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Smart Regulation for a Broadband

Discussion Papers

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GSR 2011 Discussion Paper

The Regulatory Landscape for Mobile Banking



Work in progress, for discussion purposes

Comments are welcome! Please send your comments on this paper at: <u>gsr@itu.int</u> by 7 October 2011.

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1 THE REGULATORY LANDSCAPE FOR MOBILE BANKING

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1.1 Introduction

Nearly 2.7 billion adults in the developing world are considered "financially excluded," that is they do not have access to basic financial services such as bank accounts.¹ 2.2 billion of the unserved adults live in Africa, Asia, Latin America, and the Middle East.² Research indicates that within developing countries, on average, one bank branch and one automated teller machine (ATM) exists for every 10,000 people.³ This lack of, or limited access to, banking and financial services constrains growth and prosperity for consumers and the economy. For these "unbanked" individuals, lack of access to banking services leaves them trapped in an oftentimes poor, cash only society." ⁴ For a country's economy, limiting banking activity to traditional approaches can stifle entrepreneurship, stunt development and even stall economic growth through the effective exclusion of large numbers of potential banking customers.

However, for those "unbanked" individuals, access to a variety of financial services is now accessible through their mobile devices ("m-banking"). This accessibility changes the landscape for these unbanked individuals since more than 4 billion people in the developing world are mobile phone subscribers.⁵ Individuals can engage in a variety of financial services, including mobile transactions and payments, by using their mobile phone and without having to visit a financial institution. Given the large penetration of mobile services in many countries, including in developing countries, m-banking offers a potentially important way to bring banking and financial services to the "unbanked."

M-banking services can thus be both transformative in targeting the unbanked, and additive by targeting those who already have a bank account and providing an alternative means of accessing the services available with that account.⁶ Among the advantages of m-banking are that the costs of such services are typically lower than branch-based services; transactions can be made instantly; and customers do not need to be reliant on cash or visiting a physical location that may be many miles away.⁷ This, in turn, means that banking services will not only be accessible, but can be conducted in real time offering customers greater efficiencies and providing a swift and reliable means to engage in these services.

Some m-banking services began by offering customers the opportunity to transfer airtime credits to other users as a proxy for sending electronic money, and then introduced more robust money transfer services (including bill payments, deposits to bank accounts and other common transactions) as users became more comfortable with the concept.⁸ The vendor of prepaid airtime has been transformed into a provider or enabler of banking services, accepting and disbursing cash transferred via mobile networks.

Consumer prerequisites for m-banking

- Mobile device capable of sending and receiving m-banking messages or instructions⁹
- Subscription to a mobile service
- An account at a banking institution (for bank-based services) or an MNO-based m-banking service¹⁰
- M-banking application (may be embedded on SIM card supplied by mobile operator or downloaded from bank, service provider or application store)

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In the realm of m-banking, a large portion of services conducted may be viewed as mobile payment type transactions where the mobile handset plays a key role in the initiation and authorization for payment. The mobile phone can thus be transformed into a virtual wallet to make payments between parties with compatible accounts, transfer funds, and convert virtual money into cash. As m-banking services have become more widely accepted in a given market, there has often been increasing acceptance of the use of such services to transfer payment from consumers to businesses, from businesses to employees, and from governments to citizens. Beyond payments, m-banking services also serve as a secure store of value, allowing customers to store their funds electronically, making them less prone to theft or loss. M-banking services can also be leveraged to authenticate financial transactions, as discussed in Box 1. There are a variety of m-banking models, which have often been 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. These models each have distinct means of operating, especially with respect to the relationship with the end customer in terms of establishing accounts, deposit taking, and lending services.¹¹ Although the universe of m-banking services now encompasses a wide range of service models that cannot always be neatly described as following one or the other model, or sometimes even being easily placed on a continuum between the two models, this paper uses these two primary models as discussion points and examines some of the ways that m-banking has been introduced around the world. It also addresses the key regulatory issues that have emerged with respect to m-banking and analyzes the ways in

which governments, particularly telecommunications and financial service regulators, can help to promote mbanking in their countries.

Because m-banking technologies and services are still in an early stage of development, it is difficult to generalize about their impact - or lack thereof - on banking activity or revenue generation. Nevertheless, according to the GSM Association (GSMA), as of July 2011, there were 122 live deployments of m-banking systems and an additional 85 planned deployments.¹² In most cases, however, m-banking services still report relatively low levels of adoption. According to a 2011 World Economic Forum report, only four countries -Ghana, Kenya, Philippines and Tanzania – demonstrate mobile financial service adoption rates above 10 percent.¹³ Nevertheless, the Central Bank of Kenya (CBK) had increases of nearly 150 percent in the number of formal bank accounts in Kenya between the end of 2005 and the end of 2008.¹⁴ The CBK attributed a significant portion of this increase to formerly unbanked consumers gaining familiarity with banking concepts through mobile operator Safaricom's mbanking service and opting to also open a formal bank account. In terms of revenues, for the year ending March 2010, revenues from M-PESA commissions accounted for 9 percent of revenues, or approximately KSH 7.56 billion (approximately USD 94.26 million). This paper primarily focuses on m-banking services in developing countries, but it is important to note that, as discussed in Box 2, there are m-banking services deployed in developed countries as well.

Box 1: Authentication of financial transactions

It is worth noting that mobile handsets and networks can be used for authentication of financial transactions, such as through the use of smartcard technology embedded in handsets or SIM cards. There is significant work underway in the mobile and banking industries with respect to the incorporation of smartcard technology into mobile devices, and new or revised regulatory frameworks will be an important component in enabling such services. In particular, the use of mobile handsets for authentication of payments will likely require an enabling environment that clearly defines the role of each party as well as the characteristics of a mobile or electronic ID for users. These important developments merit further detailed attention and are outside the scope of this paper.

Box 2: M-banking in developed countries

While this paper focuses primarily on m-banking services as they apply to developing countries, it is important to note that there are also m-banking and m-payment systems deployed in developed countries. In general, these services tend to be bank-based, offering customers mobile access to the accounts they hold in traditional banks. Such systems are seeing rapid adoption, particularly with the rising adoption of smartphones.

