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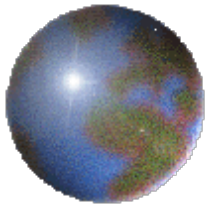

Session 2.1

The Top 10 Issues Facing the Telecom Sector in 2010

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AGENDA

- Convergence
- Regulatory Frameworks
- Managing the Regulatory Process
- Regulations
- Licensing
- Digital Dividend in Spectrum
- Spectrum Sharing
- Open Access
- Universal Access
- Customer Service in a Converged Environment

Convergence: Definition

- Convergence has been defined as the ability of one or different networks to carry different services. Or the bringing together of industries in the communications area, which were previously viewed as separate and distinct in both the commercial and the technological sense.
- Examples are the provision of Internet access and TV to mobiles and triple or quad play services offered by ISPs or Cable TV Operators.

Convergence: Benefits

- Convergence creates possibilities for companies to develop and deliver services across technology platforms, increases economic growth, and allows for users to gain access to new kinds of communication and media services
- Promotes the expansion of competition, allowing the introduction of inter-modal competition where networks and technologies compete with each other with no technological or regulatory restrictions;
- Technology convergence provides the possibility for new competitors to enter the markets. Telephony can be offered by cable TV operators, TV to telephony providers
- Reduces costs of telecommunications services;
- Fosters the development of more efficient technologies and services;
- Opens the door for new ways for people to obtain Internet access

Regulatory Frameworks

- There are three approaches taken by countries to address convergence:
  - a legislative approach;
  - a regulatory approach; and
  - a self-regulation approach.
- Although the first two are most commonly used among policy-makers, the self-regulation approach is gaining increasing popularity.

Legislative Approach

- The legislative approach develops legislation that responds to convergence.
  - Legislative solutions define new laws or create new regulatory frameworks to respond to convergence and guide future policy direction, either by developing and implementing a reform of the telecom legal framework or by amendments to existing laws.
- An advantage of the legislative approach is that it allows for the introduction of a new framework to deal with convergence, without the constraints imposed by other regulations or by the existing telecom law that may contain categories where converged services do not fit.
  - A new law or an amendment of an existing law can eliminate contradictions and inconsistencies in regulatory classifications.

Regulatory Approach

- Under this approach, countries do not develop new legislation rather they modify existing regulations to address new technologies.
  - For example, in the US, the FCC introduced regulatory modifications to allow new technologies, such as power line communications (PLC).
- This approach can be a practical way of addressing convergence provided that existing regulations can be modified or new ones introduced relatively quickly.
  - This approach must be carefully managed to minimize inconsistencies between new and existing rules as such it is often used by policy-makers to complement a legislative approach.
  - This complementary mix allows governments to establish new legal frameworks while dealing with its specific effects through regulation. For this combined approach to work the legislation must be sufficiently flexible to allow periodic regulatory adjustments.

Self-Regulation

- The self-regulation process consists of developing and designing convergence policy through an ad hoc or existing consultative body.
  - The role and functions of these consultative bodies varies, but they generally issue recommendations to the government addressing the need for changes in convergence legislation and/or regulation.
  - The outcome is often self-regulation or industry guidelines.
  - These consultative bodies often address specific issues of convergence (*i.e.*, VoIP or Next Generation Networks (NGN)) or undertake a more comprehensive analysis assessing the consequences of the legislative and regulatory environment
  - The self-regulation process has certain potential problems, e.g., the intervention of industry representatives may pose a risk in those jurisdictions where competition has not developed since the consultative body may be dominated by these operators and its conclusions could reflect narrow interests.

Institutional Design

- In selecting the appropriate institutional structure, countries have various design options available, including economy-wide, infrastructure-wide, industry-wide, communication-wide or purely sector-focused institutions.
  - The choice depends in part on the extent the chosen sector, e.g., ICT, energy, water, transport, is similar to (or different from) other sectors of the economy in a particular country
    - On the availability of suitably qualified staff
    - On the state of reform and infrastructure development of each utility sector.
- Determining the ideal organizational structure for a regulatory authority requires an assessment of various factors including: the country's needs and objectives; political environment; legal requirements; and available expertise in the labor market

Institutional Design (continued)

- Single-sector regulatory bodies are one whose sole function is to oversee one particular sector e.g., telecom, water, and electricity.
- "Converged" regulator combines Broadcasting, Telecom, and Cable into one authority
- Multi-sector regulatory authority (MSRA), normally encompass various industry or economic sectors that are considered public infrastructure services, e.g., telecommunications, water, energy, and transportation.
- The fourth format is not a regulatory authority, but an approach where general competition policy is used to oversee and govern the specific utility sector.

