Internet TV competes for viewers with broadcast TV. A related issue is the potential impact on content regulation, which in turn raises the question of how this might be realistically achieved for net-based content. With further convergence between telecoms, broadcast and internet traffic and content, there may be a need to look more closely at converged regulation.

Operators may seek to deploy traffic shaping across networks to help deal with the trend of increased video traffic, with a possible follow-on effect of users paying for higher service levels and/or premium content services, thereby

creating a new business model for them. The controversial issue of traffic shaping may need to be considered not just at the end user level, but also at a wholesale level. As with “IP world” trend, increased transparency will be necessary for users to make informed decisions about which provider they prefer. The key role for ComReg is, therefore, to ensure maximum transparency, in particular concerning any traffic shaping or traffic interference, and to further ensure that consumers have maximum flexibility in changing providers. While there have been some pressures towards obliging regulators to enforce copyright and Intellectual Property Rights (IPR), these have been opposed in Europe by the European Parliament as being inappropriate to telecoms regulation.

Impact:

- ComReg should continue to ensure transparency of services being provided so that consumers are in a position to make informed purchasing decisions about the service. In this way, consumers can choose to pay a premium for a service which, for example, prioritises certain traffic types on the network, should they decide that they want to.
- As the boundaries between traditional broadcast TV and Internet TV become blurred, ComReg will have to work with the BAI to ensure that market distortions do not occur.
- The increase in video preference will result in demand for additional network capacity, and ComReg should consider ways in which to facilitate their deployment – for example, by encouraging infrastructure investment and promoting the efficient use of spectrum.

1.1.3 User Generated Content

One of the distinguishing features of the digital revolution has been its facilitation of mass user generated content. There has been a notable growth in the popularity of sites such as You Tube, social networking sites such as Bebo, Facebook and LinkedIn which allow users to upload their own content, personal websites and blogs. Mobile devices enable anytime, anywhere content generation, with consequent increased demands for higher bandwidths. This may prove to be a challenge for operators who are required to provide higher bandwidth for consumer social networks which cannot be monetised, though the need for symmetric bandwidth for consumers will remain limited. For business users however, the requirement for symmetric bandwidth will become ever more critical as services such as Software as a Service (SaaS) and cloud computing facilities become more prevalent.

Impact:

- ComReg should focus on providing regulatory certainty to encourage efficient investment in higher capacity networks.
- ComReg should work with the Department to implement relevant aspects of Next Generation Broadband (NGBB) strategy.

1.2 INDUSTRY TRENDS

1.2.1 Convergence

There are four key areas in which the trend towards convergence has been increasing;

Fixed/mobile convergence: An increase in bundled service offerings incorporating fixed and mobile services, 'home zone' services and the acquisition of fixed line services by mobile operators (e.g. Vodafone/BT/Perlico).

Content and telecoms convergence: The growth rate of video services, mobile television services, application stores and smartphones and new partnerships between application developers and operators.

Broadcast and telecoms convergence: For example the BBC iPlayer and the RTE player.

Software industry and operators convergence: Operating systems such as Symbian, Google's Android, and Google's sdk 'Go'.

These forms of convergence may lead to a change in market structures. They may also require refined definition of services and service offerings and may offer the operator the opportunity to avoid becoming a bit-pipe provider by migrating up the value chain.

Although there is a clear trend for convergence of terminals and networks, convergence of the industries themselves is less likely. It can be difficult for new entrants to move into the business of content provision, as has been demonstrated by a number of high profile failures in the past (e.g. Microsoft). Currently, online delivery of television is relatively expensive for the providers when compared with broadcast models though this is offset by the much greater marketplace. Ultimately, current online TV services (like the

iPlayer) will lead to the widespread use of web-enabled televisions, the first of which already exist.

The new generation of high definition TVs will be browser enabled from mid-2010. In some EU Member States, the availability of integrated products raises potential competition concerns about use of ‘must have’ premium content to achieve downstream anti-competitive effect in the telecoms market.

Moreover, as “over the top TV” becomes more popular and accessible, consumers will demand better, faster quality broadband. Planning and resourcing to meet this demand will be a challenge for the industry. Players such as Apple and Microsoft have entered the communications applications and operating systems markets; while there is a threat of proprietary devices and applications emerging, equally certain systems such as Google base products are growing market share based on a principle of open access.