For example, a study released in May 2011 showed that 20 million mobile users across five European markets (United Kingdom, France, Spain, Germany and Italy), representing 8.5 percent of mobile subscribers in these markets, accessed their bank account via a mobile handset in March 2011. This represented a 15.4 percent rise in mobile banking users since August 2010, reportedly driven by smartphone users who accounted for 70 percent of the mobile banking market in March 2011. According to the study, among smartphone owners the number of banking users has risen by 40 percent since August 2010.¹⁵

1.2 M-banking Models

The growth, sustainability, and expansion of mbanking services have been characterized by the use of several different models to support the delivery of a variety of banking products and solutions. The approach or model that a company implements to rollout m-banking services is often dependent on the country's current financial laws and regulations in force and the degree of flexibility the financial regulator wishes to allow in order to make m-banking available. In some cases, almost any model or approach may be used and the decision on how to advance m-banking will be more flexible-based on what policymakers and service providers think will work best. In other cases, countries may have detailed or strict regulations that will limit the ability of (prospective) financial service providers to offer m-banking services. Consequently, mbanking services may be required to adopt a particular model, or the countries' legislators and/or regulators will have to make changes in order for a wider set of mbanking services to be offered. Often, the constraints that may exist in a given market preventing development of any m-banking type application largely are attributed to restrictions posed by existing financial regulations. However, it may also be the case that the primary operator within a market may not have an interest in providing the applications necessary to support mobile banking.¹⁶

Although the sections below describe two primary models, many variations of each model exist. The variations in approach are often based on the unique set of circumstances in a particular country that will dictate how m-banking systems and services may be rolled out. As a result, it is perhaps better to consider these models as two ends on a scale, with multiple possibilities for m-banking in between. Figure 1 sets forth the range of business models for m-banking that may be considered. Working from top to bottom the first model reveals a bank-based model where a mobile network operator provides the most minimal, albeit critical piece in service delivery. Working down the diagram, the various models of m-banking are presented with the final being a solely mobile run model.

1.2.1 Bank-Based Model

The most conventional form of m-banking is the bank-based model. In this model, banks make some of their services available through the use of a mobile device, entering into an arrangement with the mobile operator to offer their services either through text messaging or more elaborate smartphone applications. This allows customers to conduct a range of financial transactions without having to go to a physical bank facility.

In the bank-based model, a customer establishes a direct contractual relationship with a licensed and supervised financial institution. The use of this model offers banks the potential to substantially increase the use of their services, both by extending new mobile services to their existing customers and by extending services to mobile telephony customers who do not currently have a bank account. In either case, the customer can access their bank accounts and other financial services through their mobile device.

The m-banking customer's relationship with his or her bank may also be carried out though the utilization of agents as a means to provide services. In simplest terms, an agent is an extension of the bank; they are able to provide commercial or transactional services e.g. customer service, keep records, handle cash and manage liquidity.¹⁷ Agents can play a role in a broad range of services including account opening, cash-in and cash-out services including disbursement of bankapproved loans and person to person transfer services.¹⁸



Many countries permit a wide range of individuals and legal entities to be agents for banks. There appears to be no singular formula for identifying suitable entities to serve as agents. In India, for example, post offices, and mobile network operators, can all act as agents. Kenya allows any for-profit organizations, such as a grocery store, or other local retail establishment in a community to act as an agent. However, nongovernment organizations or educational institutions cannot serve as agents.¹⁹ The determination of a suitable agent network is typically determined by the lead provider as to whether they will use existing retail chains or develop a new network.²⁰ Some approaches taken in Latin America with respect to branchless banking are for example the Brazilian and Peruvian model, i.e. using stores and smaller chains as banking agents, or the Mexican model i.e. partnering with large retail chains to set up full branches.²¹

Another bank-based approach is in Peru where mobile operator Movistar launched Pago Móvil, a service that allows Movistar subscribers to make payments charged to their Visa credit card through their mobile handset. The service is available in conjunction with Visa cards issued by several Peruvian banks.²²

Bank-based m-banking models are generally considered "additive," meaning that mobile banking services are generally targeted to existing bank customers. These customers are typically comfortable with technology and want a convenient method in addition to credit cards, ATMs, and the Internet to manage money without having to handle cash. Bill payment, account transfers, and balance inquiries are common services offered to retail customers.²³ Nevertheless, once an m-banking program is put in place, a financial institution may find that it can attract new customers based on the advantages that such services offer in terms of security, stability, and customer base. For example, people who previously have not had a bank account may feel more secure dealing with an established and regulated financial institution rather than a non-bank alternative, and may be more comfortable using services via their phone rather than by going to a physical bank.

In addition, some m-banking services are targeted to the unbanked but have structured as bank-based models due to existing legal and regulatory constraints that related to the provision of financial services. This was the case in Pakistan. In 2008, the State Bank of Pakistan (SBP), which acts as the regulatory authority over Pakistan's banks, issued its branchless banking regulations.²⁴ These regulations only allowed mbanking to be provided through a bank-based model on the basis that this provided greater reliability because the existing banking institutions could be made fully liable for the provisioning of service.²⁵ However, it would allow joint ventures between a bank and an operator/non-bank, whereby the operator can be used as a channel to provide the bank's services.²⁶ Pursuant to the SBP's new rules favoring a bank-based model, but allowing for joint ventures, Telenor Pakistan acquired a 51 percent controlling stake in Tameer Microfinance Bank (TMB), which gave it the ability to provide m-banking services under the new rules. Telenor Pakistan and TMB launched *easypaisa* in 2009. As noted earlier, *easypaisa* seeks to target the unbanked population rather than the existing customers of a bank. A recent study found that the majority of *easypaisa* customers (69 percent) live on less than \$3.75 per day, 40 percent live on less than \$2.50 per day, and just a few customers (5 percent) live below \$1.25 per day.²⁷ Half of the respondents did not have a bank account.²⁸ Telenor estimates that as a

result of the provision of m-banking services, increased financial inclusion will lead to Pakistani GDP growth of 3 percent by 2020.²⁹ See Box 3 for more detail on *easypaisa* usage.

The introduction of m-banking service has often required modifications in the legal and regulatory framework. For example, in Bangladesh, non-banks offering m-banking services must obtain a license from the Bangladesh Bank (See Box 4).

Box 3: easypaisa - How do customers set up an account and utilize the service?

Under *easypaisa*, a customer can register for a mobile account from any of the Telenor Franchises, Telenor Sales and Service Centers, Tameer Bank branches or Tameer Bank Sales and Service Centers. The customer representative captures the customer information in the system; takes a photograph of the customer and a copy of their thumbprints; and prints out the account opening fee receipt. The customer receives a verification call from the bank within three hours, and after successful verification, an account for the customer is opened. Subscribers can either dial *786# from their handset or log into the *easypaisa* mobile account website to access their account.³⁰ Figure 2 demonstrates how *easypaisa* customers can utilize their mobile account.



Box 4: M-banking services in Bangladesh

In Bangladesh, as of 2009, 97% of the adult population did not have access to formal banking services.³¹ In order to facilitate allow m-banking, Bangladesh introduced certain modifications into its banking regulations. In late 2009, Bangladesh Bank (the Central Bank) published draft payment and settlement system regulations to modernize the payment and settlement systems in Bangladesh.³² Bangladesh Bank is the designated authority to grant licenses for payment systems, payment system operators and payment service providers. Under Bangladeshi regulations, payment system operators are entities licensed by Bangladesh Bank to operate a settlement system between participants, with the principal participant a bank or financial institution that maintains accounts with Bangladesh Bank for meeting cash reserve requirements. Similarly, a payment service provider must also have accounts with Bangladesh Bank for meeting cash reserve requirements.³³ The regulations also set forth provisions for the Bank to undertake corrective and remedial measures to protect against any violation of the licensing terms and conditions including the power to suspend or revoke the license, impose financial penalties and order compensation. Under these regulations, parties interested in providing m-banking services must acquire a license from Bangladesh Bank which typically takes several months.³⁴

Three banks currently offer m-banking services in Bangladesh: Dutch-Bangla Bank Limited (DBBL), BRAC Bank Ltd., and Islami Bank Bangladesh Ltd (IBBL).

