*International Journal of*
*Emerging Research in Management &Technology*
*ISSN: 2278-9359 (Volume-5, Issue-6)*

**Research Article** | **June 2016**

# ICT Regulatory Environment: India and the World Next Generation Technologies & Their Regulations

**Om Pal Singh**
B.Tech., MBA, Assistant Director, Advanced Level Telecom Training Centre, BSNL, Ghaziabad, Uttar Pradesh, India

***Abstract:***

***Communications are an essential means for reaching the "Bottom of the Pyramid" and enabling individuals to reduce poverty and improve the quality of their lives. Competitively priced and technologically varied service offerings have allowed businesses to compete and thrive globally. However, there are still serious market gaps (such as providing widespread high speed broadband services at affordable prices and connectivity to remote areas), that, when coupled with evolving and converging technologies, pose challenges to policymakers and regulators. Technology is changing telecommunications markets by merging, converging and re-organizing them from the inside-out. The future of telecommunications is being written by SMS and Internet Protocol, as well as by traditional packet-switching, and implemented in applications that tie platforms together, creating services we could not have predicted but on which we have come to depend. Communications technologies alone, however, will not drive the innovation that the developing world needs. As a result of the rapid rate of technological development, business innovation and changes in social attitudes continue to push communications in unpredictable, innovative directions. Well-trained, informed and independent individuals in ministries, regulatory agencies, companies and universities play a critical role in shaping the future of the communications landscape, thereby creating more opportunities for open collaboration, innovation and economic growth. These tools benefit the individuals entrusted with creating both a level playing field for and an environment in which communications can reach its potential as a powerful enabling tool for supporting innovation and achieving inclusive sustainable development. Today, regulators in the telecommunication industry stand at a crossroads in an era of transition. Over the past decade, privatization has continued apace, mobile telephony has succeeded in connecting half the world's population, Internet Protocol (IP)-based networks are in full ascendancy, while the Internet now touches upon nearly every facet of our lives – professional and private. Any one of these trends is revolutionary– together, they are nothing short of cataclysmic. Regulators face an understandably daunting challenge in trying to keep up with such a rapid pace of technological change. In many cases, regulators are seeking to cope with the challenges of convergence and the new online world with old-world tools. There is a need to serve as a compass for regulators facing the ever more complex challenges involved in industry transformation and regulatory reform. Now, more than ever, regulators need guidance and a solid basis on which to build sound foundations for the future digital economy. They can no longer afford to focus narrowly on classically defined mandates and market definitions. Rather, regulators must understand the evolving converged environment to deal with new and unprecedented issues transcending the original scope of their regulatory practice. A trans-sector focus tailoring regulation to help multiply the effects of ICTs across all sectors of the economy can prove helpful– whilst ensuring that large segments of society are not excluded from the benefits of access to ICTs. Last but not least, regulators need to seek and apply durable policies and principles that can be continually brought to bear in a changing market.For markets to truly flourish, regulators also need new, inspired regulatory approaches that are as innovative as the technologies they regulate.***

***Keywords: WSIS, ECTA, POTS, WTO***

## I. INTRODUCTION

**ICT & ICT Regulation:**

Digital technologies are changing the ways in which the majority of people live, work, play and interact with each other. Our vocabulary is evolving as existing words assume new meanings – app, burn, rip, text, game, cookie – or appear in new combinations, such as smart phone, cyber crime, file sharing, instant message, search engine and navigation bar. Some vocabulary is entirely new, including blog, podcast, googling, Web 2.0 and Wikipedia. The range of acronyms continues to expand – MP3, P2P, SMS, BPO, DRM, NGN, VoIP, VoBB, WiMAX, NGA, IP and LTE.

This evolving vocabulary can even evoke the experience of an era, such as the "dotcom bubble." The field of ICTs reflects the growing and highly significant contribution of the Internet and other burgeoning technologies to a new landscape of economic and social activities and relations. The landscape is populated by innovative ways of performing existing and new activities. In terms of the evolving vocabulary, we have entered the "Information Society" and the "New Economy."

The ongoing World Summit on the Information Society (WSIS) process is global recognition of the impact of ICTs on society, and the need to ensure that a global digital divide does not persist. ICTs, such as the Internet and the mobile phone, have become vital for almost all economic and social activity. The new digital economy runs on the fuel of ICTs, from e-commerce to professional networking. A key characteristic of ICTs is that they are regulated by national

administrative agencies that are keen on ensuring that principles such as fair competition and universal access are upheld in the public interest. Government regulation of ICTs extends into many disparate areas, ranging from pricing regulation, mergers and market entry to content, copyright, and privacy. Given the speed of technological innovation, it is not surprising that the substance of ICT regulation has had to evolve rapidly. The liberalization of ICT markets has stimulated cumulative interacting innovations in products, services and technologies with a general convergence or blurring of distinctions between platforms, products and services. These developments necessitate some form of regulatory response to keep them in check. The evolutionary nature of regulation is evident, for instance, in the moving target of European Union (EU) regulation.

The information and communication technology (ICT) sector continues to experience remarkablechanges. The ever-expanding digital world touches nearly all aspects of our modern lives. Today, access to online services is vital in order to find a job, receive a salary, pay bills and taxes, vote, learn and make individual and business decisions. Almost all people today are within reach of amobile service signal. The reality is that the number of mobile cellular subscriptions now nearly equals the world's population. Meanwhile, the uptake of both fixed (i.e., wired) and wireless broadband services has continued to grow worldwide, although at different speeds in different regions of the globe. The number of active mobile broadband subscriptions has grown overthe last two years by more than 30 per cent annually, reaching more than 2 billion in 2013 – a figure three times as large as the number of fixed broadband subscriptions. Smartphones are leading the way in drawing consumers online, but tablets are showing very healthy shipment growth rates, as well, with more than 263 million tablets expected to be sold in 2014. That figure was 179 million just a year ago. The availability of cheaper smartphones coupled with falling mobile broadband service prices and increasing mobile broadband network coverage, is likely to bring the experience of living in a seamless digital world to many of the 4.4 billion people who are not yet online, helping to reduce the global digital divide.

The apps marketnow leads the way into new communications behaviours, opening the door to new business models and a redefinition of the role of the consumer. Putting the consumer in the driver's seat, the digital ecosystem has radically changed the way people communicate by giving the consumer an active role, one that can make or break the success of ICT players. The apps market saw the addition of millions of users per month to reach more than 100 billion downloads in 2013.

While huge efforts have been made to increase international connectivity, many countries still face challenges in deploying and expanding next-generation networks to support the ongoing growth in data traffic. Governments throughout the world are striving to bring ICTs to everyone.

The need for regulation varies depending on the conditions of the marketplace. While the design of the regulatory framework may differ, certain critical elements should be included in an effectiveregulatory framework, such as the functional aspects of the regulatory authority; decision-makingprocesses; accountability; consumer protection, dispute resolution and enforcement powers. Consideration and proper implementation of these features are key elements for creating an enabling environment for development of the sector and for increased consumer welfare.

