

TRENDS IN  
TELECOMMUNICATION

REFORM

2012

SMART  
REGULATION  
FOR A BROADBAND  
WORLD

SUMMARY



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International Telecommunication Union

# **TRENDS IN TELECOMMUNICATION REFORM 2012**

## **SMART REGULATION IN A BROADBAND WORLD**

### **SUMMARY**

MAY 2012





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# INTRODUCTION

The Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU) is pleased to present the twelfth edition of *Trends in Telecommunication Reform*. The *Trends* report is an integral component of the on-going dialogue between ITU/BDT and the world's ICT regulators. As in past years, this year's theme – "Smart Regulation for a Broadband World" – has its genesis in the Global Symposium for Regulators. This important meeting was held in September 2011 in Armenia City, Colombia.

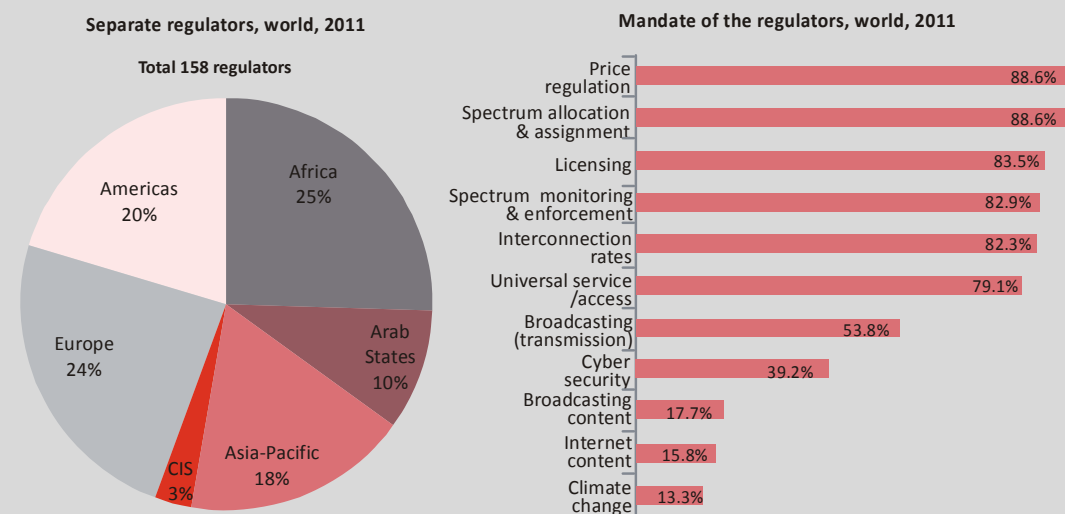
This year's *Trends* Report contains ten chapters that explore various legal and regulatory issues that are emerging as broadband becomes ubiquitous and as the digital economy grows:

- Chapter 1 sets the foundation for the discussion about regulation for a broadband world by outlining key trends in the ICT market and in ICT regulation.
- Chapter 2 discusses the issues surrounding the development of national broadband strategies, policies, and plans; it includes the presentation of a decision tree designed to assist policy-makers and regulators in making key regulatory and policy choices as they formulate national broadband plans.
- Chapter 3 examines open access regulation in the digital economy. It considers what forms of regulation may be appropriate at various levels of the ICT value chain. It also discusses how the nature of broadband networks may require changes to existing approaches to open access.
- Chapter 4 considers strategies and models for funding universal broadband access. Special attention is given to universal access funds.
- Chapter 5 examines broadband-enabled innovation and outlines policy approaches that can promote such innovation.
- Chapter 6 focuses on social media. It provides a backgrounder on social media and considers how the regulatory community can use social media in discharging its duties. It also assesses the policy issues raised by social media in light of the fact that ICT regulators may be asked to establish a policy framework for the use of social media generally in society.
- Chapter 7 examines intellectual property rights (IPR) in the digital economy and the role of ICT regulators and policy-makers in protecting these rights.
- Chapter 8 considers the regulatory landscape for mobile banking (m-banking). In addition to assessing the two main m-banking models, this chapter surveys the regulatory issues that arise from the provision of m-banking services.
- Chapter 9 addresses the problem of electronic waste (e-waste). It surveys the issues surrounding e-waste and proposes policy approaches that ICT regulators can adopt to address e-waste.
- Chapter 10 concludes this Report.

# 1 OVERVIEW OF ICT MARKETS AND REGULATORY TRENDS

Chapter 1 provides an overview of ICT markets and regulatory trends in the sector. Over the past five years, a growing number of telecom/ICT regulators have seen their mandate expand to include information technology and broadcasting. More recently, electronic content, cybersecurity, data protection, privacy and environmental issues have entered into the purview of regulators. The increased use of online applications and services to communicate and do business (such as social media, cloud services, e-payment and other m-banking services) bring a host of new regulatory issues to the fore, for all ICT stakeholders.

**Figure 1: Mandate of Regulators, worldwide, 2011**

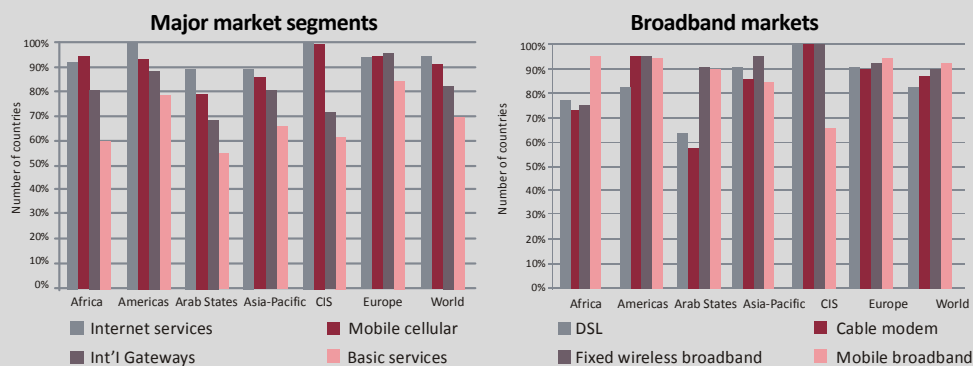


Source: ITU World Telecommunication/ICT Regulatory Database.