DBBL was the first bank to introduce m-banking services through mobile operators Banglalink and Citycell.³⁵ Primarily using these mobile operator's retail outlets and agents, low-income individuals in remote areas can receive m-banking services such as mobile payments and remittance services. Subscribers must own a mobile phone to receive the service. Subscribers withdraw and deposit cash from the mobile by going through the agent network.

Islami Bank Bangladesh Limited (IBBL) entered into an agreement with Software Shop Limited (SSL) Wireless to provide mbanking services to existing IBBL customers. As a result, customers of IBBL can check their balance and make inquiries using their mobile phone. Customers can also receive SMS alerts and mini statements by just sending SMS to 6969 number from any mobile operator. The goal is to upgrade the service to allow customers of IBBL to receive money from anywhere in Bangladesh and abroad.³⁶

On July 22, 2011 BRAC Bank launched what it describes as Bangladesh's 'first complete mobile financial service,' offering mobile subscribers a range of banking and other financial services via their mobile phones regardless of whether they have a bank account or not. The service is being offered through bKash Ltd., a subsidiary of BRAC and in partnership with mobile operator Robi (Axiata Bangladesh). Robi customers are provided with a fully encrypted bKash mobile wallet account, developed on a VISA technology platform and fully encrypted to enable secure transactions. Customer accounts can be credited with electronic money either as salary, loan, or as domestic remittance. The cash can then be moved out as electronic money to any of the cash-out agents assigned by bKash. Currently, the service is only available to Robi subscribers but the hope is to expand this to other mobile operators in Bangladesh.³⁷

As m-banking services develop and more companies want to get involved, we are also seeing varied arrangements of the bank-based model (see Table 1).

Some banks opt not to have an exclusive arrangement with one mobile operator but allow their m-banking services to be used by any the customer of any mobile operator. For example, one of Pakistan's largest commercial banks: UBL, began offering services in 2009. It has no arrangement with a designated mobile operator.³⁸ Rather, it follows a "one to many" model. It has built its own agent network under the brand "Omni" and can serve customers of any mobile operator, or none, with an account that can be accessed via phone or card. Similarly, mobile operators are not limiting themselves to working with just one bank to offer m-banking services. Software Shop Limited (SSL) Wireless in Bangladesh offer its m-banking services through a distributed bank system that includes over 13 banks in the country.³⁹

Table 1: Different Variations of M-Banking Models			
One to One Model	Exclusive arrangement between a bank and a mobile operator.		
One to Many Model	The bank provides m-banking services through multiple operators or a mobile operator provides m-banking through multiple operators.		
Many to Many Model	The banks and mobile operators all provide m-banking services and exclusivity is not permitted.		
Source: Telecommunications Management Group, Inc.			

Following this non-exclusive paradigm, in 2008, the Bank of Ghana issued branchless banking guidelines that supported a bank-based model of m-banking using nonbank retail agents but prohibited exclusive partnerships to deliver service and only permitted what is termed a "many to many" model.⁴⁰ This approach, according to the guidelines, would offer the maximum connectivity and outreach to all given that all banks and all mobile operators should be able to "entertain each other's customers."41 The guidelines further note that agents can include merchants, gas stations, or the post office, but notes specifically that the customer account relationship must reside with the financial institution.⁴² There are currently three m-banking services that are provided by mobile operators in partnership with banks. These include MTN Mobile Money, Airtel Money and Tigo Cash. Of these, MTN Mobile money has the largest number of subscribers, currently approximately 1.9 million across Ghana.43

1.2.2 Non-bank based Model

Under a non-bank based model, a formal bank typically only serves as a holder of deposits. The primary entity or operating unit managing the customer relationship is a non-banking entity. Most often this is a mobile operator This model seeks to overcome the barriers that prevent the establishment of formal banks in developing economies—including remoteness, significantly high banking costs, and a lack of customer education and knowledge about financial services—by decoupling financial services from the traditional banking providers.⁴⁴

A non-bank based model has certain distinct characteristics. First, customers have no direct contractual relationship with the regulated financial institution. Instead, customers exchange cash at a retail agent in return for an electronic record of value.⁴⁵ The

customer conducts transactions (e.g., making transfers, depositing money) at a retail establishment that serves as an agent for the non-bank based service. The customer's "money" is then recorded in a virtual account on the server of a non-bank entity.⁴⁶

Non-bank based models are typically "transformational" because the m-banking services are primarily targeted to the unbanked. This may include poor or remote populations living in informal or cash economies that have limited or no access to formal banking institutions. ⁴⁷ Transformational banking focuses largely on areas where there is moderate to high mobile phone penetration coupled with a low penetration of traditional banking institutions.

Under this approach, a mobile phone can be transformed into a virtual wallet and utilized to make payments, transfer funds, and convert virtual money into cash without the need for a bank. As described in Box 5, mobile provider Globe Telecom in the Philippines, for example, offers its "GCASH" service, which provides a cashless and cardless way to transform a mobile phone into an electronic wallet meaning that the phone can be utilized to send and receive money from and to other GCASH users. A similar approach is used in Brazil, where mobile operator Oi offers its Oi Paggo service, through which payments can be made to retailers as long as both customer and retail have Oi Paggo accounts and handsets capable of text messaging.⁴⁸

The direct links to customers under a non-bank based model are the authorized agents. A variety of functions can be performed at Globe Telecom retail agents including converting virtual money into cash, making payments and transferring funds. Agents can include other local retail establishments such as grocery stores and gas stations.⁴⁹

Box 5: GCASH in the Philippines

To use the GCASH service, a Globe Telecom customer registers its account with Globe Telecom. A customer loads its mobile wallet with GCASH via a *cash-in transaction* -- the process of converting cash to GCASH at a Globe Center or at any accredited GCASH partner (for example many convenience stores (e.g., 7 Eleven) are GCASH partners). The BSP requires retail agents conducting cash in and cash out functions to register with the Central Bank and send personnel for training on anti-money laundering practices.⁵⁰ Agents are also required to maintain records of all transactions for up to five years. While the Core Information and Technology Supervisory Group (CITG) within the BSP handles all mobile banking issues and supervises telecommunications companies, telecommunications companies are solely responsible and liable for their agents.⁵¹

M-banking customers under a non-bank based model can order payment of funds to anyone else who may be participating in the system and can receive payments from them. In this scenario, customers may also use m-banking as a means to transfer money between accounts and pay bills. There are two mechanisms typically used to conduct transactions – a point of sale network and phone-based system. If the system relies on a point of sale network and distributes cards, customers are required to visit a participating retail agent each and every time they want to conduct a transaction.⁵² Under a phone-based system, customers are required to visit a retail agent in order to add value by depositing cash or convert stored value back into cash.