In the 1990s, many countries introduced the first wave of reform by privatizing their nationaloperators. Until that time, telecommunications services were largely provided under monopolyconditions and thus limited regulation existed because the government was acting as both operatorand regulator. In the very initial stages of liberalization, some countries have created a regulator when introducing a private monopoly. These regulators oversee the sector and ensure that the private operator knows and can comply with the— rules of the game.In the second wave of liberalization, which sometimes occurs simultaneously with privatization, governments typically authorize the entry of new service providers and new services (e.g., mobile services and valueadded services) into the market.

**Regulation: Definition**

- **General:** Principle or rule (with or without the coercive power of law) employed in controlling, directing, or managing an activity, organization, or system.
- **Law:** Rule based on and meant to carry out a specific piece of legislation (such as for the protection of environment). Regulations are enforced usually by a regulatory agency formed or mandated to carry out the purpose or provisions of legislation. Also called regulatory requirement.
- Regulation creates, limits, or constrains a right, creates or limits a duty, or allocates a responsibility.

Since the late 1980s, market liberalization and advances in technology have driven the digitalization of all aspects of national economies. In moving to a competitive telecommunicationsmodel, strong regulation and regulators have been required to enable new entrants to competeagainst dominant players with significant market shares. And yet, despite the evolution of competition, regulation 2 of the evolving telecommunications industry does not appear to be getting *easier*. Instead, there is a new, perhaps more complex, *digital ecosystem* emerging from the convergence between the information technology, telecommunications, and media/entertainment Industries. Dr. Bob Horton, suggested a framework for understanding the evolution of telecommunication regulation, postulating three different "generations" of regulatory practice. With slight changes to Dr. Horton's hypothesis, the generations can be described as:

- *First generation* – Monopoly (either public or privately owned) utilities were closely managed,with the intent to encourage improvements in efficiency and service. In effect, regulation simulated the desired effects of competition.
- *Second generation* – Characterized by partial privatization and licensing of competing infrastructure providers, this phase of regulation focused on balancing the goal of opening up access to incumbents' networks with the need to protect government infrastructure investments and ongoing shareholdings.

- *Third generation* – With full privatization, regulation shifted toward a focus on protectingcompetition in service and content delivery, with an increasing perception of the need for consumer protection.

## II. WHY REGULATE?

The last decade of the 20th Century saw unprecedented changes in the global telecommunications industry. Numerous state-owned telecommunications operators were privatized, and a wave of pro-competitive and deregulatory telecommunications policies swept the world. New market-based approaches to the supply of telecommunications services were introduced in scores of countries.

The liberalization of telecommunications markets was motivated by various factors, including Increasing evidence that more liberalized telecommunications markets were growing and innovating faster and serving customers better.

- The need to attract private sector capital to expand and upgrade telecommunicationsnetworks, and to introduce new services.
- Growth of the Internet, which caused data traffic to overtake voice traffic in many countries, and led to the introduction of many new service providers.
- Growth of mobile and other wireless services, which provided alternatives to fixed networks and introduced new service providers to Telecommunication market.
- Development of international trade in telecommunications services, which are increasingly provided by transnational and global service providers.
- The successful transformation of monopolistic telecommunications markets into competitive ones requires regulatory intervention. Without it, viable competition is not likely to emerge.
- In fact, the times when privatization and the introduction of significant competition occur can be the busiest periods in the life cycle of a regulatory organization.

Regulatory intervention is required for a variety of reasons.

- Typically, regulators must authorize or license new operators.
- They must often remove barriers to market entry by new operators.
- They must oversee interconnection of new entrants with Incumbent operators.
- Regulatory interventions also be required to ensure competitive markets do not fail to serve high cost areas or low income subscribers.

The objectives of telecommunications regulation vary from country to country. Governments in most countries continue to see telecommunications as an essential public service. Even after telecommunications networks are no longer run by them, governments normally retain a regulatory role to ensure that telecommunications services are supplied in a manner consistent with national perceptions of the public interest.

With the widespread adoption of market-based approaches to the supply of telecommunications services, the regulators' role is seen to involve in maintenance of a regulatory environment conducive to the efficient supply of telecommunications services to the public instead of involving in the detailed management of the sector. When regulatory measures are proposed or reviewed, governments and regulators must generally ensure that

- there is a demonstrated need to regulate, and
- most efficient measure is selected to meet the specific regulatory objective.
- Promote universal access to basic telecommunications services
- Foster competitive markets to promote:
  - efficient supply of telecommunications services
  - good quality of service
  - advanced services, and
  - efficient prices
- Where competitive markets do not exist or fail, prevent abuses of market power such as excessive pricing and anti-competitive behaviour by dominant firms.
- Create a favourable climate to promote investment to expand telecommunications networks.
- Promote public confidence in telecommunications markets through transparent regulatory and licensing processes.
- Protect consumer rights, including privacy rights
- Promote increased telecommunications connectivity for all users through efficient interconnection arrangements
- Optimize use of scarce resources, such as the radio spectrum, numbers and rights of way.

### The Regulator: Rationale for an Effective and Independent Regulator

Effective regulators are normally associated with being independent to some degree. The rationale for establishing independent, often sector-specific, regulatory institutions is based on ensuring non-discriminatory treatment of all players in the liberalized market. At the outset of the transformation process the pre-existing monopoly structure allows for discriminatory behaviour. The emphasis on non-discrimination arose from four sources which, in part, reflect different constituencies in the market. These four broad imperatives are to ensure that:

- Cooperation is enabled in a competitive environment to ensure that a level playing field exists between unequal entities in the marketplace;

- All equipment suppliers are treated equally where the market is dominated by a single buyer with strong pre-existing relationships with suppliers;
- All new entrants and investors in the telecommunications service sector are treated equally by the dominant competitor, who will be a supplier of inputs (*e.g.*, interconnection) to the businesses of the new entrants; and
- All customers have a "voice" and their complaints and interests receive an adequate response.

Addressing non-discrimination involves building confidence in and the legitimacy of an "independent" regulatory institution. The central issue is establishing a functioning, enabling environment consisting of the regulator(s) and regulations that will attract sufficient and sustainable investment to satisfy existing demand, expand supply and introduce new services. Independence stimulates investor confidence and reduces regulatory risk.Reinforcing investor confidence through an independent and effective regulator will attract private investment in the ICT sector. Independence, transparency of the regulatory process and regulatory policies that encourage competition are factors that influence the level of investment in ICTs.

An effective regulator results in less regulatory risk and increases the likelihood of investment in the sector. Figure 1 shows the relationship between effective regulations and investment. The higher score from the European Competitive Telecommunications Association (ECTA), the more effective the regulations are. As the figure below demonstrates, investments in telecommunications rise as the regulatory environment improves.