In 2011, countries worldwide persisted in their efforts to foster competition in telecommunication/ICT markets. Perhaps not surprisingly, the ICT sector continued to grow rapidly in 2011, with the exception of fixed telephony, where penetration rates have been on the decline since 2005.



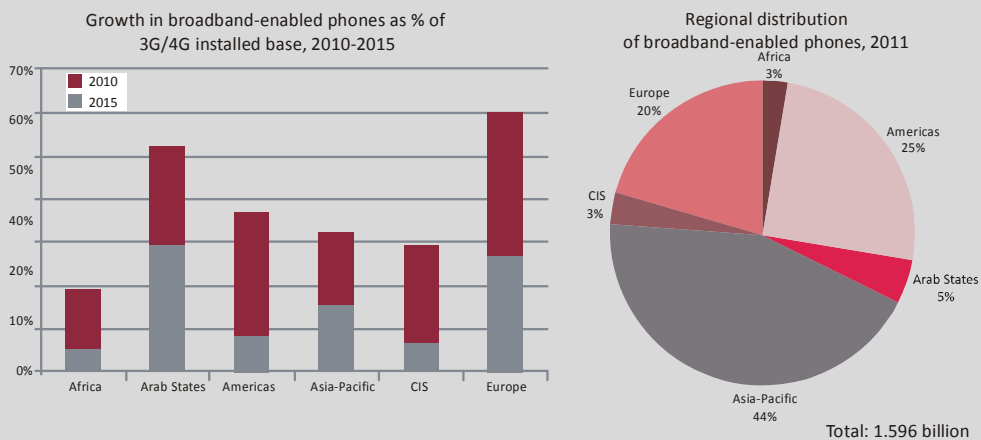
**Figure 1.1: Competition in selected services, by region, 2011**



Note: According to responses provided to the annual ITU Telecommunication/ICT Regulatory Survey.

Source: ITU World Telecommunication/ICT Regulatory Database.

**Figure 3: Expected growth in broadband-enabled phones and regional breakdown, 2011**



Note: Data based on actual and planned broadband-enabled phones shipments.

Source: ITU, TAS.

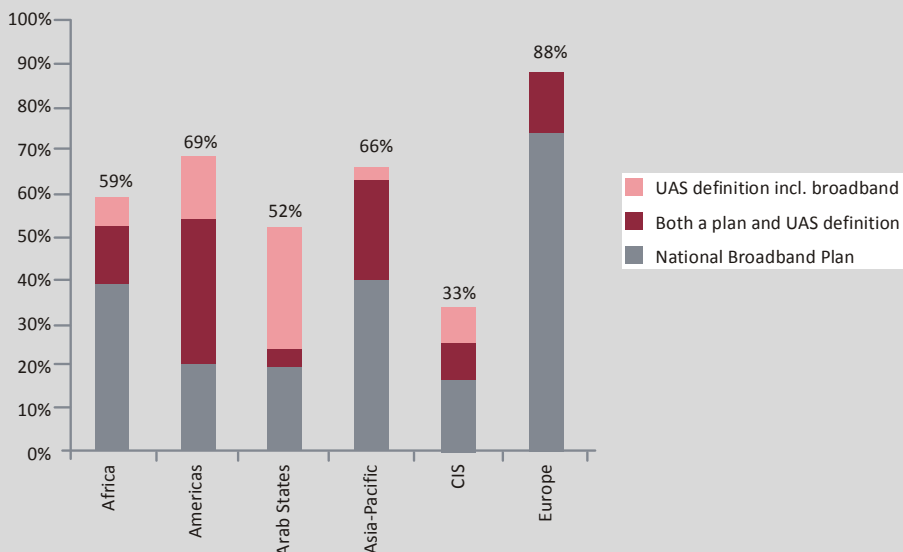
Globally, the provision of mobile cellular and mobile broadband services remains very competitive in 92 percent of all markets. By the end of 2011, ITU estimated that the number of mobile-cellular subscriptions reached close to 6 billion, representing a global penetration of 86.7 percent and a penetration level of 78.8 percent in developing countries. The robust penetration rates for mobile cellular and mobile broadband services have particular relevance for the rollout of mobile banking services, an issue that is canvassed in Chapter 8.

Fixed broadband subscriptions have more than doubled over the past five years to an estimated 591 million fixed broadband subscriptions globally by the end of 2011. The share of subscriptions in developing countries is increasing rapidly, but there is still a huge divide. Fixed broadband penetration level stands at 4.8 percent in developing countries, compared to almost 26 percent penetration in developed countries.

Mobile broadband has grown even faster in terms of the number of actual users and reached an estimated 1.19 billion subscriptions in more than 160 countries by the end of 2011. In developing countries, mobile broadband penetration had reached an estimated 8.5 percent by end 2011, up from 5.3 percent just one year earlier. The increasingly crowded and competitive market for mobile broadband is resulting in booming demand for bandwidth, squeezed margins for operators and enhanced virtual experiences for consumers.