An illustration of the non-bank model is presented in Figure 3.

Perhaps the most successful non-bank m-banking service is M-PESA, a mobile money transfer service launched on a pilot basis in October 2005 by Safaricom and Vodafone and commercially launched in March 2007 (See Box 6 for additional information on the service). The M-PESA stored value accounts are carefully structured so as not to constitute a "banking activity" under the Kenyan Banking Act.⁵³ However, to address liability concerns, M-PESA, in consultation with the Central Bank of Kenya, Safaricom invests an amount equal to M-PESA's net deposits in commercial banks in order to ensure the safety of customer deposits.

M-PESA is at the far end of the spectrum in terms of not requiring any license to provide its services. Arguably, since M-PESA was an early entrant into the m-banking business, it was able to take advantage of more openness and flexibility from the regulatory framework. However, in many other jurisdictions, mbanking services that are provided by non-banks are subject to licensing requirements. For example, in the Philippines, the Central Bank (BSP) allows non-bank companies to provide m-banking services.⁵⁴ However, companies must first obtain prior approval from the BSP before offering such services.



Box 6: M-PESA in Kenya

M-PESA targets un-banked pre-paid mobile subscribers. The service comprises a simple registration process to establish a customer's new M-PESA account into which they can deposit, transfer and withdraw cash at a large number of Safaricom's reseller/distribution agents. The account identifier is the mobile phone number and the customer goes to the very same place that they would go to buy airtime. M-PESA operates through a wide network of locations, including Safaricom customer care centers or M-PESA agents. Only Safaricom customers can register for M-PESA. However, recipients do not need to have an M-PESA account or be a Safaricom subscriber, although the M-PESA service is less expensive if money is sent to a registered M-PESA customer.

A current Safaricom customer may need a SIM replacement to get a new SIM with the M-PESA applications on it. SIM replacement is done at any Safaricom office. If a customer is not a Safaricom subscriber they need to purchase a Safaricom line with the M-PESA application to enable registration as a new customer.

1.2.3 Comparison of Models

1.2.3.1 Advantages and Disadvantages of the Models

Bank-based

The bank-based model of m-banking most closely mimics the traditional banking relationship and serves as an extension of that formal arrangement. Customers enter into a direct contractual relationship with a licensed and supervised financial institution. The new technology-enabled banking distribution model permits an unbundling of activities traditionally conducted at a bank branch office. As further discussed in Section 1.3.2.1, existing regulation was not developed with the convergence of telecommunications and finance in mind. This typically leaves many gaps and ambiguities through which innovative applications may not be fully considered, including those offered by bank-based m-banking service providers.⁵⁵

A disadvantage of the bank-based model is that it may not be able to innovate as easily or respond as rapidly to market needs. In addition, a bank-based model that is closely tied to existing services offered by a formal bank may have a more limited reach than a non-bank service, depending on the level of interaction the client is required to have with a bank branch.

By contrast, an advantage of the bank-based model is that requirements to mitigate risks and address data security and customer privacy are already established as banks are already required to comply with such requirements and regulations. Although banks still need to modify or add additional requirements to address the delivery of its products through a mobile device, customers may find greater comfort that the traditional brick and mortar bank is standing behind the service.

Non-Bank-based

The non-bank-based model of m-banking is typically viewed as more "transformative" because it often targets providing banking and financial services to underserved or rural regions without access to banks or the formal financial system. In this model, mobile operators are generally key to providing the service and managing the customer relationship.

Since there are different models of a non-bank based approach, the advantages and disadvantages of this model may vary. In general terms, one of the greatest advantages to the non-bank model is that it can more easily increase access to financial services for those in low-income and rural areas because the customer does not need to engage in a direct contractual relationship with the bank. An additional potential advantage may be that the company offering the service may not be subject to the more restrictive regulations imposed on a traditional bank because it does not fall under the traditional definition of a "financial institution" or its services may not fall under the definition of a "banking activity, as was the case with M-PESA mentioned above." The non-bank based model also often more flexible in providing support through its expansive agent network. While a bankbased model often utilizes a similar network, it is generally more limited in scope to existing ATM facilities, branch offices, or mobile operator outlets. In the case of a non-bank approach, with a mobile operator taking a leading role, there is typically greater flexibility in how it approaches the establishment of an agent network, often expanding to include other local retail establishments.⁵⁶ Finally, because in a non-bank based model, the customer has a relationship primarily with the mobile operator, it can be perceived as a more familiar relationship and less daunting or overwhelming for some consumers.

From the perspective of the non-bank actor, usually a mobile network operator, four main advantages have been identified by USAID:

- Reduced customer turnover (churn),
- Better brand positioning based on service creation and innovation,
- Distribution cost reduction, and
- Additional revenues from mobile transactions.⁵⁷

A disadvantage to a non-bank based model is ensuring that sufficient capital is in place to mitigate any financial risk due to a lack of funds within the system. This in turn could affect the liquidity of the system and the availability to provide cash to customers. A further risk associated with the non-bank based model is providing adequate consumer information and protection; particularly since many of these non-bank based customers may be new to banking and may not fully understand how these services operate through a mobile phone. In this instance, user education plays a key role⁵⁸, with the non-bank entity, usually the mobile operator, supporting this function. The greatest potential for problems in a non-bank model is the risk of utilizing agents to serve as points of contact for transactions. While agents are utilized in a bank-based model, the distinction here is that those agents are subject to banking regulations and requirements. Under the non-bank based model, agents are not necessarily subject to the same types of policies and regulations. The potential for operational risk is thus heightened in this model. For example, customers or retail agents could commit fraud, as discussed in Section 4.2.2 or property could be stolen from a retail agent's premises.

An additional disadvantage to the non-bank model is that it often necessitates the need for further review and refashioning of banking and/or telecommunications regulations in order to provide the service, as well as to provide adequate protection for consumers, ensure economic stability, and guarantee reasonable network interoperability.

As noted, the non-bank model can have several variations. Figure 4 presents an overview of four variations and compares some of their characteristics.

considering both the advantages In and disadvantages to the two primary m-banking models, it is important to note, that while the terms address what are "bank-based" or "non-bank based" approaches, the reality in both cases is that a banking institution is likely involved in the operation of both models. While in the case of the bank-based model, the bank stands front and center as the entity with which customers establish a business relationship, a bank may also be key to the operation of the non-bank model as well. The distinction may be that in the non-bank based approach, it is a mobile operator or other entity with which customers establish a business relationship and the bank may operate in supporting the "back office" component of the service or simply in holding the aggregated deposits collected by the mobile operator. The development of a suitable m-banking model for a given market appears to largely be driven by the legal and regulatory regimes. Thus, perhaps it is not simply bank versus non-bank models, but the determination of a suitable m-banking model evolves as a byproduct of the policy environment present in the country.