Institutional Design

- Countries with converged regulators include Australia, Finland, Iraq, Italy, Japan, Kenya, Mali, Malaysia, South Africa, Singapore, Uganda, United States and United Kingdom
- Despite this trend, most OECD countries still have separate regulators for broadcasting and for telecommunications content regulation is typically addressed by a separate ministry or government authority (e.g., in India and Saudi Arabia) or by the broadcasting authority (e.g., in Botswana, Chile and Colombia).
- In India, there are two entities responsible for content regulation. The Ministry of Information and Broadcasting monitors content related to broadcasting and film while the Ministry of Information Technology regulates content related to the Internet.

Regulatory Success

- The choice of institutional design does not guarantee success of the regulator. Success will come only if based on the following principles
  - Regulators must be perceived by industry to be independent
  - Regulators should have the expertise to assess and make sound judgments on both technical and industry-specific issues
  - The regulator must take into account various viewpoints and interests, including economic, social and political objectives.
  - The institutional design, internal structure, and administration must be flexible enough to allow the regulator to adapt to market realities.

Regulatory Framework

- Continued convergence within the ICT sector will present regulators with new challenges associated with vertical and horizontal integration of on-line services and applications. New players are progressively developing novel equipment, devices, services, applications and business models that have the potential of altering the ICT competitive landscape.
- Development of strong competencies in the economic and legal techniques and methodologies for competitive analysis will be a critical input for regulators going forward.

Managing the Regulatory Process

- Proper institutional design is important for providing confidence to investors and customers that the regulatory process is credible, legitimate, and predictable.
- Regulation is credible if stakeholders can trust that commitments will be kept.
- Legitimacy means that the regulator is not captured by the operator or other special interests.
- Regulation is predictable if regulatory decisions are consistent over time so that stakeholders are able to anticipate how the regulator will resolve issues.

Regulatory Independence

- Effective regulation also requires that the Regulator adopt and implement procedures that are transparent and open to public participation and ensure accountability.
- Independence depends on:
  - Robust and transparent governmental and legal institutions
  - The number and quality of the regulatory staff.
  - The administrative structure of the regulator, including staffing processes,
    - The legal status of the staff,
    - Remuneration principles
    - The ability to hire outside consultants provide key insights into the independence, depth of knowledge, and impartiality of the regulator, as well as its ability to attract and retain qualified personnel.

Stakeholder Consultations

- Consultations are an essential part of the decision-making process as they reinforce regulatory autonomy and accountability.
- Consultations can make the regulator more accountable without comprising its independence
  - Not only do consultations enhance the confidence the industry and the wholesale providers have in the regulator, but they also increase consensus and support for regulatory decisions, and provide a mechanism for input and feedback to the regulator from the stakeholders
  - It is critical that the Agency be willing to debate and answer questions openly and publicly.
- If the Regulator is seen as being weak or ineffective industry, consumers, and other stakeholders, will not trust him.
  - If these stakeholders lose trust in the Office of the Regulator or in the Regulator himself, foreign investors will pick up on this and be hesitant to invest in the country because of this uncertainty and trust in the market and in the Regulator's ability to ensure a level playing field.

Accountability

- Ensure that regulators and others involved in the regulatory process are held accountable for their actions
- Improving the transparency of a regulator can make it more accountable without comprising its independence.
- Increasing a regulator's accountability by providing for more formal and informal consultations will also improve the transparency of the regulator and can show the competitive carriers that the regulator has not fallen prey to regulatory capture.

Accountability & Transparency

- Mechanisms for ensuring accountability and transparency include:
  - Allowing stakeholders to appeal agency decisions to the courts,
  - Providing a detailed specification of the tasks to be performed by the regulator
  - Providing for clear rules and deadlines, transparency of the regulatory decisions (publication and reasonable explanation of decisions, existence of consultative bodies)
  - An open regulatory process along with existence of feedback procedures
  - The supervision of regulator actions by auditors and watchdogs
  - Mechanisms of removal when moral incapacity or misconduct is proved
  - Scrutiny of budget, and commissioners or directors serving fixed terms
- Transparency promotes intellectual rigor, well-reasoned decision making, and coherent policy

Enforcement

- Rules governing behavior of the Operators and other Stakeholders should be fully, fairly, and vigorously enforced so as to tolerate no breaches.
- Regulators must be able to impose appropriate sanctions, take enforcement actions, if regulatory decisions, license conditions, laws and/or regulations are violated.
- The central purpose of regulation is to protect consumers, including future consumers, and look after interests in the short and long terms.