Mindful of the critical role of ICTs, and broadband in particular, over 130 governments have today adopted or are planning to adopt a national policy, strategy or plan to promote broadband. Many of these broadband policies and plans focus on building nationwide broadband infrastructure, stimulating demand through the adoption of online services and applications, and extending connectivity to provide universal access.

**Figure 4: What policy instruments to promote broadband uptake and adoption?**



Source: ITU, [www.itu.int/broadband](http://www.itu.int/broadband)

Affordability of broadband services is a major obstacle to broadband penetration and the use of social media services in many developing countries. Although ITU data show that prices for ICT services are decreasing, prices for broadband services remain very high in many developing countries. This is particularly the case in Africa, where fixed broadband Internet access costs on average almost three times the monthly average per capita income.<sup>1</sup>

On the user side, with the advent of next-generation mobile cellular technologies and the wider adoption of increasingly sophisticated broadband-enabled mobile devices, access to Internet is becoming more ubiquitous and universal. In developed countries, a great part of the population is today already connected on the move, over broadband-enabled phones. However, significant differences in broadband-enabled phone adoption across different regions persist. It is revealing that nearly half of all broadband-enabled phones were used in high-income countries in 2011, while low-income countries accounted for only 5 percent of the global total.

An important trend is the tidal wave of data traffic over mobile networks generated by applications. Recent projections show that almost half of the mobile traffic will be generated by smartphones by 2016.<sup>2</sup> Nevertheless, backbone networks are likely to be based on high-capacity fibre optic technologies in order to be able to handle the imminent explosion in data traffic.

Another central trend explored in this year's Report relates to social media and social networking. The number of active social media users surpassed the first billion in 2011, many of whom connect to social media using their mobile devices. Interestingly, the countries with the ten highest penetrations of social media users are located in developing countries, mostly in Asia-Pacific. The profile of users is also changing, with a growing number of organizations, public entities, telecom/ICT regulators and government agencies joining the individual and business users. The popularity of social media raises a host of new legal and technical issues that are examined in greater details in chapter 6.

Chapter 1 outlines a host of other important trends with a view to highlighting the strengths of the sector and its challenges. It also identifies some of the 'smart' regulatory tools telecom/ICT regulators can use to spur network development and extend access, affordability and the take-up of ICTs.

## **2 SETTING NATIONAL BROADBAND POLICIES, STRATEGIES AND PLANS**

The principles of privatization, competition, and liberalization have been of central importance over the past two decades in the ICT sector. Although government intervention has been necessary in some cases, the regulatory approach to ICTs has generally been characterized by a reliance on market mechanisms to select more efficient structures and to provide better quality of service and choice to the user. Broadband, however, brings newer, broader and greater challenges, a greater scale of operations and greater responsibilities for government, the regulator, and industry. Thus, the case for undertaking broadband implementation on the basis of economic principles must be presented and re-calibrated. While there is a good case to be made for competition and market-based approaches as the cornerstones of a regulatory approach to broadband, policy-makers and regulators must balance respect for market forces with the need to prevent market failures. Moreover, regulatory approaches must be tailored to each country's unique characteristics, although there is great value to learning from other countries' experiences.

Most countries currently have an ICT infrastructure deficit. Given the demonstrated importance of broadband to a country's development, this deficit is a major public policy issue. Addressing this deficit generally involves the formulation of a broadband policy framework. Developing such a framework involves a number of policy considerations. It is necessary to build national consensus around the implications of and opportunities for broadband access across society; adopting a cross-sectoral approach is important in undertaking this stage of policy development. Development of a broadband policy framework should also include plans to develop the human capacity necessary to ensure a successful national deployment and uptake of broadband infrastructure. Policy considerations further include the need to create the supply and demand catalysts for government, enterprise, and individual citizens.

The considerations that should go into the creation of the Plan include: the main characteristics of the plan; different goals to be addressed; the need for substantial evidence for decision making; the means for implementing the plan; the entities involved and their roles; industry structure and regulatory measures to stimulate involvement; models of financing the implementation, based on economic analysis; the need for cross-sectoral considerations; top-down versus bottom-up considerations to setting targets; and technology neutrality. The experiences of various countries, both developed and developing, are instructive.

Much can be learned from what various countries around the world have done in their National Broadband Plans. However, successful implementation of broadband also requires a particular view to a country's unique national concerns and characteristics. Chapter 2 develops a Decision Tree in order to blend lessons learned from other countries' experiences with the need to remain cognizant of a country's own unique position.

The concept of a Decision Tree is a tool to assist in making choices related to the implementation of broadband on a national basis. It contains six levels of decision points. These decision points consist of the foundation; setting goals and targets; institutional form of regulation; regulatory support mechanisms and initiatives; infrastructure investment; and industry structure.

These decision points serve as a checklist of the elements that should be considered when creating a National Broadband Plan. As outlined in this chapter, the Decision Tree includes considerations that apply to the decisions to be made as the tree is ascended. After considering the pros and cons of each decision node in the Decision Tree, this chapter summarizes observations on “Best Practice”, including notes on contrasts between developed and developing country approaches and circumstances.