Figure 4: Non-bank model variations				
MNO as MNO as MNO as				
	Bearer	Application	venture	Bank
Churn Reduction	No reduction in Churn as any MNO can offer the service	Reduction in Churn	Definite reduction in Churn	Definite reduction in churn
Regulatory and License Constraints	No impact	Low impact. PCI compliance.	Banks typically facilitate regulatory compliance	High regulatory and license requirements
Brand	Not used	Not used	MNO Brand	MNO Brand
Banking Systems	None required	Financial Switching only	Some required	High infrastructure requirement.
Distribution Chain for cash handling etc.	Notused	Not Used	MNO and Bank	MNO only
Transactional Risk	None	Some	Half of the risk	All of the risk
Cost Revenue	Marginal Low	Some cost Good	High cost High	Very High Costs High
Source: Finmark Trust, "Mobile Banking Technology Options," (August 2007) available at http://216.239.213.7/mmt/downloads/finmark_mbt_aug_07.pdf				

1.2.3.2 Economic Benefits

With respect to m-banking and economic development, an analysis should focus on the means by which m-banking can transform, or at a minimum, enhance economic growth. The hope is that m-banking can contribute greatly to economic development through its ability to create income generation, enabling more people to access needed financial services in a cost efficient and relevant way.⁵⁹ Overall, the rise of m-banking is expected to result in a substantial macroeconomic benefit resulting from a 5-20 percent reduction of financial exclusion by 2020 across several developing economies.⁶⁰

On a microeconomic level, m-banking has the power to create opportunities for the rural poor, through access to financial services, by increasing not just financial security, but by bringing a significant developmental impact to individuals across a range of areas. Indeed the developmental impact of mobile financial services can be significant when it intersects with other sectors such as health. In this instance mbanking services can have a significant impact within the health sector whether dealing directly with health workers as supporting salary payments, performancebased funding, vouchers or conditional cash, supply chain settlements, or directly to patients enabling payments and conditional cash transfers, micro-health insurance, and payments for transportation to hospitals/clinics. ⁶¹ M-banking may also support education and further educational opportunities by enabling families to better manage their money and provide them the security to keep their children in school rather than needing to send them to work to help the family's financial situation.⁶² M-banking and m-payment systems can also be leveraged to ensure secure and less-costly delivery of government-toperson (G2P) payments, which can include social transfers as well as wage and pension payments. According to CGAP, there were at least 170 million poor people worldwide that received G2P payments.⁶³ By making such payments more secure and easier to receive and store, m-banking services could expand the developmental impact of G2P payment programs.

The model most suitable for a given country will depend on the regulatory environment and if the policies that exist favor development of one model over another. This is especially true in the case of a nonbank-based model. In order for this model to be utilized, a regulatory structure must be in place that will allow non-banks to engage in some subset of banking activities such as facilitating payment services.

1.3 Key Regulatory Issues

M-banking presents regulatory challenges in terms of each of the models discussed in the previous section. Telecommunications, financial, and competition regulators have sometimes overlapping issues to address, while m-banking providers must navigate the regulatory requirements from all three regulators to ensure that their services comply with all relevant laws and regulations.

1.3.1 Identification of roles and responsibilities for regulators

1.3.1.1 Telecommunications regulators

As m-banking continues to attract new customers and service providers, telecommunications regulators find themselves in the position of determining what changes – if any – are necessary to their existing regulatory framework. Traditionally, the key roles for the telecommunications regulator in an economy's financial system were indirect: to ensure the reliability and security of the communications infrastructure that connected financial institutions to their customers as well as to each other – the same role played by the telecommunications regulator in most sectors outside of the ICT sector itself. Although the rise of m-banking and m-payment services does not change this role, certain additional issues come into play with the development of m-banking services.

Due to m-banking services, mobile service providers are playing a much more integral role in the transmission and/or storage of funds. This is blurring the traditionally clear boundary between regulation of telecommunications services and regulation of financial services. Depending on the business model employed service telecommunications by the providers, regulators may face questions regarding their responsibility for overseeing or facilitating these emerging services. For example, in the case of nonbank based m-banking or m-payment systems, which may not fall under the regulatory purview of financial sector regulators, does the telecommunications regulator bear any responsibility for ensuring the safety and accessibility of e-money?

Telecommunications regulators should understand the type(s) of m-banking systems already introduced in their markets, as well as to evaluate what other type(s) of models may or may not be permitted under current telecommunications and financial regulation. This should involve the analysis coordination and participation of the financial regulator. While the financial regulator will be familiar with its own financial regulations, it is less likely to be familiar with the laws and regulations imposed on mobile operators, as well as the technical aspects of the service. In addition, in coordination with the financial regulator, the telecommunications regulator could then undertake a review of existing sector regulation to assess whether regulations need to be revised to account for mbanking and m-payment activities, and any cases in which new regulation may be required.

For example, perhaps due to the success of mbanking and greater familiarity with the service, the Pakistan Telecommunications Authority (PTA) is working with the SBP to develop revised guidelines to expand how the bank-based model operates in Pakistan.⁶⁴ The head of the PTA has expressed the need to develop a unified and open regulatory framework for further promotion and expansion of mobile banking services in the country. His vision is the establishment of a "TPS" (Third Party Solution Provider) model including mobile operators (providing m-commerce application interface), banks (providing financial services), consumers (end-user utilizing m-commerce services) and a TPS (a third party vendor performing integration of all entities).⁶⁵ Such an approach would seek to move Pakistan beyond the bank-based model and enable it to evolve to a non-bank based structure.

be discussed in As will Section 1.3.2.1, telecommunications regulators appear to have several existing responsibilities that may warrant reconsideration or revision in order to accommodate the wide range of m-banking. These areas of responsibility may include, but are not necessarily limited to, customer protection, interoperability, accounting requirements, universal service obligations, tariff regulation, and SIM registration.

1.3.1.2 Financial regulators

Financial regulators also face many questions and concerns regarding their role in the regulation and oversight of m-banking services. Often, financial regulators are empowered to specify the scope of banking services carried out by a financial institution and to issue appropriate banking licenses. A key consideration is that, in general, only banks are authorized to take deposits, and thus the protection of deposits is a key component of banking regulation.⁶⁶ On the other hand, credit can often be offered by nonbank institutions. The question of whether m-banking services and their providers are subject to banking regulation is therefore dependent upon the determination of what constitutes a banking activity as well as how a bank is defined. Thus the financial sector regulator, depending on their enabling legislation, can play a significant role in - essentially - determining whether m-banking and m-payment activities require separate licenses from a mobile operator license; if a separate license is required, what type of licenses needs to be obtained; and more generally whether the m-banking provider will be otherwise subject to the same financial regulation as traditional banks. In considering their approach to regulation of m-banking services, financial regulators will need to aim for a regulatory regime that imposes suitable oversight and safeguards on all services identified as banking services, whether traditional or mobile, while permitting sufficient flexibility for providers to develop innovative financial products.