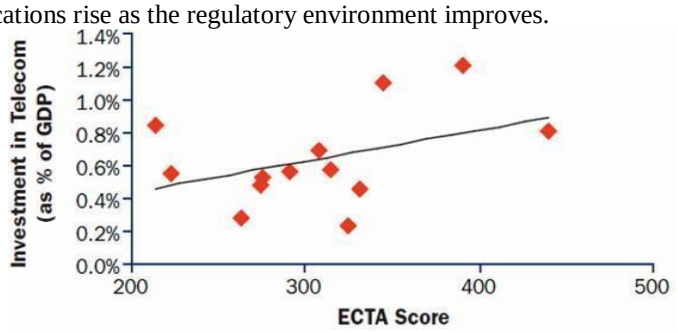



Figure 1. Relationship between Effective Regulation and Investment in Telecommunications

**What is "Independence" and how is it Fostered?**

Absolute independence of regulatory bodies is neither possible nor desirable. A regulator should not set and implement its own agenda. "Independent" regulators are expected to be subject to government oversight and a system of checks and balances.

Effective regulation that supports sustainable investment requires some independence from political influences, especially on a day-to-day or decision-by-decision basis. The regulatory body must be an impartial, transparent, objective and non-partisan enforcer of government-determined policies by means set out in controlling statutes of the regulator, free of transitory political influences. The regulator should also be independent from the industry that supplies ICT services.

The regulator should implement the policy of the government and only make decisions that are within its legal authority. However, regulators need insulation from political intervention, so that the regulatory process is not politicized, its decisions are not discredited and the policy of the government is implemented. Legal and Institutional Framework, a balance is needed to ensure that the regulator is both independent and responsive to the broad policies of the government. Several formal safeguards have been employed to achieve such a balance, such as:

- Providing the regulator with a distinct statutory authority, free of ministerial control;
- Prescribing well-defined professional criteria for appointments;
- Involving both the executive and the legislative branches of government in the appointment process;
- Appointing regulators (the Director General or Board/Commission members) for a fixed period and prohibiting their removal (subject to formal review), except for clearly defined due cause;
- Where a collegiate (Board/Commission) structure has been chosen, staggering the terms of members so that they can be replaced only gradually by each successive government;
- Providing the agency with a reliable and adequate source of funding. Optimally, charges for specific services or levies on the sector can be used to fund the regulator to insulate it from political interference through the budget process;
- Exempting the regulator from civil service salary limits to attract and retain the best qualified staff and to ensure adequate good governance incentives; and
- Prohibiting the executive from overturning the agency's decisions, except through carefully designed channels such as new legislation or appeals to the courts based on existing law.

There are currently far more regulatory authorities independent from ministerial control around the world than dependent regulators. 153 countries have established regulatory authorities that are separate from the ministries in 2009 and it increased to 158 in 2010. As shown in Figure 2, there has been a steady rise in the number of separate regulators over the last 20 years.

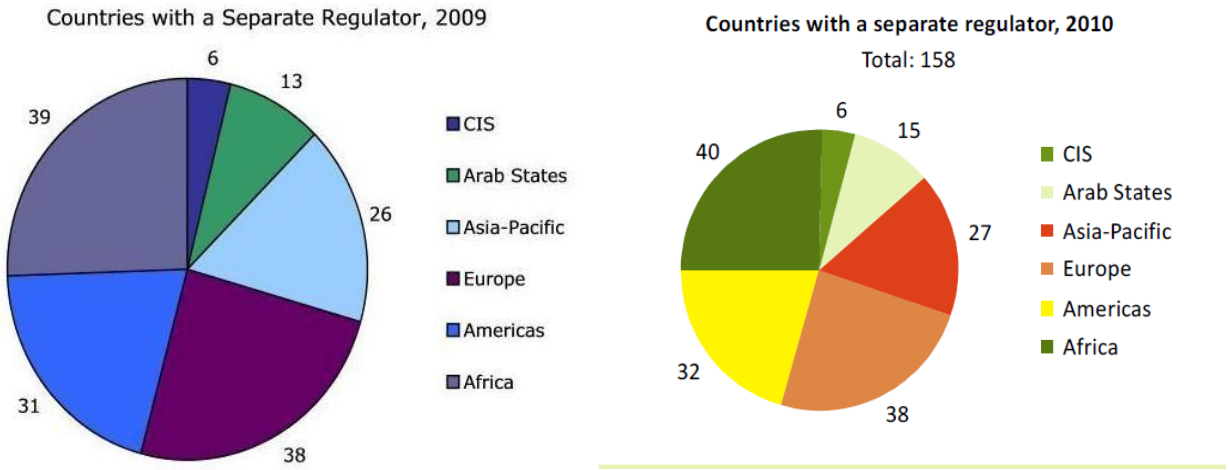



Figure 2. Number of Countries with Separate Regulators around the World

*Source*: ITU, ICT EYE, Regional Reports.

**Accountability, Transparency, and Predictability**

In addition to independence, an effective regulator should demonstrate other characteristics, including accountability, transparency and predictability. These traits should be enhanced by a clear division of responsibilities between the ICT regulator, ministries and other regulatory agencies, such as the competition authority or radio spectrum management body where relevant.

The independence of the regulator must be balanced with accountability. The regulator's authority provides it with significant power to redistribute income among different constituents in the economy. Therefore, safeguards are required to ensure that the regulator does not become corrupt or inefficient. Citizens and regulated firms must know who is responsible for a decision and the reasoning behind the decision. Interested parties must be able to provide relevant input to a decision through consultation processes. They must be able to obtain redress easily and quickly when the regulator has acted arbitrarily or incompetently. These types of safeguards produce a balance between independence and accountability. Several formal safeguards have been employed to achieve this balance, such as:

- Publishing the statutes of the regulator that clearly specify the duties, responsibilities, rights and obligations of the regulator, as well as differentiating between primary and secondary regulatory goals where there are multiple goals;
- Ensuring that the decisions of the regulator are subject to review by the courts or some other non-political entity although some "threshold" should be established to deter frivolous challenges that simply delay the implementation of decisions;
- Requiring the regulator to publish annual reports on its activities and requiring a formal review of its performance by independent auditors or oversight committees of the legislature;
- Establishing rules for the removal of regulators if they show evidence of misconduct or incompetence;
- Allowing all interested parties to make submissions to the regulator on matters under review; and
- Mandating that the regulator publishes its reasoned decisions.

Transparency in interconnection, authorization and licensing practices, and universal service obligations is a specific requirement of the World Trade Organization (WTO) and a general requirement of the EU regulatory package. Transparency entails the regulator making available all relevant information in a timely fashion. Transparency enhances the confidence of interested parties in the effectiveness and independence of the regulator and strengthens the legitimacy of the regulator. Consequently, all regulatory rules and policies, the principles for making future regulations and all regulatory decisions and agreements should be a matter of public record. ICT regulation is an important policy issue, and all citizens need information about the policy to evaluate the performance of government.