Impact:

- Convergence may result in changes to market structures that can impact market analysis. ComReg must ensure that its market analyses take into account the effects of convergence and bundling on both market definition and the determination of significant market power.
- ComReg to ensure that markets remain competitive and consumers have the information they need to make informed choices.
- The issue of content regulation is the concern of other regulatory bodies. However, ComReg will be conscious not to hamper the wave of convergence-related innovations.

1.2.2 Globalisation

The trend for globalisation can be seen with the increasing global reach of manufacturers and operators, e.g. Telefonica, Vodafone, Ericsson, Nokia Siemens networks etc. who can achieve greater economies of scale through globalisation. Added to this global *pot pourri* is the multiplication of international standardising bodies and alliances, though frequently these are of an *ad hoc* industry-established nature. The highly targeted nature of many of these quasi-standardisation bodies can lead to rapid adoption of newer technologies, while their efforts to co-ordinate and focus like-minded industry bodies, at global level, can lead to early agreement on common technical standards, such as Long Term Evolution (LTE).

Telecommunications can act as a facilitator for globalisation, though this is accompanied – in the case of the traditional operators and service providers (SPs) – by the challenge to remain competitive when faced with competition from the new players in ‘their’ territory. The new cross-border capabilities

bring greater economies of scale but also new demands on harmonisation, for example in the field of spectrum. They also bring cross-border regulatory challenges, as witnessed the difficulties faced by Ofcom when addressing regulation of Skype. This trend may lead to competition issues which will be addressed by the EU on a case-by-case basis.

Impact:

- For ComReg, globalisation is an issue that will be best tackled at European level, and especially by leveraging BEREC, the RSPG, CEPT and the common interests of most European NRAs, with ComReg taking an active role, acting in the best interests of the consumers.
- ComReg will continue to support international harmonisation and standards (official or otherwise).
- ComReg can also continue to play its part in ensuring Ireland is an attractive location for potential incoming investment and R&D (e.g. the Test and Trial scheme).

1.2.3 Consolidation and Cooperation

There are many examples of mergers amongst operators, for example T-mobile and Orange, AT&T and BellSouth, Vodafone and Perlico. Additionally, for mobile operators, there are ‘levels’ of network sharing which could be employed which effectively constitutes a ‘ladder of consolidation’ – from cooperating with site sharing up to full consolidation. This impacts on spectrum licensing and assignments, as there may be additional potential to address rural or underserved areas, but that may require conditions be applied to licence acquisitions. While sharing arrangements offer potential for investment and funding, as well as lowering costs by virtue of economies of scale, they may also exhibit the undesirable characteristic of being less responsive to market demand. Caution is needed in respect of sharing agreements, as they could lead to less competition, while opening the door to new monopoly structures. Sharing arrangements may in time, tend towards a reduction in service differentiation between the operators concerned. Nevertheless the clear and increasing trend for consolidation between operators, suggests that opportunities are being unlocked which may enable the roll out of newer networks. It also creates the opportunity for wireless infrastructure providers to operate as wireless network wholesalers. The more unified co-operating operators, with reduced costs and shared interests may also provide a better basis in a small country like Ireland, to effect real innovation.

Impact:

- ComReg will need to monitor future investment strategies and competitive outcomes.
- If trends towards consolidation at the network level are realised, ComReg will have to sustain and increase the effectiveness of its wholesale regulation to protect competition.
- For ComReg, there may be aspects of flexible spectrum management that could be further investigated (e.g. WAPECS, Spectrum trading etc). Conditions will need to be applied to spectrum assignments to ensure that, if necessary, assignments between consolidated operators can be better managed.
- ComReg's regulatory strategy should take account of the forthcoming EU Recommendation on Next Generation Access, currently at draft stage.

1.3 TECHNOLOGY TRENDS

1.3.1 An Internet Protocol (IP) World

The migration to all-IP networks continues, as fixed line telecommunications roll out Next Generation Networks (NGNs) and as mobile networks tend towards High Speed Packet Access (HSPA)+ and Long Term Evolution (LTE). As networks become fully 'IP-enabled', there will be further growth of IP-based services at both retail and wholesale level, e.g. VoIP, Internet Protocol Television (IPTV), carrier Ethernet products etc. This will lead to the phasing out of proprietary data services and in time, the legacy Public Switched Telephone Network (PSTN).

These IP-enabled network rollouts will create economies of scale for operators, which will drive lower network element and terminal costs. They will also facilitate the provision of services which are independent of the network over which they are deployed, which may create incentives for network operators to advantage or disadvantage different service providers (see "Network/Service Separation", below). This evolution will inevitably involve pain for some or all market players, as the relationship between investment and return is likely to be far from linear and as much of the

traditional industry attempts to play ‘catch-up’ and learn how best to adapt to a cascade of new services and new capabilities.