Importance of Leadership

- Ensuring Transparency, Accountability, and Trust are only one part of the issues Regulators face
- To be successful, regulators need to properly fulfill their technical roles while also helping the political process express the values guiding policy and helping the players in the policy and regulatory processes adapt to new realities.
- Getting the technical issues right only goes so far; to be successful, the regulator needs to recognize context and provide leadership and/or play the role of the politician
- A challenge for regulators engaging in creating new policy choices is that regulators need to recognize the limits of their political authority, i.e., that there will not be unanimity.
- Leadership is about "mobilizing people to tackle tough problems"

Leadership

- Regulators are sometimes scapegoats for unpopular policies and unavoidably become involved in shaping the policies that they are supposed to implement.
- Leadership techniques can help regulators survive and thrive in such an environment
- To be successful, regulators need to recognize context, changes in context, and patterns in the changes.
  - When changes occur, some people have to give up things that they have valued about the past, which increases the danger to the regulator's job.

Leadership Techniques

- Regulators should address this challenge by "getting on the balcony."
- Getting on the balcony is a metaphor for seeing what is really going on with yourself and others and how others are interacting with you and with other people. When you are on the balcony looking down you gain an additional perspective on what is happening all around you.
- Getting on the balcony requires stepping back from the fray and asking:
  - Who cares about the actions I am taking?
  - What seems to happening beyond my vision?
  - Why are some people engaged and others not engaged?
  - Who am I hearing from and, perhaps more importantly, who am I not hearing from?
  - What seems to energize particular people, and what seems to lead to resistance?
  - How can I get it done?
- Asking these questions can help the regulator understand what is happening

Leadership Techniques

- While getting on the balcony is an important part of the leadership process, it is also important to quickly get back into the fray and orchestrate the process in a way that allows adaptive work that of making changes in these values, traditions, attitudes, and behaviors.
  - The need for adaptive work arises when fundamental changes in a group's (or an individual's) environment calls for a rethinking of basic goals and strategies
  - Protect out-of-the-box thinking by engaging the public and stakeholders in open forums on a regular basis
- Modeling Behavior of what you can expect from others is another type of leadership techniques.
  - It shows others that the regulator recognizes what others have to give up for change to occur.
  - Second it shows others that the regulator is also willing to pay the price for change.

Dispute Resolution

- Besides having transparent, open and participatory procedures, an effective regulator needs the power to resolve disputes and enforce its decisions and laws.
  - Regulatory decisions and rulings need to be impartial, and guided by values and reasoning without conflict of interest
- The failure to resolve disputes quickly can limit competition, cause delays in the introduction of new services and infrastructures, block or reduce investment in the sector, and impede liberalization and development of the sector.
- The best dispute resolution mechanism, varies depending on the stage of a country's telecom market, regulatory development, regulatory framework and approaches, as well as general business culture.

Dispute Resolution (cont)

- Dispute resolution can be addressed through two separate approaches, official and non-official mechanisms.
  - Governmental authorities, statutory bodies and courts (official)
  - Some regulatory controversies may be best resolved through unofficial channels, e.g., alternative dispute resolution (ADR) processes when traditional means of resolution are costly, time consuming, and unpredictable.

Regulatory Adjudication

- When effectively and efficiently applied, regulatory adjudication has certain distinct advantages as well as disadvantages.
  - It draws upon the legitimacy of the official sector, as well as the benefits of its enforcement mechanisms;
  - A well-staffed regulatory agency can access staff resources with different expertise (*e.g.*, technical, economic, and legal) to provide input into decisions;
  - The adjudication process can give the public a channel to provide input into the decision-making process.
  - It can result in lengthy and cumbersome procedures;
  - Susceptible to misuse of regulatory intervention by market-players, particularly incumbent operators, as part of a strategic response to hinder competitive conditions;
  - Legislative mandates can reduce the regulator's flexibility in confronting significant disputes and sector issues
  - A tendency of regulatory bodies to fragment or compartmentalize decisions into separate proceedings