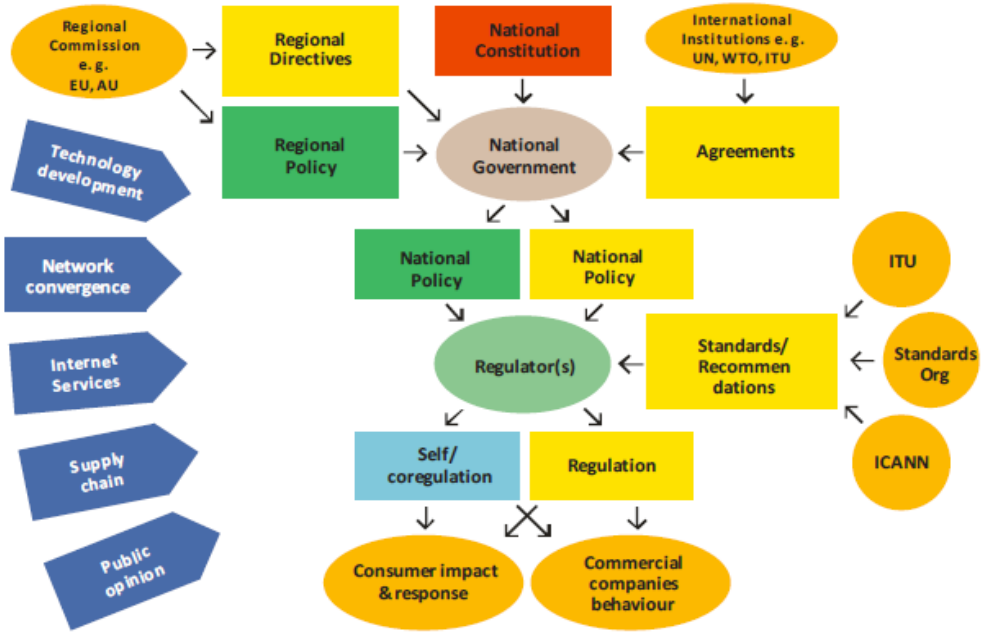
Transparency is an important contributor to good governance in general. Importantly, transparency reduces the probability that interested parties, especially those adversely affected by a regulatory decision, will believe that decisions are biased, arbitrary or discriminatory. The reasoning behind regulatory decisions, including the principles and evidence that guided them, will be apparent when they are clearly presented in the public record. Discriminatory or corrupt decisions will become evident and more difficult to substantiate once transparent processes are in place.

A successful market that attracts investors requires a predictable regulatory process. Independent regulators are predictable if they adhere to the rule of law. The most important features of the rule of law are respect for precedent and the principle of *stare decisis*, particularly in common law jurisdictions. Respect for precedent means that regulators do not reverse policy decisions unless there is evidence that those decisions have led to significant problems or that new circumstances warrant a change in the rules. The principles of *stare decisis*require that cases with the same underlying facts be decided in the same way every time. This is of particular relevance in the resolution of disputes. Adherence to these principles enhances confidence in and the credibility of the regulator and reduces regulatory risk, which reverberates positively with investors.

## III. THE CHANGING ENVIRONMENT

Regulators' activities change as the environment in which they are working evolves. This section addresses the current changing environment in terms of technology, networks, suppliers and consumer services. Figure below depicts the key areas of change and the stakeholders involved in the digital ecosystem.




**Technology development:**

Technological advances in telecommunications have been sparked by operators' need for efficiencies, cost savings and increased capabilities – all to increase their competitive advantages. The top international vendors have risen to the challenge and are all pursuing technologies that can offer ever faster and cheaper fixed and wireless network solutions based upon Internet protocol (IP). High-speed, broadband fixed, 3G and now Long Term Evolution (LTE) networks (commonly known as "fourth generation" or "4G") have enabled the progressive development of increasingly "smarter" phones and terminals and a growing environment of applications and services. Research companies such as NPD3 and IDC4 are reporting thatsome 50 per cent (around 900 million) of all mobile phones sold in 2013 have been smart phones. With broadband wireless networks and powerful new
phones, consumers now have access anytime, anywhere, to increasingly sophisticated online applicationsand services.

These technology advances have been underpinned by cooperation in developing new standards.

For example, the 3rd Generation Partnership Project (3GPP5) has played a key role in ensuring international standards for LTE. 3GPP unites six telecommunication standard development organizations (ARIB, ATIS, CCSA, ETSI, TTA, TTC), known as "organizational partners" and
provides their members with a stable environment to produce the highly successful reports and specifications that define 3GPP technologies. ITU standards (called "recommendations") are also fundamental to the operation of today's networks. For Internet access, transport protocols, voice and video compression, home networking, and myriad other aspects of information and communications technology, hundreds of ITU standards allow systems to work – locally andglobally.Meanwhile, ITU has allocated and identified a wide range of spectrum bands for use by the new wireless networks, which it defines under the term "international mobile telecommunications" or "IMT." The release of additional spectrum (the so-called digital dividend) from the transition to digital TV has also been a major boost for the telecommunication industry.

Mobile broadband is now more prevalent than fixed broadband. ITU has estimated that by end of
2013, the number of fixed broadband subscriptions will have reached 688 million globally, amounting to a global penetration rate of just 9.8 per cent. At the same time, the number of mobile broadband subscriptions grew by 21 per cent between 2010 and 2013, reachingan estimated 2.1 billion by the end of 2013. This figure, while representing nearly three times the number of fixed broadband subscriptions, still pales in comparison with total mobile subscriptions, which were estimated at 6.84 billion by end of 2013. Still, ITU predicted that mobile broadband penetration in the developing world would reach 20 per cent by year-end 2013, while penetration levels in the developed world would be at 75 per cent.

The balance clearly has shifted from fixed, wireline services in the home to wireless delivery of service to the mobile individual. This indicates the overwhelming shift to mobile broadband in all parts of the world. The paucity of fixed broadband subscriptions in the developing world is particularly significant; many parts of the world are likely to remain without large-scale fixed broadband penetration.

Meanwhile, the total number of Internet users will reach an estimated 2.7 billion worldwide at the end of 2013. In developing countries, the number of Internet users will have more than tripled since 2007, reaching more than 1.8 billion. Yet despite this rapid growth, less than a third of inhabitants in the developing world will be online by the end of 2013. There is still a majorjob to be undertaken in connecting the unconnected.

**Network convergence:**

The emergence of broadband communications has changed the way that content is packaged and delivered. Whether generated by broadcasters or by consumers, content is now being distributed over the same integrated networks. Consumers can listen to radio, watch live TV, and take part in a live video conference using the same service. With the pressure to cut costs and take advantage of new technologies, operators are progressively merging their networks so that calls originating from a mobile or fixed-line telephone or data terminal are carried over the same IP-based core network.