All-IP networks will be based on a flat architecture. Depending on what type of network emerges - either a single provider or multi-player networks - levels of service and competition may vary at different layers of the network. At the access layer, there may be either multiple competing networks, or a dominant player, or a number of players, delivering large volumes of capacity on a high capacity network, with competition at the service layer enabling an enhanced level of service and product differentiation. In the latter case, regulation at the wholesale level will need to ensure an appropriate level of wholesale access to next generation networks. The implications are significant and may transcend the concern or scope of regulation, while still having significant implications for competition.

All-IP networks will act as a driver for newer technical enablers such as Internet Protocol Version 6 (IPv6) and allow for the possibility of increased levels of convergence. However, so many business and consumer services now rely on access to these technical services that the question of their security and resilience becomes ever more important, especially with increased trans-national data flow.

The 'any-to-any' principle is fundamental to telecommunications and is facilitated by the IP world. However, the policy of selective blocking of certain services which some operators have employed on their networks has a detrimental effect on consumers and on competition - although the ability to shape traffic on the network is acknowledged as a legitimate network management practice. It is important that consumers should have transparency on operator policies so that they can make informed decisions about their network and service providers, so as to create a competitive market. Where transparency is not sufficient to resolve issues, the use of competition powers against potential anti-competitive agreements or abuses of dominance may be necessary.

Impact:

- For ComReg, a proactive approach to monitoring the evolution of networks and services is indicated, with important objectives being the assurance of network resilience, network integrity and network security.
- A balanced approach to network neutrality, that takes into account the interests of both consumers and industry will also be essential to ensure maximum take-up of services under fair conditions. Competition powers, coupled with transparency provisions contained in the NRF should prove effective in dealing with most Net Neutrality issues.
- ComReg must ensure that the basic building blocks (numbering, portability) are in place to deal with an all-IP world.

1.3.2 High Capacity Networks/Carriers

Increased consumer demand for mobility and capacity requires an upgrade of both fixed and mobile infrastructures to service it. The future is likely to see increasing inter-platform competition which will drive investment in networks. As transmission technologies evolve towards high-capacity delivery mechanisms such as Long Term Evolution (LTE), Wi-Max and all-fibre networks, bandwidth-hungry applications and devices evolve which quickly devour much of these new resources. Service providers state that business models, including consumers' willingness to pay for new services, are uncertain and that regulatory consideration must be shown to investment challenges, and the associated risk, in building new access and core fixed and mobile networks. This dilemma of (expensive) extra provision with potentially little extra reward to offset the rise in bandwidth consumption is the result of a step change in technological capabilities and in consumer demand, which finds industry at a critical crossroads.

These trends are linked to the growth of video and user-generated content, and to emerging developments such as cloud computing, the semantic web and the Internet of Things. These hold great potential for society but, from an operator's perspective, only serve to fuel the growing demand while leaving revenue growth uncertain. There are dangers, firstly, of overall under-investment in infrastructure if operators' revenues do not grow with data volumes (though not necessarily in a linear relationship). Secondly, of skewed investment if operators focus unduly on the access network while neglecting the less visible needs of the core, including backhaul.

Mobile operators are investing in expanding their services, through the acquisition of spectrum rights of use and upgrades to existing networks. On the fixed side, Eircom's debt burden remains a challenge to investment in Next Generation Access (NGA). Declining voice volumes and tariffs, coupled with downward pressure on broadband charges, may exacerbate this. At the same time, the cost of delivering broadband is putting pressure on operator margins across the industry. In this context, it is important that regulatory policy navigates between these pitfalls and ensure sustainable competition while incentivising investment.

The demand for an integrated service of mobility, voice, internet and broadcasting appears to be driving two main changes to market structures: consolidation and co-operation. Consolidation among market players is emerging, between fixed and mobile operators such as BT, Perlico and Vodafone or Eircom and Meteor and, internationally, between mobile operators such as Orange and T-Mobile. These changes typify a ladder of consolidation amongst industry players which is altering market structures and product offerings.

Industry changes are also characterised by an inclination for operators to work together and share infrastructure and investment. Sharing of infrastructure can help avoid unnecessary duplication of investment, thus lowering costs and barriers to entry. This may require increased cooperation and collaboration to address the investment and network management challenges. An emerging

trend within European MNOs is for radio spectrum resource sharing and infrastructure sharing, in order to improve efficiency. Given the cost imperatives, this is likely to continue if the necessary agreements between MNOs, and regulatory and competition approval, can be achieved. However, there is the danger that the benefits of dynamic competition may be lost, as network innovations become common to the entire industry rather than a tool of competitive advantage for an individual player.