**Table 1: Best Practice Observations**

<b>DECISION LEVEL</b>	<b>DEVELOPED COUNTRIES</b> <i>Important considerations</i>	<b>DEVELOPING COUNTRIES</b> <i>Important considerations</i>
6. Industry Structure	Open Inter-platform competition Open service competition	Limited Inter-platform comp. Open SP competition
5. Infrastructure Investment	Public – private partnerships	Public – private partnerships More government non-financial aid in-kind
4. Regulatory Support Mechanisms	Extend beyond primary reliance on fibre-optics. Use of UAS. Spectrum, rights of way.	Greater reliance on radio technologies. Forbearance. Broader use of UAS. Spectrum, rights of way.
3. Institutional Form of Regulation	Independent, converged and/or integrated	Independent, converged and/or probably more integrated
2. Goals and Targets	More sophisticated goals and targets	More sophisticated goals and targets
1. Foundation	Infrastructure planning inclusive of all stakeholders	Infrastructure planning inclusive of all stakeholders, plus augmented by capacity building

*Source: B. Horton*

This Chapter compares some examples of different policy approaches. A number of different countries’ experiences are canvassed, including the experiences of the United States, Germany, the Republic of Korea, Japan, New Zealand, Australia, and the Dominican Republic. The chapter concludes by setting out a series of mini-case studies. These case studies include Fiji, Papua New Guinea, Argentina, Brazil, and Hong Kong China.

### **3 OPEN ACCESS REGULATION IN THE DIGITAL ECONOMY**

The market liberalization that has taken place over the last 20-30 years has been achieved by facilitating open access to the incumbent's network while encouraging the parallel growth of mobile networks. As the ICT sector transitions to broadband networks in a digital economy, open access will continue to occupy a central role in the regulatory environment.

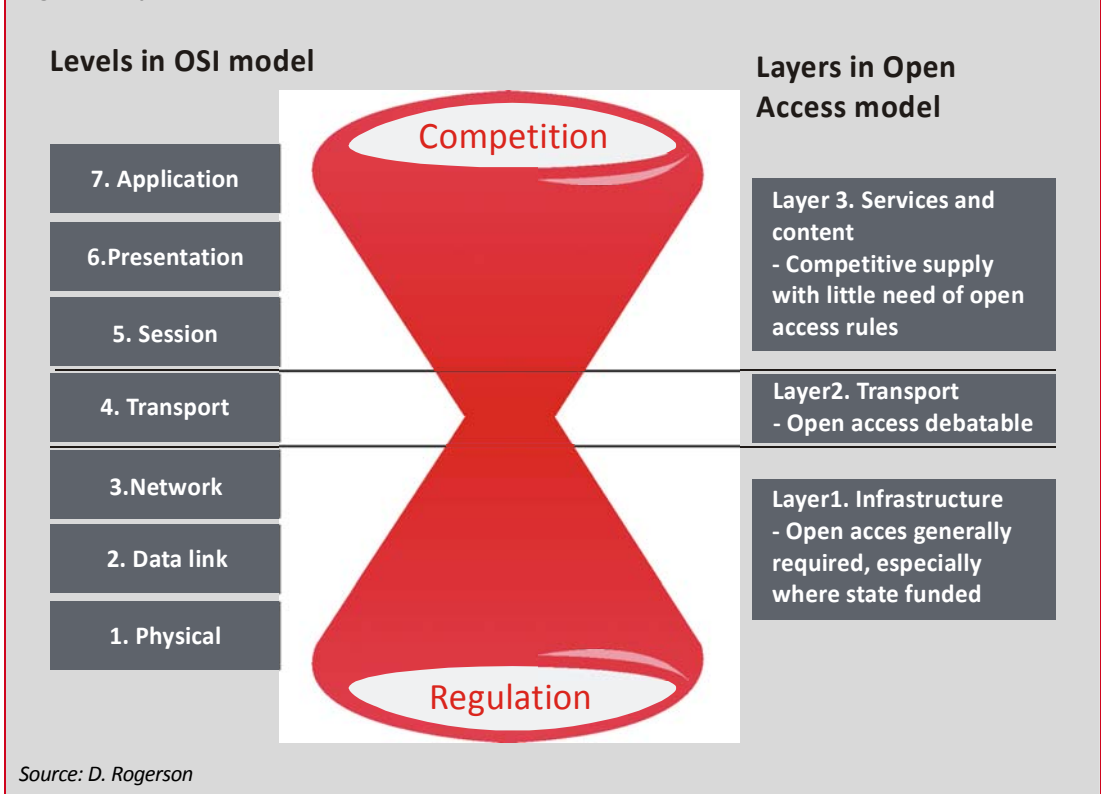
Broadly-speaking, open access means that all suppliers, whether in horizontal or vertical markets, are able to obtain access to the new network facilities on fair and equivalent terms. The precise definition of open access may vary depending on the regulatory model adopted, and the terms and conditions of access most certainly will vary. Nevertheless, open access is paramount if the new digital economy is not to rest on network infrastructure provision that has folded back into a purely monopolistic framework.

An examination of recent theory and practice suggests that open access is critical in the case of publicly funded national broadband networks and generally required wherever there are actual or potential economic bottlenecks preventing competitive supply. However, there is an inherent tension between open access and competitive supply of networks and services. Regulators need to be wary of imposing terms for open access that are overly onerous since such terms are a disincentive for potential investors in infrastructure.

Generally, open access is progressively less important moving up the layers of the OSI reference model, provided that open access is available at the lower layers and there is sufficient incentive in the regulation of open access to encourage investment in infrastructure. Open access to infrastructure mostly concerns levels 1-3 of the OSI model (physical, data link and network layers). Open access regulation at these levels should generally focus on principles and practices such as: transparency; non-discrimination; access requirements like unbundling and co-location; price controls; and cost accounting regulations. Regulators and policy-makers must take care to adapt existing open access approaches for the digital era.