The main difference between mobile and fixed services lies in the access network and whether the customer's terminal is connected to the public network – either by a fixed connection (copper, cable or optical fibre) or a wireless one (cellular or WiFi). A converged network enhances efficiencies in the provision of services and the use of scarce spectrum. For example, a mobile call or Internet session can be handed over to the fixed network as the customer's terminal moves into the range of a Wi-Fi or WiMax signal.

While the core networks can operate using packet switching, the interfaces for both mobile and fixed voice users are still largely using circuit-switched technology (although this is changing for fixed access using MSANs). Interconnection between competing networks is still performed using circuit-switched technology and Signaling System No. 7 (C7) signaling.

**Internet Services:**

Supported by the growing number and capability of smart phones and higher-speed, broadbandnetworks, services provided over the Internet have experienced significant growth. These servicesrepresent new opportunities, as well as challenges, for many traditional media industries, including TV, music and news networks – not to mention every conceivable retail and service industry that can now sell its products over the Internet. "E-commerce" is changing the face ofshopping for goods and services, with impacts on shops, stores and other "brick-and-mortar" firms.

The advances in network capability have enabled the development of new value-added or "over-the-top" (OTT) service providers. OTT content and service providers are offering a multitude of applications and developing new revenue sources. The growth in OTT services has challenged the business models of infrastructure providers. Voice-over-IP (VoIP) services such as Skype are just as much an application as a weather forecast or interactive game. OTT services have benefitted from the introduction of unlimited broadband access, while operators have been slow to adjust their charging plans to reflect actual usage.

Licensed operators of telecommunication services are now lobbying for some OTT services, such as VoIP, to be made subject to licensing requirements. Their argument is that if OTT services provide voice calling, that service should be just as licensable, under the same terms that apply to traditional operators. But in most cases, the VoIP services fall outside of the existing regulatory service definitions because they are not directly provided to customers but rather are accessedover a network that is already licensed. VoIP service providers can argue that they are not using any scarce resources such as numbering, spectrum or access to land. They maintain that that the customer already is paying the licensed service provider for Internet connectivity, and the VoIP providers also pay to be connected to licensed operators. Their service results in data being passed between operators, who can deal with the exchange under interconnection arrangements.

Meanwhile, the OTT service providers are providing services that consumers want to buy, and network operators do benefit through increased demand and traffic. Competition and improved technology have prompted operators to evolve from the provision of "plain old telephone service" (POTS) to the provision of broadband services that allow voice, data, video, live TV, games, social networking – the list goes on.

However, operators of converged networks are likely to continue seeking new approaches, working with OTT providers, to defray network costs and capital investments. Some of the biggest drivers of OTT revenues (and network capacity demand) are social networking sites, which have provided a new way for people to communicate and share ideas. The eBusiness Knowledgebase website provides a ranking of the top 15 social networking sites; in May 2013, Facebook alone was visited by some 750 million people.eBusiness also ranks the top 10 websites (of all kinds).The May 2013 list consisted of Google, Facebook,Yahoo, YouTube, Wikipedia, MSN, Amazon, eBay,Twitter and Bing.

A 2012 Nielsen study on how Americans use theirmedia time indicated that many people have "cut thecord" and no longer watch video via broadcast, cable orsatellite TV. These individuals comprise more than5 million "zero TV" U.S. homes, up from just over2 million in 2007.

Indeed, the proliferation of broadband networksand the digitization of content are bringing about a profound and rapid transformation of the media andcontent landscape, with potential fallout for regulatoryfunctions. Russia, for instance, has issued severalInternet Protocol Television (IPTV) licences. It is nowquite common for a radio "chat show" to take a callfrom someone living overseas and listening to theprogram on the Internet. The Russian broadcast stationand the chat show channel are both licensed, but manyInternet service providers are not. The aggregateaudience for unlicensed, self-produced and "long tail"content is growing. For example, in March 2013YouTube's worldwide audience12 exceeded 1 billionmonthly unique users. To put this in perspective,however, the Broadcaster Audience Research Board(BARB) in May 2013 indicated that, on average,43.779 million people per day watched TV in the UK,out of a total population of around 60 million.Entertainment is not the only driver of online services.

To cut costs, banks increasingly have begunoffering services over the Internet. There is now asteady rise in the use of the mobile devices for financialtransactions, a trend that developed partially from prepaidmobile services. In the developing world, wheremost people lack bank accounts, "mobile money" or"mobile wallet" services represent a significantopportunity to reach the "unbanked" or "underbanked" market. In January 2013, Juniper Researchestimated

that by 2017, more than 1 billion mobilesubscribers (15 per cent of global mobile subscribers)will use mobile banking services. This gives telecommunicationsand financial regulators an incentive towork together to ensure that consumers are properlyprotected.
*Near-field communication* (NFC) is a form of rapidcommunication between wireless devices like smartphones or tablets. NFC allows a user to simply wave asmart phone over another NFC-compatible device tosend information over the Internet without needing totouch the devices together or go through multiple stepssetting up a connection. NFC technology is enabling thedevelopment of a host of new services to assisttransactions. For example, consumers may be able tosimply swipe a smart phone over a sensor at thesupermarket checkout lane or to buy a theater ticket –not to mention sharing the latest game with a friend.

**Supply chain:**
Along with the lessening of restrictive practices andthe growth of competition in the supply of equipmentand services, there has also been consolidation in themanufacturing sector. There are now only a relativehandful of equipment providers globally that cansupply a full range of network equipment and servicesto the telecommunication companies. A list of the top10 suppliers would include Alcatel-Lucent, Alvarion,Cisco, ECI Telecom, Ericsson, Fujitsu, Huawei, JuniperNetworks, Nokia, Marconi, Qualcomm and ZTE. Thereduction in the number of global equipment providers,along with the growth in their size, has made iteasier for the major market players to cooperate indeveloping harmonized standards, advancing newtechnologies, and operating with greater economies ofscale.
Many developing countries face increasing regionalizationof their telecommunication markets.
International telecommunication groups like BhartiAirtel, America Movil, Telefonica, Millicom InternationalCellular, Etisalat, MTN, Qtel, Digicel, Cable and Wireless,Vodafone and Vimpelcom now operate across nationalboundaries in their respective regions. This brings somebenefits, but it also affects the environment forregulators, including the following impacts:

- Regional companies may not have local regulatorystaffs in each country, leaving national regulators with no local personnel with which to interface.
- Regional or corporate regulatory affairs staffs maygive higher priority to regional regulatory policy interests than to local or national ones.
- Regional marketing and pricing strategies mayovertake local ones.
- Services and branding may be defined regionally orinternationally, rather than to suit local or nationalcircumstances.
- Cost reductions, economies of scale and centralizationmay be achieved through aggregation of procurement activities, sharing of IT platforms,centralized billing, internalization and aggregation of traffic for international connectivity, and locationof customer support in call centres and data centres.
- Efficiencies may be achieved from regionallyintegrating corporate structures, sharing expertise across the enterprise, and making the same individualsresponsible for multiple jurisdictions.
- Strategic decisions may be centralized;
- National subsidiaries may share the same boardswith affiliates or parent companies.2
- There may be integrated regional networks andtechnology transfers.
- Integrated disaster preparedness and recoverypolicies may be implemented.