For example, policymakers and regulators around the world are currently debating if and how existing regulation ensuring the safety and liquidity of customer deposits to m-banking services regulation should be imposed on m-banking systems. With the bank-based m-banking model some level of protective regulation is in force, as deposits are held by banks already subject to regulation. But some non-bank based m-banking systems may currently fall outside of all financial regulation, and thus be free of such regulation. Between these two extremes may lay a number of permutations, such as the M-PESA model in which Safaricom, in consultation with the Central Bank of Kenya, invests an amount equal to its net deposits in commercial banks in order to ensure its safety.⁶⁷

Financial regulators are also the key actors in antimoney laundering (AML) activities and combating the financing of terrorism (CFT) efforts. The introduction of m-banking and m-payment services, while having the beneficial effect of expanding banking services to the unbanked, also provide new avenues for criminal or terrorist actors to move money in service of lessdesirable goals. Financial regulators bear responsibility for implementing appropriate AML/CFT mechanisms, often through the use of Know Your Customer (KYC) requirements⁶⁸ imposed on financial institutions. In the case of m-banking and m-payments, financial sector regulators need to determine the appropriate balance between stringent KYC requirements – which may limit access to banking services - and more relaxed requirements that will make it easy for more people to sign up, but that may be less effective for combating money laundering and terrorism. For example, in South Africa the government established a tiered KYC system, under which the existing AML/CFT law was amended to allow the poor and unbanked greater access to banking services by allowing less-demanding registration requirements for certain types of accounts.⁶⁹ So-called Exemption 17 accounts may be opened by South Africans who cannot provide proof of their address, but have daily and monthly restrictions on the amount of money that can be transferred out of the account, as well as maximum balance restrictions. A further change noted that m-banking falls under Exemption 17, but that if the consumer wishes to open a banking account without submitting to an in-person identity verification process, even lower limits on transfers and maximum balances apply.⁷⁰ Similarly, in Ecuador⁷¹, Colombia, Mexico and Peru⁷², the financial regulator has also authorized the creation of "basic accounts" with lessstringent KYC requirements - as well as balance or transaction limitations - that can be leveraged by mbanking providers as a means to improve financial inclusion by making banking services available to those who may not be able to satisfy the KYC requirements of a traditional bank account.

1.3.1.3 Competition authorities

Competition authorities, depending on their enabling legislation, are responsible for the enforcement of competition law, including addressing anti-competitive behavior, reviewing and approving or denying merger requests and certain business partnerships, as well as promoting competition. In addition, some competition authorities are responsible for consumer protection regulations. M-banking brings about a market situation in which divergent actors banks and mobile operators, for example, or even alliances between banks and mobile operators - are offering substantially similar services. However, sectorspecific regulators - such as the telecommunications regulator and the financial sector regulator - may also have oversight or enforcement power regarding competition matters within their specific sector.

As competition issues arise in the fields of mbanking and m-payment, it is possible that competition regulators could become involved, whether as required by the legal framework or in an advisory capacity. One analysis identified two key issues with respect to mbanking for competition authorities: the acceptable boundaries of cooperation in payment infrastructure, and the risks of anti-competitive "lock in" of a particular service.⁷³ The exact requirement to or interest in coordination between an economy's competition authority and either or both of the financial sector or telecommunications sector regulators will depend on the legal and regulatory framework in place.

1.3.1.4 Opportunities for coordination/ cooperation among regulators

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. It is likely that the greatest coordination will take place between the telecommunications and financial services authorities. But other agencies are likely to be integrally involved, such as competition regulator, as well as agencies responsible for consumer protection issues. For example, in bank-based m-banking models, as mobile network operators and banks enter into partnerships to deliver and promote m-banking services, it would be preferable for the regulators to coordinate their oversight or to clearly define responsibilities so that all parties - the regulators, the companies and even consumers - clearly understand relevant regulations and oversight mechanisms for such business arrangements. Similarly, while competition issues in the telecommunications and financial sectors may currently be addressed by the relevant sector-specific regulator and the competition authority, the close relationships between network operators and financial institutions may require at least some level of consultation regarding the nature and timing of decisions in one sector and how such decisions could affect the other.⁷⁴

Cooperation between regulators will be a necessary tool for the development of a coordinated approach to the oversight of m-banking and m-payment systems. As discussed above, each regulator will have unique competencies and capabilities that can be brought to bear in a coordinated approach to regulation and oversight of m-banking services. For example, the financial regulator may benefit from relying on the technical and technological expertise of the telecommunications regulator as both seek to understand the emerging options for m-banking, m-payments and other financial transactions enabled by mobile technology.⁷⁵ Similarly, the telecommunications regulator will benefit from the specialized knowledge of the financial sector regulator with respect to, for

example, KYC requirements that could be harmonized with similar SIM registration requirements.

The specific impetus for cooperation between regulators, as well as the form such competition should take, will necessarily vary by jurisdiction, taking into account government policies and priorities, existing legal and regulatory frameworks, and market conditions. However. options for promoting cooperation and coordination could include an intergovernmental commission where the financial sector and telecommunications sector regulators periodically convenes to discuss and address current and emerging issues related to m-banking. In addition, the two regulators could cross-train relevant staff members and leadership on issues related to m-banking.

1.3.2 Regulatory frameworks for m-banking

1.3.2.1 Challenges of the convergence of ICTs and financial services

In addition to the need to promote coordination and cooperation among the relevant regulators, another key challenge resulting from the ongoing convergence of ICTs and financial services are outdated legal and regulatory policies.

In many economies, the legal and regulatory environments in the banking, competition and - to a somewhat lesser extent - telecommunications sectors were developed or most recently revised well before the convergence of ICTs and financial services. For example, in Peru, banking laws and regulations previously only allowed banking to be conducted by entities with physical locations, but in 2008 were revised to enable branchless banking by allowing licensed financial institutions to make use of agents.⁷⁶ Policymakers, legislators and regulators need to review and revise frameworks to account for mobile financial services. According to one analysis, in the absence of new policies or regulations, there may be preliminary evidence to indicate a difference in m-banking opportunities between economies with civil law traditions and law traditions. common Oversimplifying for the purpose of comparison, in common law systems, behavior is permitted if it is not prohibited in the law, while in civil law systems behavior is prohibited until it is expressly defined and permitted. Because the concept of banking through a mobile device may not have considered when drafting a law or regulation in a common law country, this may allow the introduction of m-banking, as was the case of M-PESA.