Open access can serve as an ex ante regulatory response to the ability of an operator to exercise Significant Market Power in wholesale broadband markets. However, regulators need to undertake steps to determine whether Significant Market Power in fact exists and whether open access requirements are a proportionate response to the related market failure.

Figure 5: Open access and the OSI model



While open access to levels 1-3 of the OSI model is critical, the need for open access to the transport layer (level 4 of the OSI model) is questionable. So long as competition is protected in wholesale markets, effective competition may emerge at the transport level without the need for much or any ex ante regulatory intervention. The question of regulation at the transport level is principally one of traffic management, including the issue of network neutrality.

At the digital applications and services levels (levels 5 to 7 of the OSI model), policies designed to facilitate demand through education, industry co-operation and e-Government initiatives are preferable to open access obligations. These levels do not typically exhibit the characteristics that suggest that ex ante regulation is necessary. Regulatory and policy objectives for these levels in the digital economy should focus mostly on demand-leadership, the protection of public interests, and curbing abuse of market dominance. This chapter concludes by identifying best practice arrangements, especially for developing countries.

## **4 THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME: STRATEGIES FOR FINANCING UNIVERSAL BROADBAND ACCESS**

As the broadband revolution unfolds, large segments of the world's population are being left behind. Over five billion people have never experienced the Internet or have only experienced it through public or shared access, let alone experienced the Internet through broadband access. Indeed, there is a wide disparity in broadband access around the world, both within countries and between countries. In this context, the concept of universal service and access remains relevant, although it is now necessary to re-assess the concept. Chapter 4 undertakes a re-assessment of this concept and reviews the policies and strategies surrounding the financing of universal broadband access.

Over the past two decades, the scope of universal service and universal access (UAS) has widened. Today, UAS is increasingly being re-conceptualized to include Internet – and even broadband – and to address issues around digital inclusion. Moreover, stimulating demand for services, particularly broadband-related services, has become a priority. Funding that was previously focused on supply-side interventions – networks and facilities – is now increasingly being channelled to interventions that will stimulate demand.

Notwithstanding these changes in the scope and objectives of UAS, it remains firmly rooted in the market liberalization context, and despite the changes in the environment, its rationale is fairly consistent. Moreover, policy and regulatory considerations in designing universal service and access projects and the fundamentals of universal service and access have not changed.

There are many approaches to public universal access financing, including different funding partners and vehicles. In most cases, the appropriate structure and set of partners depend on the type of project and its objectives. No single funding model is appropriate for all universal access projects or for all countries. Nevertheless, there is a specific universal service and access framework checklist that will facilitate the selection of an appropriate funding model.

Since the 1980s, there has been a shift away from the public provision and funding of ICT infrastructure to a model centred on private sector participation. Since then, the general consensus about financing network deployment and service rollout has not changed: private capital should be used first to address the gaps identified. However, in light of the greater financing requirements of Next Generation Networks and also bearing in mind the constrictions on liquidity following the 2009 global financial crisis, there is increasingly a return to public funding. Three particular models continue to stand out: equity investment, public-private partnerships (“PPPs”) and financial incentives. The mix of approaches and where they are best applied has, however, changed, mainly



in light of experience over the years with more infrastructure PPPs and USAFs as a means of providing financial incentives, amongst others.

<b>Table 2: ICT Funding Options</b>		
	<b>CASH</b>	<b>IN KIND (INDIRECT)</b>
<b>PRIVATE</b>	Infrastructure rollout Device subsidies	Mandatory USAF obligations
<b>PUBLIC</b>	Equity investment PPPs Disbursement of USAF subsidies Commitment of Stimulus plan funds	Tax incentives Spectrum licensing Rights of way Risk guarantees

*Source: M. Msimang*

Ultimately, there is not a single “right” universal service funding model. Instead, different circumstances require different responses. The selection of a funding model should be done on a case-by-case basis with reference to criteria such as economic efficiency, equity, competitive neutrality, technological neutrality, certainty, transparency, and cost effectiveness.

The most popular response to the funding challenge posed by universal service and access in developing countries has been the establishment of Universal Service and Access Funds. Chapter 4 includes a detailed analysis of these Funds with a view to providing lessons for other types of funding based on subsidies and incentives.

## 5 BROADBAND-ENABLED INNOVATION

Innovations are inventions that have some sort of (economic) impact, e.g., raising productivity and competitiveness. Chapter 5 considers a particular category of innovations, namely *broadband-enabled innovation*. An innovation is broadband-enabled if, at some fundamental level, it requires, uses, and perhaps enhances broadband Internet.

Innovation matters to a nation, and broadband can be an important enabler of innovation. Data suggest that ICTs account for roughly one-third of all patents (inventions) and a tenth of all value-addition (impact) by businesses in today's major economies. Moreover, studies based on people's impressions demonstrate that the ICT sector is viewed as being highly innovative. Broadband-enabled innovation (BEI) has a unique role among all information communication technologies in the contribution to innovation, as data point to a correlation between more broadband and more patents (a key marker of innovation).

Case studies, including BEI incubators such as the iHub in Kenya and municipal networks such as the Pirai network in Brazil, demonstrate technological, process, and policy-broadband-enabled innovations globally.

Public policies that enhance a nation's capacity to innovate have attracted considerable attention from social scientists and policymakers. Indeed, it is widely believed that the right set of public policies is required in order to ensure that a nation will be innovative. Many of these policies are designed to address some of the specific challenges associated with innovation. These challenges include, for example, the need to protect intellectual property rights and the fact that innovation can have high levels of uncertainty, risk, high transactions costs, and occur around incomplete information. Moreover, some innovations result in "winners" and "losers", and can thus cause interest groups to emerge to influence government policy or even inhibit the innovation. All of these challenges have resulted in a tight collection of innovation policy "pillars" that have been utilized across many nations. These public policy pillars revolve around the following issues, each of which is explored in the chapter: research and development (R&D) investments; intellectual property right protections; education and demand development; universities and public research institutes; and trade and financing.