Regional and international operators also have thepotential to cross-subsidize, using profits in one countryto sustain anti-competitive activities in another. Suchtechniques can also be adapted to efforts to minimizeor avoid taxes. In fact, with the consolidation of themarket into a few regional and global operators andequipment suppliers comes the issue of potential anticompetitivebehaviour by companies that have gainedsignificant market power (SMP). Global suppliers could, for example, use SMP to force network operators toadopt technologies that suit the suppliers' globalbusiness interests rather than those of the operator.
One way to achieve this is by stopping support for oldertechnologies, requiring operators to invest in new onesbased on the suppliers' timetable, not their own.
Meanwhile, the market's shift to IP-based technologyhas reinforced the reality that the dominant
industry players are no longer the incumbent telephonecompanies. Tech companies such as Apple andSamsung, with their smart phones and tablets, andGoogle and Microsoft, with their software applicationsand platforms, have become the new business leaders.These companies are rapidly increasing their stockvalues, while the infrastructure players are struggling tokeep pace. There has been a quantum change in thevalue chain, and now the software and applicationservice providers dictate to the infrastructure players.

## IV. THE EVOLVING ROLE OFREGULATORS

The impact on regulators of theevolving telecommunication environment and changingpublic policy is significant. Thetrend of technology convergence and the changing faceof competition, with new entrants, mergers andacquisitions, are directly affecting the role of regulatorsaround the world.

**Competition and services:**
More than 161 countries had established independentregulatory agencies by mid-2013, whileliberalization of telecommunication and ICT marketscontinued. Competition is now the norm in most ICTmarkets throughout the world.

The range of newservices now offered over broadband networks,however, is requiring regulators to work closely withdifferent interest groups and authorities.
These newservices are raising basic questions about how theyshould be regulated: Can old models be applied or is anew approach needed?
In this evolving network environment, a progressivepolicy framework to oversee the physicalinfrastructure is absolutely necessary, but it is notsufficient by itself. Networks are ultimately set up todeliver services, and regulators have to face thechallenges that these new services and applicationsbring. In theory, regulators should be transitioning from*ex ante* to *ex post* regulation36 and more reliance ongeneral competition law and regulation. However,many markets are undergoing consolidation, resultingin two or even one fixed infrastructure operator and areduced number of mobile network providers. Mobilenetwork operators, which have always been subject tocompetition in most markets, are now offering seriouschallenges to the fixed providers – to the extent thatthey now dominate most call-origination markets. So,regulators need to base their approaches on soundcompetition principles and assessments of theirmarkets. This will allow them to act flexibly enough tocope with the changing fortunes of different marketplayers.
ITU's Global Symposium for Regulators (GSR) hasestablished *Ten Best Practice Guidelines for EnablingOpen Access.* The list recommends regulation that willset the right balance between service competition andinfrastructure competition. This includes ensuring equaland non-discriminatory access to networks andalleviating potential bottlenecks.Creating an environment that gives consumers achoice of services and providers has been a fundamentalfunction of regulators. In a competitive digitalenvironment, with more and more broadband services,the challenge becomes ensuring that everyone hasaccess to those services. In remote rural areas,circumstances such as low population density, distancefrom urban and backbone networks, and challengingterrain and climate can make it uneconomical to buildcompetitive network infrastructure. In such cases, thefocus may shift to competitive provision of services,including from OTT providers. Choice among OTTservices can be maintained by ensuring *networkneutrality*. However, operators often fight hard againstregulations that require them to provide access to theirnetworks.
In spite of regulatory requirements, establishedoperators have often used interconnection, roaming,infrastructure sharing and network access issues toinhibit competition or maintain a competitive advantageand higher prices. Regulators have beenchallenged by many of these issues, resulting in delaysin building truly competitive markets. In many cases,regulators have forced infrastructure sharing, but oftenjust at a passive level, such as mast or duct sharing.Where a structurally separate broadband network ismade available to all operators on wholesale terms,however, full infrastructure-sharing can be achieved.
Regulators and incumbent operators alike can facechallenges when a global operator enters their market.Global operators have cost and strategic advantagesover local incumbents that can help them considerablyin gaining market power. Global players can afford tofield highly qualified regulatory lawyers and supportstaffs to confront and bedevil the regulator. Moreover,they can use profits from one country to cross-subsidizeofferings in another, undercutting prices, rapidlyincreasing market share and dominating the subsidizedmarket. Retail cross-subsidies can be generated bothfrom overseas markets and from highly profitable (andlightly regulated) mobile calling termination rates. Theresult can increase the level of mobile-to-fixed or fixedto-mobile substitution (depending upon which marketsegment is being subsidized). Moreover, operators canuse internal accounting to establish favourable financialadvantages for subsidiary companies. Often, the globalparent company provides support or common servicesto the local subsidiary for free. Capital equipment maybe purchased through central contracts, with volumediscounts provided to subsidiaries but not open to rivallocal incumbent operators.
On the other hand, regionalization and globalizationcan bring many advantages in terms of cuttingcosts and introducing new services. Regulators have torespond when operators exploit the rules to their ownadvantage and threaten to distort markets. However,regulators should ensure they do not block investmentand change unduly in an effort to protect nationalincumbents. The key is to support market-drivenadvances in technology and business practices, whileensuring that anti-competitive activities are prevented.
Production of "codes of practice" or "guidelines" onwhat regulators deem to be anti-competitive can assistoperators. The code of practice for competition intelecommunication services adopted by the InfocommDevelopment Authority (IDA) of Singapore is representativeof many such codes. It aims to:

- promote the efficiency and competitiveness of theinformation and communication industry;
- ensure that telecommunication services arereasonably accessible to all people, and are suppliedas efficiently and economically as practicable– at performance standards that meet social, industrialand commercial requirements;
- promote and maintain fair and efficient marketconduct and effective competition;
- promote the effective participation of all sectors ofthe information and communication industry;
- encourage, facilitate and promote industry self-regulation;and
- promote investment, development and expansionof the industry.

Many competition policy issues center on the relationshipbetween dominant and non-dominant marketplayers, including content providers. The regulator hasa role to play in the application of competition policy,including merger control.