Alternative Dispute Resolution

- ADR includes:
  - Negotiation
  - Mediation
  - Arbitration

Corruption & Conflict of Interest

- Ethical challenges for regulators include the "revolving door," which occurs when the regulator's decisions are influenced by future employment concerns or past employment relationships.
- The financial interests of the regulator herself or of her family raise another ethical challenge, if these interests are related to the financial performance of the operator.
- To address ethical issues, some countries adopt codes of conduct for regulators, which
  - Restrict the regulator's future employment for a certain period of time,
  - Prohibit the receiving of gifts,
  - Limit the regulator's personal investments, and
  - Restrict the regulator from being involved in decisions where the regulator cannot maintain fairness, or are perceived as not being able to maintain the appearance of fairness.

Next Generation Networks

- Next Generation Network is a broad term that describes key architectural evolutions in core and access IP based networks.
  - It refers to the future networks that support fixed, mobile and nomadic users and able to carry voice, data and multimedia services.
  - It is based on IPV6 and MPLS technologies and protocols.
- The Telecom network is evolving toward a future in which IP-based networks replace circuit-switched networks, both for fixed and mobile (3G and 4G) services.
  - Legacy interconnection regulations will not disappear– indeed, the complex interconnection environment calls for greater oversight.
- Convergence has forced a reassessment of Interconnection policies
  - Effective interconnection arrangements are crucial in fostering the development of integrated ICT markets
- IP networks will coexist with older legacy networks, including 2G mobile and PSTN networks.

Interconnection

- While "interconnection" and "access" are related they are distinct.
  - Interconnection is a bridge between different networks to enable customers of each network to communicate with each other. Access enables an operator to use the facilities and / or services of another operator
- Regulators also need to consider quality standards for interconnection.
  - Is the quality of service provided by an incumbent to an interconnecting entrant the same as to its own retail customers?
  - Is the overall level of quality consistent with that of increasing competition; would some customers sacrifice quality for lower prices, sparking a "race to the bottom" for quality?

Interconnection in an IP World

- Traditional interconnection regulation was established for telecom operators with interconnection rates generally based on time (*i.e.*, per minute).
- Services based on IP protocol, however, do not fit within the traditional schemes of switched voice interconnection, e.g., IP interconnection separate out transport from service, while legacy networks combine them.
- Interconnection between PSTN networks is relatively simple and well established, and does not raise interoperability issues, but IP Interconnection requires different kinds of access and different kinds of charges.
- Countries are addressing these needs by introducing: (i) both symmetrical & asymmetrical interconnection, (ii) new kinds of "access" through interconnection regulation and (iii) a technology-neutral interconnection charging system based on capacity, instead of time and distance.

Access to International Gateways

- An International Gateway is defined as any facility through which international telecommunications traffic is sent and received.
  - IGWs are potential bottlenecks in any nation's telecom market as they often restrict international traffic flows and maintain artificially high prices.
- A nation's ability to fully participate in the global Info Society may be impeded due to the high costs of Internet access or international communications.
- By liberalizing the IGWs and allowing large number of operators, including those who operate domestic networks, to operate international gateways, incentives for illegal behavior, i.e., bypass, will disappear as the termination rate drops significantly.
- International calls will flow through legal channels, yielding taxes to the government and drying up the corrosive flow of black money.

Pricing issues

- It is important to be clear about what is meant by "prices".
  - A price for a given telecommunications service is more than just the charges for that service it consists of a description of the service, the terms and conditions of service provision and the applicable charges
- Prices are based on underlying cost using an acceptable methodology, LRIC, FDC
- Prices are non-discriminatory
- Prices are transparent

Interconnection Cost Models

- What is a cost model?
  - A methodology for estimating a provider's cost of offering a service (or facility)
  - Motivated by widely-accepted premise that service tariffs/prices should be cost-orientated
    - Prices should relate to underlying costs
  - Measures the direct and indirect costs of providing interconnection
- Captures the volume sensitive & fixed costs that are directly identified with interconnection + a share of common overhead cost
  - Involve determination of many input variables
  - Typically implemented in spreadsheet program or similar software

Types of Costing Methods

- Fully Distributed Costs
  - Allocating all costs of the firm to the services provided
- Incremental Costs
  - Changes in firm's cost due to change in output of one service, holding other output constant
  - Must account for fixed ("overhead") costs
- "Long Run" adds notion of efficient costs, rather than embedded costs. These are the Costs associated with a provider employing efficient technology & operations

Licensing

- Traditionally, the number of licensed voice telephony or broadcasting operators has been limited.
- Previously, authorization and licensing of service providers was based on the type of service (voice, data, and video) or technology (cellular, fixed telephony, terrestrial broadcasting).
- However, in a converged setting, it is difficult to maintain these boundaries because of overlaps, broadcasters are offering telecom services (Internet, voice), while telecom service providers (e.g. phone companies) are offering broadcasting services (IPTV). Further, cellular operators are providing mobile television services.