These five pillars of innovation policy are found across all areas of invention, from manufacturing to service sectors and beyond. But some innovation supporting policies are of special relevance to ICTs and broadband. These include policies of openness and neutrality.

Most broadband policies enacted by states to date have focused on coverage over change and innovation. There has been an emphasis on universal services. However, the authors suggest a possible adjustment to the universal service obligations imposed on operators of telecommunication service networks, including broadband. Instead of an obligation mostly focused on coverage and access (with perhaps some small investment in R&D), operators may instead respond through invention and innovation: a Universal Innovation Obligation.

## 6 CONFRONTING THE SOCIAL MEDIA REGULATORY CHALLENGE

Social media has emerged in recent years as an essential tool for hundreds of millions of Internet users worldwide and a defining element of the Internet generation. For regulators, social media must be considered from several perspectives. First, the landscape must be better understood so that the importance of social media can be properly assessed for policy purposes. Second, the regulatory community must consider how it can use social media to service its stakeholders and to meet its public mandate while at the same time assessing whether social media raises specific new regulatory or policy challenges that should be addressed. Third, regulators may be asked to establish a policy framework for the use of social media by others as the policy concerns associated with social media mushroom in importance.

### Box 1: Key Questions for Regulators

1. Is your legislative framework technology neutral such that it applies to the online environment, particularly online social networks? Does your regulatory mandate touch on online issues?
2. Social media networks often involve elements of both telecom and broadcast. Is the regulatory agency responsible for both? Is the legislative framework consistent?
3. Advertising and marketing legal issues are a key part of the social media environment. Do these issues fall under your mandate?
4. Do the leading social media networks maintain a physical presence in your jurisdiction? If not, do you anticipate problems with enforcing potential rulings?
5. Have you considered developing best practices or general guidelines for social media use?
6. Have you developed public education programs to enhance public awareness and comfort with Internet use?
7. Is there scope to work with other national regulators or agencies to develop consistent national strategies on social media use and regulation?
8. Do you work with global counterparts to address social media legal and policy issues such as privacy and data protection?

There are thousands of social media networks ranging from enormous, all-purpose sites such as Facebook to smaller, subject-specific networks that cover every issue or interest imaginable. While there are differences between general and specialized social media sites, most incorporate common characteristics that involve engagement with others, such as sharing information, likes and dislikes, photographs, videos, and online spaces for interaction. Moreover, social media sites are not restricted to social networking, as Twitter and YouTube illustrate.

Regulators have increasingly embraced social media to interact more effectively with interested parties. Stakeholders are also using social media to advance policy positions. The experiences of regulators in various countries such as Bahrain, Australia, Kenya, the U.K., and Canada illustrate the variety of ways that social media is being used in the regulatory context.

Regulators are increasingly asked to develop substantive policy and regulatory responses to the challenges posed by social media. The legal issues associated with social media track more generally the issues posed by the Internet: regulatory questions, privacy, free speech, advertising, financial regulation, election regulation, and access.

Despite its many potential benefits, social media brings with it significant new challenges. These challenges include both practical matters and substantive issues.

## **7 INTELLECTUAL PROPERTY RIGHTS IN TODAY'S DIGITAL ECONOMY**

While intellectual property rights (IPR) have not traditionally come within the purview of telecommunication/ICT regulators, endemic copyright infringement facilitated by broadband service is increasingly drawing regulators into the middle of the copyright debate, particularly in the area of enforcement and Internet intermediary liability. ICT regulators are increasingly being viewed as the appropriate authority to implement rules that protect copyright, provide protection for consumers and encourage investment and service innovation within the digital economy.

Much of the current debate around copyright revolves around the question of how to strike the delicate balance between protecting the copyright owner and developing frameworks that encourage use, innovation and creativity. Although there is strong consensus on the principle of copyright, there is a great deal of divergence on what this means in practice with regard to legal protection and enforcement of rights.

The digital economy with its new technologies, new applications and new markets is placing significant pressure on policies and existing legal frameworks. Finding the right balance between protecting content owners and those wishing to reproduce copyright material using a variety of technologies and for a variety of purposes is a significant challenge for policy-makers and regulators.

Protection of copyright occurs through a number of institutions and treaties at the domestic, regional, and international level. The rules for enforcement of IPR at a national level are outlined in the TRIPs agreement, which falls under the auspices of the World Trade Organization. The agreement outlines what protection must be given to rights holders, what enforcement mechanisms must be available nationally and outlines how international disputes should be handled. Implementation of enforcement measures is a national responsibility.

The nature of digital products makes them easy to copy and to distribute. There are a number of different ways copyright material is made available commercially through illegal 'pirate' services or privately between individuals.

There are various approaches to copyright protection and enforcement. Copyright infringement is a civil offence in most jurisdictions. However, where the infringement is for commercial gain, it may be possible to take criminal action against the offenders. Moreover, there are a number of other approaches that can potentially reduce the level of copyright infringement, for example, by using innovative forms of licensing or redefining the very concept of copyright. There are also approaches (e.g., industry initiatives) that can address copyright infringement without the need for legal action.