**Net neutrality:**
The question of whether action is needed to ensureunfettered access to the Internet is still beingdebated and challenged. The move to require Internetnetwork operators to ensure equal access and nondiscriminatorytreatment is referred to as

*net neutrality*.While there is no single, universally accepted definitionof the term, most agree that it should include thegeneral principles that (1) network owners that provideaccess to the Internet should not restrict how consumerslawfully use that network, and (2) operators shouldnot be able to discriminate against unaffiliated OTT orcontent providers that seek access to their networks.
The U.S. Federal Communications Commission, forexample, has generated net neutrality rules through its*Open Internet Order*. There is still a debate in theUnited States, however, about whether more specificregulatory guidelines are required to protect themarketplace from potential abuses. Some argue thatexisting laws on competitive behaviour are sufficient.The US Congress (i.e., the national legislature) isdebating net neutrality; meanwhile, operator Verizonhas challenged the FCC's rules in a federal appealscourt.

**Licensing and authorizations:**

In the early days of liberalization, secondgenerationregulators focused on creating competition in different market segments by separately licensingmobile, fixed , Internet and international services.
Third-generation regulation moved to unified licences,pioneered by Singapore, Australia, Nigeria, Kenya, Egyptand a number of EU countries. Technical advances andthe pursuit of IMT standards allowed different wirelesstransmission technologies to be used in the samefrequency bands. As a result, unified licensing hasallowed any company wishing to provide telecommunicationservices to do so using any technology andoffering any type of service, whether it is fixed, mobile,data, or Internet. The unified licence still includes,however, requirements for consumer protection,quality of service, coverage, interconnection, competitivebehaviour and lawful interception.
In some countries, there have been issues with theintroduction of unified licences. These have concernedsuch matters as licence fees (for example, in India) orefforts by incumbents to delay competition. Leavingsuch issues aside, a technology-neutral approach isoften needed to support sound and sustainablecompetition, and unified licensing is one such approach.One example is the "general authorizationscheme" developed by OFCOM in the United Kingdom.This approach also has been set out in the EU'sdirective on authorization of electronic communicationsnetworks and services.The core innovation is the replacement of individuallicences with general authorizations, whileanother regulatory framework still exists for use offrequencies and numbers. In other words, the operatormight be required to submit a *notification* to regulatoryauthorities, but it may not be required to obtain anexplicit decision authorizing it to offer service. There isa clear distinction, however, between operating under ageneral authorization and having a right to use scarceresources such as radio frequencies and numbers.Broadcasting or content production and distributioncould be subject to a similar approach.

**Interconnection:**

Dealing with interconnection, as well as rates forfixed and mobile termination, has always been a timeconsumingand resource-intensive task for regulators.Interconnection barriers have been a major tool in thearmoury of incumbent operators in slowing down thelaunch of new entrants' services. Apart from transitoperators, interconnection must not be seen as asource of profit but rather a reciprocal arrangementbetween licensed operators that need to terminatecalls for each other's customers.
Interconnection issues will continue to be a significantchallenge to regulators, who need appropriatepowers to ensure that interconnection rates reflectcosts in order to support sustainable competition. WithIP networks, there is an opportunity to simplifyinterconnection rates using either "sender-keeps-all" ora single, low rate based on an efficient IP network. Withconverged networks, there is a progressive blurring ofboundaries between the content and voice worlds.

**Institutional efficiencies:**

Regulators need appropriate regulatory powersand tools to fulfil their mandates efficiently and withoutundue political and market influence. Their actionsshould be based on the principles of accountability,transparency, stability and predictability. Like anyorganization, a regulatory agency requires a clear visionand strong leadership. Governments can help byestablishing clear ICT policies for the regulator toimplement; the lack of a clear legal framework willimpact a regulator's ability to work effectively.

## V. FOURTH-GENERATIONREGULATION

The evolution of the fourth-generation regulator'srole can be viewed as a necessary response to severalcritical issues arising out of the changing environment.These issues, as depicted on Figure, stem largelyfrom economic and social development realities andobjectives set by government policy-makers. To beclear, these issues should be seen as additions to themore traditional tasks of regulators, which shouldprogressively become less important with the maturingof a competitive market place.

**Universal access to broadband networks:**

What will not change, however, is the fact thatoperators in a competitive environment will notwillingly serve communities in areas where it does notmake economic sense to do so. Further, competitiveoperators often focus on new customers and growingmarket share, rather than on retaining existingcustomers.

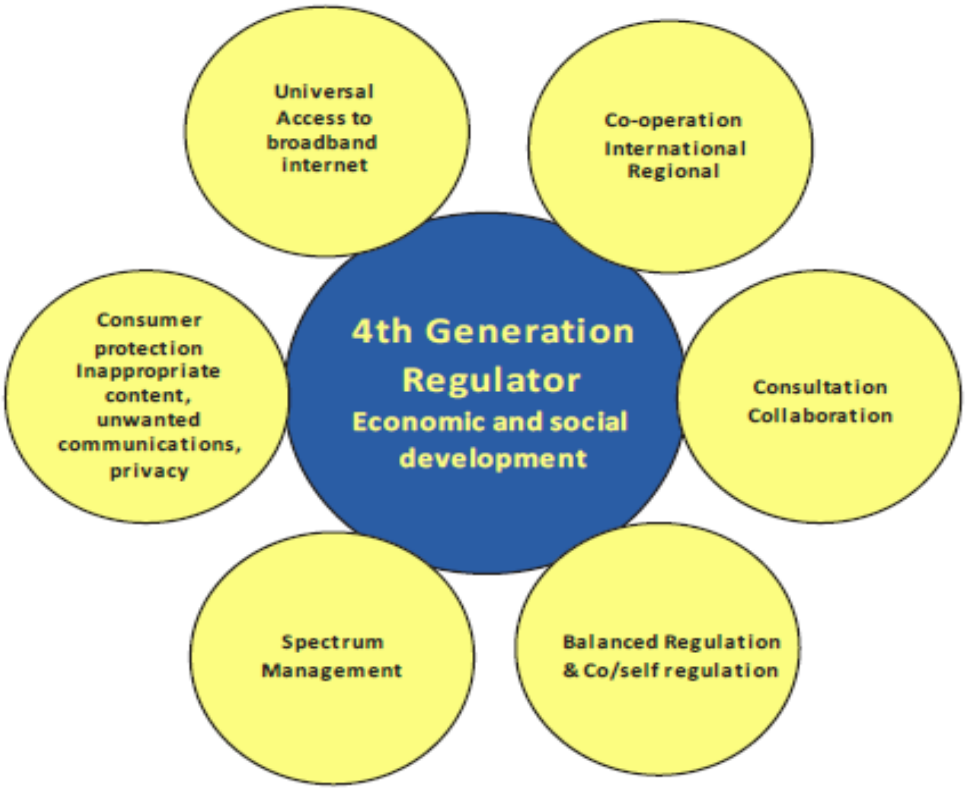



Figure: The Evolving Role of Regulators

The key challenge for governments and regulators,then, is to encourage the private sector to cover aslarge a percentage of the population as possible,leaving only the smallest number of people to beconnected using financial subsidies. The fourthgenerationregulator has a major role to play in this,working with a wide range of interest groups to ensureuniversal broadband connectivity to the Internet. Inurban and developed countries, this should be on a*universal service* basis (i.e., striving to make sure everyindividual person or household has broadband service).
In rural communities and developing countries, thepolicy goal is more likely to be *universal access* (i.e.,ensuring that each individual has access to broadbandservice somewhere in the community).