The future regulatory approach will depend on the management of the network and subsequent competition issues. A recent European Commission draft Recommendation on Next Generation Access Networks¹ recognises the opportunity of designing a shared network (for instance, with multiple fibres owned and/or operated by different operators) which eliminates bottlenecks and facilitates competition; in this instance the regulatory regime would be materially different to current policy. This may even provide the opportunity to allow greater freedom of wholesale prices and an appropriate *ex ante* margin squeeze test, coupled with a requirement for transparency. What is essential in whatever structure emerges is that the principle of open access exists and is supported by policies of transparency and equivalence.

Impact:

- ComReg to facilitate multi-platform networks to support the current and future demands.
- Significant levels of investment are needed in both fixed and mobile systems, and in access and core networks. ComReg policies will need to focus on appropriate incentives and regulatory certainty to encourage this, while safeguarding consumers and competition.
- ComReg must monitor the implications of emerging industry investment strategies and their impact on competition, and adjust regulatory policy where necessary.
- ComReg's spectrum policy should aim to make more spectrum available for higher capacity mobile networks and for wireless backhaul (including WiMax).
- ComReg to monitor and influence EU legislative developments on infrastructure sharing.
- While ensuring that better quality high capacity networks are developed, there is the potential for an increased digital divide where networks are only rolled out to highly profitable areas. ComReg will ensure that cross-platform competition is facilitated.

¹http://ec.europa.eu/information_society/policy/ecomms/doc/library/public_consult/nga_2/090611_nga_recommendation_spc.pdf

1.3.3 Network-Service Separation

Network - Service Separation is a fundamental aspect of Next Generation Network (NGNs) and has contributed to the emergence of the 'cloud computing' concept and the growth of so-called 'over-the-top' services. As there is potential to de-couple the network provider from the service provider, new business and operational models emerge e.g. a 'bit-pipe' utility or a fragmented service delivery (such as one pipe on which sit multiple quasi-independent service providers). This also allows for the internationalisation of services which opens the door to a huge world of potential customers for Irish service providers. Obviously, such a beneficial scenario also heightens the importance of service-based competition. As with the 'IP world' trend however, this will be accompanied by greater data protection and security concerns. The role of ComReg and other agencies in ensuring these concerns are adequately addressed can only become more demanding.

The ultimate outcome of this trend towards network and service separation remains as yet unclear for NGNs. Voice is now a very diverse market and ComReg's regulatory approach will need to evolve to reflect this, though common European decisions are likely to form the foundation for addressing the inherent cross-border capabilities of Voice over Internet Protocol (VoIP) and NGN. Self-regulation, however, is likely to remain the best solution for cloud computing based services, so long as data protection issues that arise in that context can be resolved.

Finally, as networks and services are increasingly separated as NGNs are deployed, there is a unique opportunity for the industry to develop new wholesale service models that overcome the limitations of legacy wholesale products, for example by allowing competing operators full control of service parameters.

Impact:

- Regulation of voice services will have to evolve to reflect the changing and diverse voice market, particularly in relation to ‘over-the-top’ services which may have issues around the provision of emergency service access and continuity of supply of service (for example, during power cuts).
- The nature of network-service separation also allows for the internationalisation of service provision which raise issues of data protection and security for users of the services. ComReg should remain vigilant to the possibility of consumer protection issues and should liaise closely with the Data Protection Commissioner to ensure that necessary standards are being met.
- The separation of networks and services provides the potential for additional competition by new entrants and also for newer business models for existing operators. For vertically integrated operators, it also raises the possibility of discrimination against downstream service providers. ComReg will consider the full range of remedies, including functional separation, as part of the market analysis process.

1.4 REGULATION TRENDS

1.4.1 Development in Regulation in Ireland

In addition to considering EU telecoms regulatory developments, it is worth reviewing emerging debates in Irish Regulation generally including:

- The focus on the growth in the number of regulatory agencies, potential mergers.
- The outcome of the Department of the Taoiseach review of the efficiency and effectiveness of sector regulators and recent Government policy statements on better regulation, the smart economy and the innovation economy.
- Increased awareness of the constraints in performing statutory objectives which can point in different directions in the short term.
- Increased expectations of collaborative working with stakeholders, in common with all businesses, at present and public bodies while guarding against regulation capture.