For ICT policy-makers and regulators, the copyright debate is an increasingly important issue within their portfolio. The debate is interwoven with debates on child online protection, net neutrality, privacy and open access. Where ISPs are involved in enforcement action, there may also be a specific role for the regulator to facilitate industry self-regulatory approaches and/or to define and implement enforcement rules and procedures.

Some of the potential policy issues raised by current challenges related to copyright enforcement include: the scope of copyright and User Generated Content; measurement and reporting of copyright infringement; market structure; enforcement; industry self-regulatory initiatives; consumer education; protection of rights; and international cooperation.

Although ICT regulators cannot resolve all challenges relating to copyright in the digital economy, the chapter does set out a number of areas that regulators can, and should, influence.

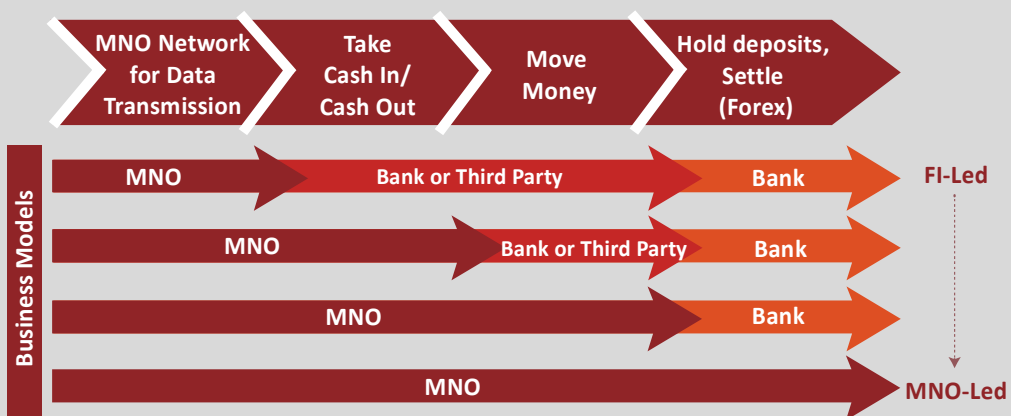
## 8 THE REGULATORY LANDSCAPE FOR MOBILE BANKING

Mobile telephony has made it possible for previously “unbanked” individuals to receive access to a variety of financial services by using their mobile phones and without having to visit a financial institution. While many people in the developing world do not have access to financial services, most do have access to mobile telephony services. Mobile banking (or “m-banking”) thus has the potential to serve as an important means of bringing banking and financial services to the “unbanked.”

There is a variety of m-banking models. Such models are often described as falling into two primary categories or on a continuum between two extremes: a bank-based model and a branchless or non-bank-based model. Many variations of each model exist. The variations in approach are often based on the unique set of circumstances in a particular country that dictate how m-banking systems and services may be rolled out.

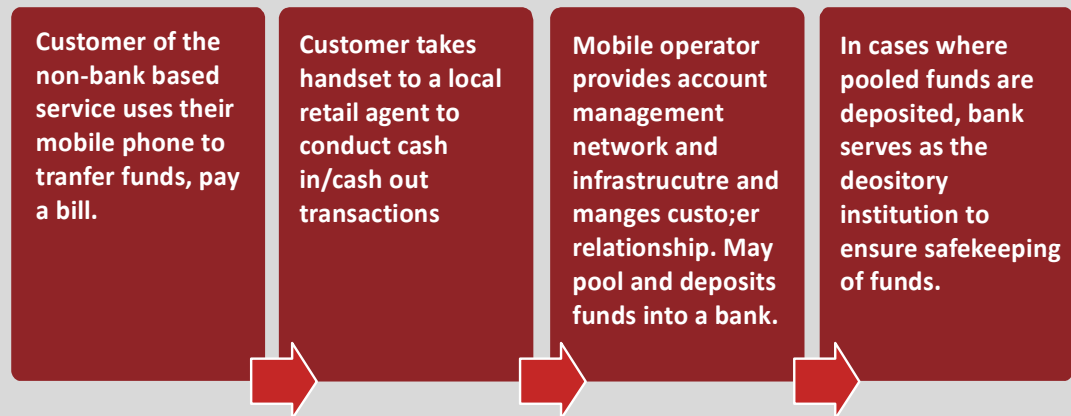
The two main m-banking models are compared in terms of their distinct operating structures, their advantages and disadvantages, and some of the factors relevant to the adoption of the models. Ultimately, the m-banking model most suitable for a given country will depend on the local regulatory and policy framework. The models that have been adopted in various countries, including Pakistan, Bangladesh, Ghana, Kenya, Brazil, Peru, Mexico, and the Philippines, are instructive in this regard.

**Figure 6: Business Models**



Source: USAID FS Share, FS Series #9: Enabling Mobile Money Interventions



**Figure 7: Example of non-bank based model**

Source: Telecommunications Management Group, Inc.

As discussed in Chapter 8, each of the m-banking models presents regulatory challenges. Telecommunication, financial, and competition regulators sometimes address overlapping issues, and m-banking providers must navigate the regulatory requirements from all three regulators to ensure that their services comply with all relevant laws and regulations. Perhaps the most important potential change to the regulatory regime with respect to m-banking is the necessity for closer cooperation and coordination among the relevant regulators.

Another key challenge resulting from the on-going convergence of ICTs and financial services are outdated legal and regulatory policies. Other regulatory issues relating to m-banking include: consumer protection; interoperability; roaming; SIM registration/know your customer regulations; universal access; accounting; tariff regulation; and law enforcement access and compliance.