In civil law systems, the regulatory ambiguities are less likely to leave space for innovation,⁷⁸ creating a different – but still important – need for revised frameworks, in this case to provide regulatory certainty and the resulting openness in the market for the entry and growth of m-banking services. We have seen such modifications to legal frameworks introduced in numerous countries such as India, Mexico, and Philippines to allow for the provision of such services. Nevertheless, even in countries where m-banking services may be allowed to operate, the regulators may still find it necessary to modify existing laws and regulations to address others aspects of the service relating to the use of agents, provision of remittance services, etc.

1.3.2.1 Other regulatory issues

The changes identified below are considered with respect to m-banking in general, rather than focusing on one particular m-banking model. Current regulatory frameworks are more likely to enable m-banking services closer to the bank-based model end of the spectrum identified in Section 1.1. However, regulatory frameworks can be amended to permit the establishment of non-bank based m-banking systems, which may help foster the spread of m-banking. Many of the challenges faced by regulators include reconsidering their existing responsibilities with an eye to oversight of m-banking and potentially making appropriate adjustments. For example:

1.3.2.1.1 Customer protection

In an environment in which m-banking becomes a crucial means of storing value or transmitting payments, who is responsible when there is an error related to a transaction? To whom should customers address their complaints? What redress mechanisms are in place? What safeguards exist to protect consumers' personal and financial data? These issues are relevant to all mbanking models, although the responsibility for addressing consumer protection would more likely fall within existing financial sector regulation for a bankbased model. By comparison, for a non-bank based model, addressing customer protection may require telecommunications regulators to look to financial sector regulators, as well as possibly consumer protection agencies for guidance, as well as to reevaluate the tools at their disposal, such as quality of service (QoS) guidelines and relevant reporting and monitoring procedures, to take into account new use cases, particularly those related to transactional errors

within a non-bank based m-banking system – a case that is not already subject to at least some level of financial sector regulation. They may also consider potential new reporting or monitoring requirements, such as tracking the number of customer queries or contacts related to m-banking concerns or errors.⁷⁹

1.3.2.1.2 Interoperability

As m-banking services continue to expand, the issue of interoperability - or the ability to transfer emoney from one m-banking service to another – is likely to become increasingly important. This discussion focuses on transfers between or involving nonbankbased systems, where value is not stored in a bank, as mechanisms and protocols for inter-bank transfers and thus between bank-based m-banking services - are well-established. As noted above, there are no widely between reported interoperability agreements providers of m-banking services that allow the direct, electronic transfer of stored value from an account in one m-banking service to an account in another mbanking service when at least one of the services does not involve a traditional bank. Unfortunately, this leads to a case such as is found in Kenya, where consumers transfer money between non-bank m-banking services by visiting an agent to cash out the desired amount of money from the first service, then carrying cash to an agent of the second service to cash in, and paying any

applicable commissions or agent fees. This situation is illustrated in Figure 5.

The issue of interoperability of m-banking systems is much more likely to require new reviews or actions as non-bank based service providers enter the market and may not have tight integration with a licensed bank. By comparison, licensed banks generally work with a clearing house – which may or may not include the economy's central bank – that facilitates interbank transfers, or rely upon internationally accepted standards and systems for cross-border transfers. As noted by the World Bank in 2011, voluntary interconnection between m-banking account providers is feasible, but may not occur due to divergent business interests.⁸⁰

Regulators have not yet taken steps to encourage or require interoperability of m-banking systems, though they could conceivably do so, such as setting standards for interconnection of m-banking platforms or attempting to mandate interconnection, although both approaches have notable drawbacks and may not achieve the regulator's desired result. Interconnection standards would need to be sufficiently technology neutral to minimize the risk of being outdated soon after – or perhaps before – finalization and implementation.



A technology-neutral approach could be limited to basic requirements for authentication, communication protocols and verification. Mandated interconnection would potentially have to address interconnection charges and the possibility of unbundling m-banking services (for example, the platform from the provision of accounts or payments). Financial and telecommunications sector regulators need to weigh the potential complexity of encouraging or mandating interoperability of m-banking systems against the risk of stifling innovation and investment. By way of comparison, another major banking revolution –ATMs - are driven by standards developed within the banking industry. For example, the EMV standard defines integrated-chip cards and compatible ATMs and pointof-sale terminals that can read the cards. The EMV standard was initially developed by the Europay, Mastercard and Visa global payments networks.⁸¹

In the meantime, the mobile telecommunications industry and financial services providers have taken steps to facilitate interoperability without a regulatory mandate, as described in Box 7.

1.3.2.1.3 Roaming

To date, there has been little analysis or examination of the use of m-banking or m-payment systems while roaming on a mobile network other than that which provides the customer's local m-banking service, whether within national borders or internationally. However, certain assumptions can be made regarding the use of m-banking services while roaming:

The roaming agreement between operators will govern what types of services are available to roaming users. Thus, the ability to manage an mbanking account via SMS, smartphone applications or other means will be dependent upon the existence of a roaming agreement, the specifics of the roaming agreement and the customer's roaming profile. In cases where the mobile network operator is part of a multinational firm with subsidiaries in other markets, there is an increased likelihood of access to m-banking services.

Box 7: Facilitating m-banking interoperability

Industry-led interoperability

The GSMA has established a global mobile money transfer (MMT) initiative that includes among its principles an effort to address interoperability issues, messaging and financial transfers at an international, multilateral "hub" level rather than at the local level.⁸² The GSMA model is described in terms of international remittances, but would likely work in the same manner for any sort of inter-network transfer. In short, the GSMA's networked approach seeks to replace bilateral agreements between mobile network operators and other members of the m-banking or m-payments value chain with a multilateral approach. In the organization's view, multilateral models reduce an operator's time and resource commitments, as each operator connected to a multilateral hub is then able to send a remittance to any mobile phone user in the world on any other participating network without any additional negotiation or agreement. This, in turn, drives consumer uptake and generates economies of scale.⁸³

International remittances

Another area in which m-banking interoperability is already being addressed by stakeholders is international remittances. According to the Migration Policy Institute, in 2009, officially recorded flows totaled over US\$414 billion worldwide, including US\$316 billion sent to developing countries.⁸⁴ In 22 countries, remittances were equal to more than 10 percent of GDP in 2009; in 11 countries they were equal to more than 20 percent of GDP.⁸⁵ The key advantage of leveraging m-banking services for remittances is that they represent an opportunity to send remittance to recipients who may have limited or no access to the money transfer services or banks that comprise formal remittance channels. While visiting a bank branches or money transfer service offices may be inconvenient or impractical for many recipients, especially those in rural areas, access to a mobile handset or an m-banking agent is much more widespread. However, until m-banking services achieve greater interoperability, there are still relatively few options for sending international remittances to a user's m-banking account.