Licensing

- Many regulators and policymakers have already modified their licensing regimes from the traditional one-service or technology license to a technology neutral, simplified set of licensing categories, and in some cases, a unified (single) license or market entry procedure for all technologies and services.
- Many countries are combining this simplification with the introduction of flexible licenses that use a technology and service neutral approach to determine the rights and obligations granted by the licenses.
  - These update the obligations for Interconnection, numbering, universal service and consumer protection rules to the new environment of convergence
- Along with a new licensing structure, it is also necessary to simplify market entry procedures as well as to simplify the administrative requirements for all telecom operators.
  - This involves modifying general authorization to allow more services to be provided

Licenses

- There are five classes of licenses
  - Individual
  - Class
  - Registrations
  - Notifications
  - Open Entry

License Classes

- Individual Licenses are the most complex
  - Require the regulator to consider each license individually and conduct a competitive selection process or auction
- Class Licenses are less complex
  - Require only an approval process for a broad category of service.
  - Issued without competitive bidding and are available to all qualified applicants who meet certain eligibility criteria established by the Regulator
  - Set out the basic rights and obligations and regulatory provisions to the particular class of service being offered.
  - Allow for Service obligations to be applied to class licenses for extra comfort and protection of the Government

License Classes (Continued)

- In recent years there has been a trend away from granting individual licenses to granting Class Licenses that authorize the provision of telecom services of the same type, regardless of who provides these services.
  - This is due to increased competition, increased flexibility in the type of licenses issued, the proliferation of service providers, and the convergence of the ICT sector and new innovative services and technologies coupled with telecom reform and deregulation.
- Registration requires the operator to formally register with the regulator before operation of the service, but do not require approval.
- Notification requires the operator simply to notify the regulator of the service, but no regulatory approval is necessary.
- Lastly, open entry is the most flexible and requires neither notification nor registration.

Approaches to Authorizations

- Unified Authorizations
  - Technology and service neutral
  - Allow licensees to provide all forms of services under the umbrella of a single authorization, using any type of communications infrastructure & technology capable of delivering the desired service.
  - In most countries, unified authorizations are issued as individual licenses.
  - However, in some countries, the process for issuing the unified authorization blends aspects of general authorization processes and competitive licensing regimes.
    - These hybrid processes can best be described as noncompetitive individual licensing processes: while applicants do not compete for a limited number of authorizations, they must meet a variety of criteria to qualify for a license and their applications are subject to close regulatory scrutiny.

Approaches to Authorizations

- Multi-service authorizations
  - Allow service providers to offer multiple services under the umbrella of a single authorization, using any type of communications infrastructure & technology capable of delivering the services in question
  - Technology neutral -- like unified authorizations
  - More limited than unified authorizations -- licensees are permitted to provide any of a designated set of services, but not all services
  - Issued as general authorizations or as individual licenses.
  - Not uncommon to have both general authorization & individual license regimes for multi-service authorizations

Licensing

- As with licensing regimes, new advanced technologies and converged services that use spectrum are demanding more flexible and service/technology neutral frameworks
- Need to keep in mind that spectrum management is about addressing the problems of potential interference between different licensed users, which is why regulators have created different classes of licenses.
- Consideration should also be given to whether there should be flexibility in spectrum allocation to take full advantage of new services and new technologies for existing services that may evolve with time.
  - A technology- or service-neutral approach to spectrum use might be another good option to consider.

Digital Dividend

- What is the Digital Dividend and why is it so important?
  - It is the amount of spectrum in the VHF and UHF bands that is above that amount required to accommodate existing analog TV programs and that might be potentially freed up in the switchover from analogue to digital television.
  - Spectrum is freed-up since digitally transmitted broadcast services require less spectrum than the amount needed to accommodate existing analog transmissions (principally, TV)
  - The Digital Dividend resides in the range of broadcast spectrum – VHF (30 MHz –300 MHz) and UHF (300 MHz – 3.0 GHz).