Our national competitiveness is largely dependent on the quality and value of our energy, transport and communication infrastructure. While the goal of using competition and regulation to improve performance to these industries has been vigorously pursued, there is more to be achieved. Ireland is in the top half and in some cases the top quartile of the EU pack in terms of telecoms regulation.

Impact:

- ComReg will continue to work closely with Departments and agencies in pursuit of a rounded view of 'Regulatory Value'
- Intensify the process of market opening and effective regulation
- Maintain fundamental practices of high quality, appropriate regulation: which is independent, expert, transparent, evidence-based
- Invest in development of new models of delivery with stakeholders
- Measure and validate the economic impact of regulation and minimise costs while remaining fully accountable for over performance

1.4 .1 Harmonised Telecommunications Regulation

The international aspect of telecommunications regulation is increasingly relevant in a globalised world. The evolutionary path of the regulatory framework in Europe started with individual countries regulating (e.g. UK and Oftel), with co-operation access borders facilitated by the European Telecoms Reform rules of 2002. These provided the basis for the development of a competitive telecommunications sector across Europe. Since then Ireland has benefited from increased competition facilitated by an array of new entrants to Irish telecommunications markets across a variety of technologies. Undoubtedly, the European Regulations transposed into Irish law in 2003, have served to facilitate increased competition on a number of platforms. This has resulted in more choice, a decrease in prices and the introduction of, and access to, new services, all of which are beneficial to consumers. In parallel to this increase in competition, Universal Service ensures that consumers are protected while competition develops, by providing a basic service to all consumers at affordable prices. In Ireland, Eircom is currently designated as the Universal Service Provider (USP).

The 2002 Framework led to the establishment of the Independent Regulators Group (IRG) and the European Regulators Group (ERG), and evolved towards the 2009 framework and the formation of Body of European Regulators for Electronic Communications (BEREC). The ITU² and European Telecommunications Standards Institute (ETSI) hold the roles of setting global and European telecom standards, while European Conference of Postal Telecommunications Administrations (CEPT) and the Radio Spectrum Policy Group (RSPG) drive interpretation at the EU level. In the Internet sphere, the Internet Engineering Task Force (IETF²), and sometimes the Institute of Electrical and Electronic Engineers (IEEE), set the international standardisation pace, with various *ad hoc* bodies also driving specific agendas. This means that there is less scope to cater for national differences and the varying pace of development in individual countries, and the effort to keep pace with accelerating activities can represent a hurdle for smaller countries. Nevertheless, there is a compensating opportunity for smaller, more agile, countries to learn quickly via the openness of the standardisation process.

In order for harmonised regulation to work, it is important that regulators consider issues laterally, for example the RSPG is demonstrably successful as it expands beyond its home ground of telecoms and into other industries e.g. transport. There is an identifiable need for more co-operation between industries. For example smart metering requires a secure communications network, the expertise for which will come from telecoms regulators. Different regulators will need to share their expertise across industry boundaries.

² Strictly, the ITU and IETF publish Recommendations rather than Standards, though for most practical purposes, the effect is the same.

Impact:

- The efficient and cost-effective use of spectrum requires increasing co-ordination at international level. ComReg should continue to play an active role in international spectrum bodies.
- ComReg should continue to prioritise participation in, and influence on, the EC, BEREC, RSPG etc. on pertinent issues.
- Cross-boundary co-operation can bring significant efficiency, cost savings and competitive advantage. ComReg's strategy should involve lateral co-operation with regulators and/or key players in Transport and Utilities functions where smart metering, telemetry, emergency communications and so on depend on communications structures. The expertise for many aspects of these areas, including, critically, network security, will come from telecoms regulators but ComReg, in turn, can acquire useful expertise.

1.4.2 Market orientation/deregulation

The evolutionary path of the Market Framework Review has seen the initial number of markets go from 18 to 7 currently, as the ultimate trajectory is for light, competition-based regulation where there is evidence of sufficient and dynamic competition. The new Telecoms Package allows for the removal of regulation where this burden of proof has been met. *Ex ante* regulation is now focused primarily on wholesale services and there may be further scope for deregulation. Indeed regulation should only be introduced if it is appropriate to the Irish market. As the market becomes increasingly competitive, there may be a shift in focus to that of consumer welfare issues e.g. universal service obligations. Once the industry shifts, then, so too must regulatory structures, and competition authorities will also have an increasingly important role to play. As with the harmonised regulation trend, there is a need to engage and be effective in international fora, with the support of relevant national stakeholders.