Policymakers, legislators, and the regulators themselves could implement more significant changes designed to create an enabling environment for m-banking services. These changes would promote openness to m-banking models and add more certainty to the regulatory frameworks in which these models operate.

A number of other considerations beyond the principal regulatory issues also arise with respect to encouraging the deployment and use of such services. These considerations include education on m-banking and mobile payments and consumer protection in the context of m-banking.

Chapter 8 concludes by setting out a regulator checklist that identifies issues and challenges faced by policymakers and regulators with the introduction of m-banking, identifies possible action items to address the issues/challenges, and provides representative examples of countries that have successfully addressed these challenges.

## 9 E-WASTE AND RECYCLING: WHOSE RESPONSIBILITY IS IT?

E-waste generally refers to various forms of old electrical and electronic equipment (EEE) that no longer have any value to their owners. An important question is whether the nature of the relationship between e-waste and the ICT sector creates a special role for national regulators of the ICT industry. At present, aspects of waste (including e-waste) tend to fall in purview of environmental law or as the responsibility of local and municipal authorities. Except in a few limited cases such as China and Thailand, there is little evidence of comprehensive e-waste regulatory frameworks in developing/transitional countries. As ICT devices and networks become ubiquitous and applications and services based on ICTs continue to grow, there is a strong case to be made for placing e-waste management at the centre of the design of ICT policy.

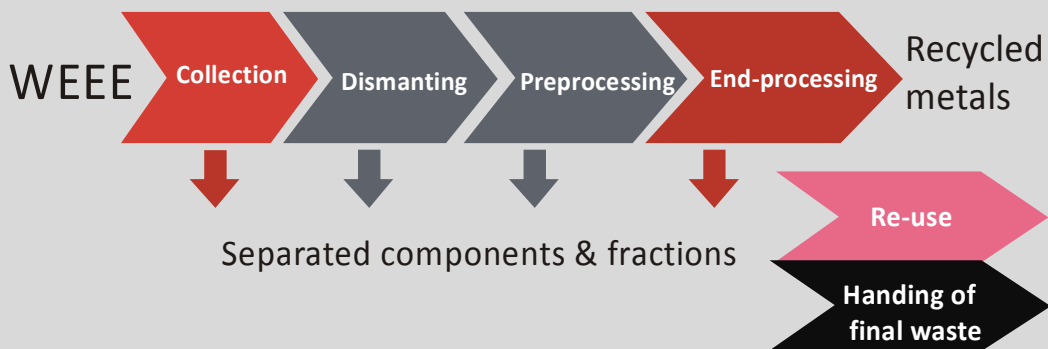
**Figure 8: Computers pile up and pollute the earth, rotting slowly and dissolving into the soil**



Source: <http://stamen-tonchev.blogspot.com/>

Various approaches have been adopted to handling e-waste, and there are a number of key actors in the e-waste ecosystem at the local, regional, and international levels. Chapter 9 discusses best practices that can be adopted at policy and regulatory levels, either through assumption of voluntary obligations or mandatory requirements in the law. The chapter also identifies incentives and obligations that regulators can adopt in an effort to reward comprehensive integration of e-waste into business strategy and at the same time exact a penalty for non-compliance.

**Figure 9: E-waste recycling value chain**



Source: *Recycling – From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies*, UNEP, 2009

Two policy principles that should be a key part of the ICT policy response to e-waste are recycling and extended producer responsibility (EPR). The first principle seeks to promote the high utilization of product and material quality through effective collection, treatment and re-use or recycling in an environmentally friendly and socially desirable manner. The second principle focuses on encouraging producers to assume responsibility for the products they generate through their entire life cycle. This is done through a matrix of incentives that systematically encourage the producer to design improvements of products and product systems that have an optimal environmental performance even at their end of life. This is known as design for environment (DFE).

Any effective e-waste management ecosystem must address the local context at the core of its design. There is a need to balance the push for access to ICTs with the practicality of harnessing the resultant e-waste in a manner that is sustainable for the long term. Other critical aspects of developing a roadmap for e-waste management include identifying stakeholders; compliance; enforcement; and awareness and capacity-building.

An effective response to the e-waste problem also requires a clear allocation of roles and responsibilities among several actors, as well as the identification and implementation of a mix of policy interventions, which must be adapted to the local context as much as possible. General policy and regulatory recommendations relate to harmonization; standards and certification; obligations and incentives of key actors; extended producer responsibility policies; and various forms of partnerships designed to address e-waste. Unique approaches can be adopted, such as

regional harmonization initiatives, that would be particularly beneficial for jump starting developing countries on the path of e-waste management.

### **Box 2: New roles .... New questions**

- Should the ICT Regulator play a role in encouraging its licensees to integrate e-waste concerns in their business strategies?
- What role should the ICT regulator assume in relation to e-waste management: facilitator, enabler, promoter, awareness raiser, and/or enforcer?
- How should e-waste policies be designed so that they do not present a bottleneck to innovation, competition and universal access in the ICT sector?
- Which mode of regulation would be ideal to ensure achievement of the desired objectives?
- What should be the scope and extent of regulatory interventions that are designed towards effective e-waste management?
- How can the ICT regulator ensure that there is effective co-ordination with other agencies, such as the environmental agency, in relation to any interventions directed at compliance and enforcement of e-waste obligations?
- What role can ITU play in supporting and ensuring acquisition of relevant skills for implementation of an e-waste regulatory framework?

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<sup>1</sup> Based on the ITU Measuring the Information Society 2011 report, [www.itu.int/ITU-D/ict/ipb/index.html](http://www.itu.int/ITU-D/ict/ipb/index.html)

<sup>2</sup> Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016.



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