Digital Dividend

- There are two categories of Digital Dividend Spectrum:
- **Cleared spectrum** refers to the broadcast spectrum that will become available once Digital Switchover occurs.
- **Interleaved spectrum (whitespace)** is additional capacity available within the spectrum that will be used in digital broadcast based on how digital terrestrial TV (DTT) networks are deployed. The white space spectrum got its name because it can be used at a local level by different users on a shared (interleaved) basis with terrestrial TV

Spectrum Allocation

- In choosing how much spectrum to allocate and for whom, regulators place emphasis on market valuations and economic efficiencies but also on social, development and cultural goals.
- Spectrum regulators are also faced with issues related to future use.
  - Should some of the Digital Dividend be reserved for future use?
  - The central issues are the uncertainty over the best use of the reserved spectrum both now and in the future and the lack of information available, as well as the potential for regulatory decisions to have undesirable effects on the incentives for spectrum efficiency.

Spectrum Allocation

- It is in the public interest to ensure that the exploitation of the Digital Dividend is managed as efficiently and effectively as possible, that results satisfy the maximum demand for spectrum, and that obstacles to efficient use are removed by policy makers and regulators.
- If the Digital Dividend is properly organized and if the results are coordinated and harmonized, then a wide range of uses is possible, as virtually all wireless applications could make use of this part of the spectrum.
- If we are to achieve the goal of efficiency and effective use of the Digital Dividend, an important issue centers on who should lead the migration process.
  - The policy maker, the broadcast regulator, the telecommunication regulator or the spectrum agency?

Spectrum Allocation

- The key question for the allocation of the Digital Dividend appears to be what is the best way of maximizing the total value to society and what are the trade-offs.
- Assessing the trade-offs is important in considering whether to intervene or allow markets to determine how the Digital Dividend is to be used.
- The use of Digital Dividend spectrum to meet universal access goals, such as access to wireless broadband is another important policy consideration.

Spectrum Allocation

- The Scarcity of spectrum and the growing using of mobile data and other wireless applications has increased the pressure on the regulators to more efficiently use the available spectrum, especially as concerns the digital dividend
- The benefits of increased spectrum efficiency are widely accepted to include promoting growth, innovation, and competition derived from liberalized and more flexible spectrum use
- The tremendous growth of innovative services and applications that use the unlicensed spectrum has led to great pressure by others to allocate more spectrum to unlicensed users

Spectrum Sharing

- Spectrum sharing encompasses several techniques – some administrative, technical and market-based.
- Spectrum can be shared in several dimensions; time, space and geography.
- Spectrum sharing typically involves more than one user sharing the same band of spectrum for different applications or using different technologies.
  - When a band already licensed to an operator is shared with others it is known as *overlay spectrum sharing*. For example a spectrum band used for TV distribution in one geographical area could be used for an application such as broadband wireless access in another area without any risk of interference, despite being allocated on a national basis
- Spectrum sharing can be achieved through technical means and through licensing arrangements.

Spectrum Sharing

- Cost is one factor to consider in determining whether it makes sense to share spectrum, this include the costs of regulation and transaction costs.
  - Whether spectrum sharing will deliver on the promise of developing innovative broadband applications for developing country users', positively impacting accessibility and affordability of ICT services?
- Spectrum sharing is required when sufficient demand for spectrum exists, causing congestion among users requiring intervention to avoid interference problems.
  - It is used when adjusting spectrum use and assignment have become burdensome and costly undermining the goals of economic and technical efficiency.
  - Interference cannot be eliminated and so identifying management models supporting spectrum sharing under administrative, market-based and spectrum commons remain as an ongoing requirement and challenge for managers

Unlicensed Spectrum

- A spectrum commons is a part of the spectrum that is free from centralized control where anyone can transmit without a license. For this reason it is sometimes referred to as unlicensed spectrum.
- There are varying approaches by regulators for managing the unlicensed but regulated spectrum commons ranging from imposing license and permits constraints to few if any constraints at all beyond technical specifications.
  - The allocation of ISM (Industry, Scientific and Medical) bands for unlicensed use by low power devices such as Wi-Fi has been encouraged by the ITU across all regions.
- In some countries, a more liberalized approach towards spectrum management has evolved resulting in considerable innovative approaches in the use of Wi-Fi, WiMax, Ultra-wideband (UWB), White Spaces bands.