While the regulatory burden on retail services has greatly diminished, progress has also been made in terms of promoting competition through wholesale regulation on the fixed markets over the past two years. Where wholesale regulation was not deemed to be fully effective as yet, a remedy of last resort in the form of functional separation is provided for under the 2011 Telecoms Package. This remains a regulatory option, where the circumstances make it necessary.

Where evidence suggests that market characteristics are sufficiently different, separate sub-national geographic markets may be defined. This has become an

increasing trend in market analysis throughout Europe, recognising the fact that competition develops at a different pace in different areas, and that densely populated urban areas often attract investment by competing networks in advance of more sparsely populated rural areas. Defining separate geographic markets, on the basis that the conditions of competition are not uniform across the country. Thus, where competition has developed more, regulation can be relatively light-handed. Conversely, where there is little competition and the incumbent's network represents a serious bottleneck; there may be a need for heavier wholesale regulation. Collating robust data for the purposes of assessing geographic markets is ongoing and may be further assisted with the introduction of post codes, noting that any sub-markets can only be identified using market definition principles.

Fixed/mobile convergence (FMC) also raises issues for defining markets. In the future, the boundaries between what are currently separate markets may become blurred, with implications for market definition and *ex ante* regulation. Where evidence exists, this could mean, for example, an adjustment to existing market definitions and/or the emergence of new cluster markets for bundled services for which the need (if any) of ongoing regulation will need to be carefully assessed. Many of the issues of convergence can be addressed through market analyses, which must be forward-looking and be substantiated with evidence. At network level, FMC may mean that mobile networks are dependent on fixed fibre core. Where there is a dependency on one network only, this creates a vulnerability to resilience and redundancy issues on the core network.

Given the varying levels of competition in the markets in other member states, this round of market analyses has seen the successful deregulation of certain wholesale broadband access markets in a few member states, where strong infrastructure-based competition was identified (often in sub-national geographic markets).

Impact:

- Engaging at an international level in all relevant fora is of critical importance to ensuring that regulation remains appropriate for the Irish market circumstances.
- ComReg should seek to ensure that the information is available (for instance, through the forthcoming postcode system) to enable it to decide whether sub-national geographic markets should be defined.
- When regulating wholesale markets, ComReg must ensure that the principles of open access and of equivalence, transparency and non-discrimination are respected.

1.4.3 Defining Minimum Standards

In a competitive market, operators may choose to serve only those areas or customers that are economically lucrative, to charge more for providing a particular service or a service at a particular location, or to withdraw from providing a service altogether. In the case of telecommunications, as with a number of other industries such as electricity and post, it has long been recognised that access to this service is so fundamental to participation in society that no citizen should be left exposed to these risks. This recognition forms the basis for the concept of the Universal Service, whereby a certain minimum level of service is guaranteed to all. In the case of telecoms, Ireland's current basic service consists of a voice service at a fixed location, narrowband internet access, payphones, a directory enquiry service and directories, services for consumers with disabilities, and measures related to affordability and control of expenditure.

The role of National Regulatory Agencies under the EU framework is to define a basic service and to ensure that all customers have access to it at an affordable price. As technology develops and consumers' needs change, the service must evolve to keep pace. Existing USO obligations for the PSTN may need to be extended to cover broadband provision, particularly as digital strategies highlight the need for ubiquitous broadband. Also, given technological developments and consumer desire for ubiquitous access, it may be appropriate in the future for the Universal Service to involve mobile

services. The new EU Directive³ amending the Universal Service Directive also paves the way for consumers with disabilities to be able to access and choose from the range of telecommunications services available to all consumers.

Another issue to be considered is that of ‘smart metering’ of utility services such as gas, electricity and water, where a medium to low bit rate communications connection will be required to monitor and to control.

Impact:

- ComReg should re-visit the definition of the Universal Service, taking into account evolving consumer needs and technologies.
- ComReg must take action to uphold minimum quality standards where competitive pressures (and therefore consumer choice) are low or non-existent.
- ComReg must protect and improve the efficiency of emergency services and services for vulnerable citizens such as the disabled and the elderly.
- ComReg must ensure that there is full transparency of contracts and services to consumers and develop market-sensitive quality standards that can help to raise quality through the promotion of best practice.

Conclusion:

This section outlined some of the key trends considered by ComReg in preparing our strategy for the period of 2010-2012. The mission, vision, goals, priorities and actions developed in our strategy have regard to these trends and their implications.