**Consumer protection:**
Responding to consumer complaints is, and willremain, a major task for any regulator. To supportmarket entry and fair competition, newly formedregulatory agencies have had to devote much of theirattention to ensuring that networks are interconnectedand that the incumbent operator does not abuse itsdominant position. For their part, many new entrantshave focused on competing and growing their customerbases. Their customer service may not always be aseffective, initially, as might be wished, and as a result,regulators often have found it necessary to deal withmany consumer complaints.
With convergence of services and the increaseduse of the Internet (especially using mobile devices),consumer protection activities are even more importantthan ever before. Many countries are adoptingconsumer protection regulations specifically designedfor ICT customers; these may be enforced either by theICT sector regulator and/or a designated consumerprotection agency.
The Australian Communications andMedia Authority (ACMA), for example, has institutedmeasures to protect consumers' interests in theInternet Age, investigating complaints about onlinecontent and gambling services. ACMA also hasencouraged the development of codes of practice forISPs and educated the public about Internet safety andprivacy risks, particularly for children.
Consumer associations and boards have been establishedin various countries to focus oncommunication issues. In the United Kingdom, notableexamples include the OFCOM Consumer Panel andthe UK Communications Managers Association(CMA).Further examples can be found in Bahrainand Vanuatu, where regulators have establishedconsumer and business advisory groups. In manycountries, other entities promote consumer protection,including government organizations and self-regulatingbusiness associations and consumer protectionagencies.
ICT regulators should collaborate with any and allinterested agencies in order to coordinate activities inthe interest of consumers. Further, regulators need toensure that operators make it clear to their customersthat complaints can be brought to independentregulatory entities. Consumers need to know whichregulatory entity to contact, based on the particularissue of concern. For example, if a customer has acomplaint concerning a mobile financial or "ebanking"service, the complaint most likely should be submittedto the financial regulator (often, but not always, thenation's central or reserve bank). Underpinning theconsumer-protection system are agreements amongregulators over the division of jurisdiction, as documentedin a *memorandum of understanding* (MOU).

In India, there are consumer-organized online initiativessuch as "Consumer Tadka," which is run by theonline consumer forum Akosha. The objective ofConsumer Tadka is to help people resolve disputes byallowing them to register their complaints online.When a consumer files a complaint on the ConsumerTadka website, an executive calls the customer andhelps them resolve their issue. Consumer Tadka alsohas produced *Filing a Consumer Complaint – The No-Nonsense Guide* to help Indians through the complaintprocess.

**Consultations:**

In many countries, regulators are required to consult with stakeholders before issuing regulatorydecisions, determinations or guidelines. With service convergence and Internet growth, the number of those stakeholders has rapidly increased and become much more broadly representative of society. For example, a measure impacting on content could draw in stakeholders from consumer groups, religious groups, educational institutions, content developers and programme producers, as well as network operators.Engaging with community leaders and involving them in consultation processes is essential, particularly indeveloping communities. Regulators and communities need to collaborate on, not only the opportunities that broadband Internet access brings, but also on the issues that may need to be addressed by some form of regulation or through education and awareness-raising efforts.

**Balanced & Innovative Regulation:**

In order to be effective, fourth-generation regulators need to exhibit such characteristics as:

- openness to ideas and approaches;
- flexibility to keep up with rapid changes in themarket;
- business sense to work with operators;
- knowledge of financial aspects of the business;
- political agility and understanding to work withpolitical leaders;
- the ability to offer policy guidance;
- the ability to develop appropriate regulations toimplement public policy; and
- an understanding of consumer issues.

At times, a regulator has to be innovative, workingto achieve the vision and goals set by policy-makerswhile remaining within the law. One example ofcreativity and flexibility can be found in Bahrain, wherethe regulator took an innovative approach to numberportability, taking on the capital costs of the numberportability system. This approach removed the burdenfrom the operators and enabled effective implementation,ultimately allowing customers to change serviceproviders and keep their existing numbers.

Often, regulators can work with licensees to developguidelines or urge the operators to police their ownindustry. This is generally referred to as *self-regulation*or *co-regulation*. With self-regulation, the industryvoluntarily develops, administers and enforces its ownsolutions to address a particular issue – with no formaloversight or legal enforcement by the regulator. Inreality, a more common approach is co-regulation, inwhich the regulator and industry together develop,administer and enforce a solution. Co-regulation maybe authorized by legislation, giving industry an officialfoundation for setting and administering its ownguidelines or codes of practice.

## VI. CONCLUSION: REGULATORY BEST PRACTICES

Based on the experiences of regulators in developed and developing markets, a fourth-generation regulator is likely to:

- implement pro-competitive ICT policies that are influenced by international and regional agreements,and that are designed to achieve social and economic objectives;
- regulate a converged communication environment, either through a single converged regulatory entityor a closely coupled group of regulators;
- regulate competitive broadband communications services, including telecommunications, Internet,television, radio and posts;
- take action, within the scope of ICT regulations, to protect public interests in areas such as health,safety, the environment, and social cohesion;
- play a key coordinating role in consumer protection and the security of content and information;
- work in a collaborative way with a wide range of national, regional and international stakeholdersinvolved in developing and sharing approaches to market development and regulation;
- work with, or manage, government-led funding and public-private initiatives to secure universalservice/access to broadband internet connectivity and to achieve digital inclusion;
- foster initiatives to involve communities in sustainable infrastructure development for broadbandconnectivity; and
- develop and support a sustainable, competitive and largely digital communication environment bybeing innovative wherever appropriate.

**REFERENCES**

[1] ITU, 2009, The World in 2009: ICT Facts and Figures, http://www.itu.int/ITUD/ict/material/Telecom09_flyer.pdf

[2] ITU World Telecommunication/ICT Indicators Database, http://www.itu.int/ITU-D/ict/statistics/
[3] Consultation Paper OnRegulatory Framework for Over-the-top (OTT) services from TRAI. Consultation Paper No: 2/2015
[4] Trendsin Telecommunication Reform, which spotlights thetheme of "Fourth-Generation Regulation: DrivingDigital Communications Ahead." ITU 2014.
[5] The consultation paper published by the Information and Communications Technology Authority (ICTA) ofMauritius, 17 March 2011.
[6] ITU-infoDev Telecommunications Regulation Handbook, 10th Anniversary Edition, 2011
[7] ITU's Global Symposium for Regulators (GSR ) 2013 edition and to access the GSR13 Best practiceguidelines
[8] ITU Trends in telecommunication reform 2013: http://www.itu.int/dms_pub/itu-d/opb/reg/D-REG-TTR.14-2013-SUM-PDFE.pdf
[9] ICT Regulation Toolkit.