Unlicensed Spectrum

- So far this approach has only been used in limited bands for short range applications.
- However, significant innovation has emerged in these bands which have led some to call for more spectrum to be managed similarly
- In the US a very active debate is raging between the broadcasters and Internet content companies such as Google over whether white spaces can be used to extend the reach of broadband services to rural communities.

Spectrum Policies

- Spectrum policies should address incentives for innovation, promote flexibility, establish spectrum users' rights and determine practical methods for compliance monitoring, interference management and dispute resolution.
- These factors apply whether spectrum is used in the spectrum commons or shared by some other means where implementation relies heavily on advanced radio technologies designed to facilitate spectrum sharing.
- Convergence of wireless technology with Internet technology is not a new topic. The challenges are to address the evolution of technology and growth in demand, ensuring that sufficient spectrum is available for current and future generations of services while protecting public safety and security.

Spectrum Trading

- Spectrum Trading is a mechanism whereby rights and any associated obligations to use spectrum can be transferred from one party to another by way of a market-based exchange.
- With spectrum trading, the right to use the spectrum is transferred voluntarily by the present user, and a sum is paid by the new user of the spectrum which is retained, either in full or in part, by the present (transferring) user.

Open Access

- Open Access to Infrastructure Sharing
  - Open Access is about creating competition in all layers of the network allowing a wide variety of physical networks and applications to interact in an open architecture.
  - Allows anyone to connect to anyone in a technology-neutral framework encouraging innovative and low-cost service delivery
  - Encourages market entry from smaller, local companies by lowering the entry barriers and reducing the likelihood of one entity becoming dominant.
  - Requires trust in parties.
    - The service provider needs to feel that the infrastructure provider is going to tackle his/her needs with same degree of attention as if the organization was doing it itself.
    - That pricing and access terms will be transparent and nondiscriminatory.
    - That the Incumbent's transport services will be separate from its access services to build this essential trust.
    - That Governance structures with oversight powers will be set up to monitor the operators

Regulatory Mechanisms to Prevent Access and/or Price Discrimination

- Accounting Separation
- Functional Separation
- Structural Separation
- Divestiture

Accounting Separation

- Accounting separation forces the operator to keep separate accounts for different network (access) parts and services and is mandatory for all carriers who possess significant market power.
  - Accounting separation is often not a sufficient enough remedy to guarantee the operational and financial equality of access that would enable alternative operators to compete with the incumbent on a level playing field.
  - The problem here is that accounting separation does not reduce the asymmetry of information hampering the regulators.

Functional Separation

- Functional Separation is defined as drawing a dividing line between an essential facility – the incumbent's access infrastructure – and the various services that use this infrastructure as a common input.
  - The aim of functional separation is to reduce the risk that exists that an SMP with proven power on a wholesale market will grant its own downstream retail and wholesale arm beneficial treatment to the detriment of its competitors, which could result in a distortion of competition on the retail markets in question.
  - The remedy proposed by regulators is to functionally separate the access/ network side from the retail or services side.
- Functional separation mandates the creation of separate business units with separate operations, accounts, processes, personnel, and incentives.
  - It is a not a substitute for other regulatory mechanisms but a complement to current regulation.

Functional Separation (Continued)

- Functional separation allows the operator to continue to enjoy many of the benefits of vertical integration, so long as these benefits are not based on the leveraging of market power derived from monopoly infrastructure, or infrastructure which is uneconomical to duplicate.
- The whole point of functional separation is to reduce the incentive and ability of an incumbent to engage in discriminatory behavior when it comes to access to bottleneck assets.
- Functional separation is a "virtual" separation of the incumbent's business, i.e., the incumbent remains intact, both from a legal and an ownership perspective, but is required to restructure itself into two or more different divisions.
  - The critical parts of a functional separation are that the business division that provides access services to bottleneck assets is separate and distinct from the downstream retail business divisions and the wholesale division.

Functional Separation (Cont.)

- Functional separation involves a series of promises by the incumbent, accompanied by concrete, identifiable steps to implement the separation.
- Requires regulator or an independent oversight group to ensure compliance with separation obligations
- Functional separation is a recent response by regulators and governments to the serious problem of anti-competitive discriminatory behavior by incumbents, and the concern that existing rules and remedies are inadequate to deal with the problem.
  - It is one of a handful of regulatory tools that regulators in France, the UK, other EU countries, Sweden, Mongolia, and elsewhere have taken in an effort to achieve competition, choice, and innovation in the broadband market when other lesser regulatory measures have failed to work

Structural Separation

- Structural Separation is one step away from divestiture, it involves separate ownership of parts and services and often results in separate companies with different objectives and different accounts.

Universal Access

- First Generation Definition of Universal Access (Service)
  - Universal Service refers to all households in a country having a telephone, so that all individuals can make a telephone call from home.
  - Universal Access as all individuals having reasonable access to a telephone that they can use within a reasonable distance and at a reasonable cost. This could either be in their own home, at a business, or some public facility. It is seen as an interim step.
- Universal Service and Universal Access measure different things, and require different policy measures.
  - Absolute Universal Access is achieved when 100% of the population has access to a given service.
  - Absolute Universal service is achieved when a given telecom service is affordable to 100% of individuals or households

New Definition of UA

- Need to modify the definition of what is UA and what is US
  - Is it voice, dial-up Internet access, or Broadband
  - Do we need to have different definitions for Urban as opposed to Rural?
  - What about Voice and Internet?
  - Is there a need to create a new term, such as UAS that covers all three of these issues?
- Need to move away from defining Universal Access by technology and move to defining it by its usability.
- New definition: Universal Access as the ability for a government to make it possible for someone to use technology to its full potential.
  - Universal Access then empowers people in rural and underserved areas by providing them with the ability to harness the power of the Internet.
  - This definition moves us away from a numerical counting of technology to ensuring that those having these technologies know how to use it effectively to make a difference in their day-to-day lives.

UAS Concepts

Issue	Basic meaning	Differentiation
Availability	Coverage of inhabited geographic territory	• Region / area • Locality size
Accessibility	All inhabitants can use	• Gender • Race, tribe, religion • Ability / disability
Affordability	Ability to pay	• Access device (Handset, PC, subscription costs) • Cost of calls & services • Minimum "basket" below a certain national limit (e.g., 3% of family income)

UAS Measurement

- Need to find better ways of measuring success of UA programs moving away from coverage to usage and quality of service
- The question then becomes are people able to use the access they have? Or is climbing a tree the only way they can get service? And does this count towards meeting UAS goals?
- Is Broadband defined differently in urban areas as opposed to rural areas?
  - What are the allowed contention ratios?
- UAS goals will continue to rise with technology & service development – towards e-Inclusion
- Focus shifts away from simple access to:
  - Bandwidth/speed, ICT capacity/ability, Applications/services

Customer Service in a Converged Environment

- The key point here is how do you provide protection to consumers in an area where neither the services nor the technology are currently regulated?
- Consumers still expect the Government to protect them from Operators and Service providers who do not deliver the service and reliability they promise, but without regulatory cover how will this be accomplished?
- Consumers also need to be protected against fraudulent or bankrupt operators
- Regulators and policymakers have tried to provide solutions to these problems by:
  - Introducing requirements that providers of new converged services provide complete information about the differences between these services and traditional telecom services
  - By stepping in and negotiating with bankrupt carriers to ensuring a smooth transition of customers to a new carrier.

Conclusion

- Convergence has led to two main trends: simplifying licensing regimes and reducing administrative requirements for entering into the market.
- Need to continue to build effective regulatory institutions and tools to stimulate investment in a converged world
- Access to the Internet is increasingly considered an "essential service". Whether this be through broadband, dial-up, fixed or mobile phone line, the need to be connected and "always on" impacts the way business is transacted and the way consumers react.
- Challenge for regulation is to promote favorable market conditions in which competition and innovation can flourish, while at the same time ensuring that consumers' interests are protected.
- It is not enough for regulators to get the technical issues right, they need to also recognize context, changes in context, and provide leadership. Leadership techniques can help regulators survive.

Conclusion

- Regulators need to be particularly attentive to the challenges stemming from convergence to pave the way for the establishment of a regulatory environment that is transparent, conducive to investment and growth, fosters fair and greater competition and innovation, stimulates the deployment of infrastructure, promotes the development of new services, is security conscious, and protects and benefits consumers
- The Telecom network is evolving toward a future in which IP-based networks replace circuit-switched networks, both for fixed and mobile (3G and 4G) services, but this will not happen overnight hence the need to continue with legacy interconnection regulations necessitating a call for greater oversight.
- Foster competition in converged services over wireless networks through efficient and integrated spectrum management
- Promote innovation and research and development.

Questions, Comments, Suggestions?

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Thank You