Despite this, some m-banking operators, such as Globe and SMART in the Philippines and M-PESA in Kenya, have entered into arrangements with Western Union to provide a channel for remittances The service allows senders in selected countries to leverage Western Union's existing agents and locations to send money directly to the m-banking accounts of mobile subscribers in the Philippines and Kenya.⁸⁶ Western Union has also entered into agreements with multinational mobile operators, including MTN and Orascom Telecom, to introduce similar services in additional markets. In addition, Western Union and the GSMA are working together on a framework to more widely enable mobile money transfer services.⁸⁷

 Cash-in/cash-out services are unlikely to be available in areas where the subscriber's mobile network operator (and associated bank, in the case of bank-based models) does not have a presence, unless the network operator or associated bank has established a partnership with a local business or another m-banking service. However, to date, there have been no widely recognized partnerships between disparate m-banking services.

There have been, however, some instances of multinational operators offering m-banking services to customers roaming on networks operated by related subsidiaries. For instance, Zain's Zap⁸⁸ service was initiated in 2009 in Kenya and Tanzania,⁸⁹ followed by launches in Bahrain, Ghana, Niger, Malawi, Sierra Leone and Uganda.⁹⁰ Zain developed Zap to operate on its One Network platform, which enabled Zain subscribers in Africa and the Middle East to roam freely in all Zain markets while enjoying local calling and messaging rates and the ability to purchase airtime in any Zain market.⁹¹ At launch, Zain noted that among Zap's features was the ability to send airtime to other Zain customers in East Africa,⁹² effectively creating a crossborder m-banking system. Airtel is currently in the process of restructuring its m-banking offerings in Africa, and in June 2011 signed a memorandum of understanding with Ecobank to promote mobile banking services across the 14 African countries in which they both operate.93

Telenor's *easypaisa* service advises customers that they can access their accounts when roaming on partner networks, but does not provide specific details of the services available when roaming.⁹⁴

1.3.2.1.4 SIM registration/know your customer

Although not a universal practice, there has been increasing interest among policymakers in the idea of registration of prepaid SIM cards as a means to reduce the use of prepaid mobile handsets in criminal or terrorist activities. SIM registration schemes have been introduced or considered in countries including Australia, Bolivia, Brazil, Germany, Indonesia, Japan, Liberia, Malaysia, Mexico, Norway, the Philippines, Peru, Singapore, South Africa, Switzerland, Thailand and the United States. The rise of m-banking services could prompt telecommunications regulators to alter SIMregistration programs in multiple ways. For example, SIM registration uses could be expanded to include anti-money laundering efforts, particularly in non-bank based m-banking systems where the financial regulator may have little to no oversight.

Telecommunications regulators may also seek to coordinate or integrate SIM registration schemes with the KYC regulations that are more common in the financial sector, so as to facilitate coordination between telecommunications and financial regulators to combat fraud and financial crimes as well as to ease the burdens on customers registration of both telecommunications and financial services. The issue of m-banking service providers having detailed knowledge of their customers and/or requiring registration applies to all m-banking models as a means to comply with crime prevention requirements.

1.3.2.1.5 Universal Access/service

M-banking by definition requires adequate mobile service coverage, and thus the areas with weak mobile network coverage will face significant difficulty in leveraging m-banking services. Expanded access to mobile services, such as could be facilitated through universal access/service plans, would therefore expand the reach of banking services to more of the unbanked population. While high-income countries have nearuniversal mobile coverage, as recently as 2009, upper middle income countries had 91 percent population coverage, lower middle income countries had 86 percent population coverage, and low income countries had only 67 percent population coverage.⁹⁵ M-banking services led by banks and nonbanks would benefit from expanded mobile coverage and penetration driven by universal access/service policies.

1.3.2.1.6 Accounting

As network operators begin to store customers' value and to derive revenues from m-banking services, regulators will need to review accounting regulations and determine if any changes are necessary. Specifically, accounting separation requirements will likely come into play, both as a means to prevent cross-subsidization and to ensure the security of consumer value stored outside of financial institutions. This issue is more likely to be relevant to non-bank based m-banking services.

1.3.2.1.7 Tariff regulation

Tariff regulation, often employed to prevent the abuse of dominance,⁹⁶ may become a tool for creating fair competition among m-banking services. In a market

with competing m-banking service offerings, even the rate charged for a standard SMS message or a USSD short-code – currently a primary means by which mbanking transactions are executed – could differentiate service offerings. The introduction of a m-banking service alongside existing mobile services could provide new opportunities for cross-subsidization or other distortions in tariff structures as operators compete for customers. The use of tariffs as a differentiating factor among m-banking services is more likely to be a competitive issue among non-bank based m-banking services, but may also be relevant to bank-based services.

1.3.2.1.8 Law enforcement access/compliance

Finally, while there are likely to be existing regulations regarding law enforcement's authority to monitor and access traditional bank-based systems, the application of those laws to non-bank based systems may need to be evaluated. Particularly in cases where a non-bank entity is holding and transferring monies, it seems likely that law enforcement authorities will want the same visibility into those transactions as they have into traditional bank transactions.

1.3.2.2 Regulatory changes to enable and encourage m-banking

In addition to reconsidering how to execute existing responsibilities and duties, policymakers, legislators and the regulators themselves could implement more significant changes designed to create an enabling environment for m-banking services. The exact definition of an enabling environment is subjective, of course, but could be defined as being characterized by openness to new m-money and m-banking models and a degree of certainty in regulatory frameworks or guidance regarding new approaches.⁹⁷ The World Forum's Mobile Financial Services Economic Development Report, for example, identifies several regulatory changes that could bring more certainty and help promote m-banking, including regulations governing the use of agents to facilitate financial services, the ability of mobile operators to deploy mobile financial systems as a principal operator, the characterization of value stored in a mobile account as a "deposit" (and therefore eligible to earn interest and to be protected by deposit insurance, for example), and appropriate AML/CFT regulation for the mobile context.

E-money (electronic money): stored value held in the accounts of users, agents, and the provider of the mobile money service.

The specific areas of focus indicated below identify some regulatory changes that could promote mbanking.

1.3.2.2.1 Flexible telecommunications licensing for m-banking services

A country's current telecommunications regulatory regime may place restrictions on the ability of mobile operators to offer non-telecommunications services, such as m-banking or m-payment services. In some countries, the telecommunications regulator may require additional licenses. For example, value-added service licenses may be required (e.g., China, Kenya and Saudi Arabia) and the specific service to be provided must be included in the license (e.g., Philippines).⁹⁹ Requiring a separate license or the inclusion of service descriptions in a license are not insurmountable barriers to the launch of m-banking services. However, depending on the licensing process, including the efficiency of the regulator in processing license applications or amendments, such requirements may create barriers limiting or slowing the entry of mobile network operators into the m-banking market. In addition, coordination of licensing requirements with other regulators is key here as it may be that the mbanking provider may also be subject to licensing requirements from the financial regulator. In order to foster m-banking, it may be useful to see what efforts can be made to streamline any licensing process that is imposed on m-banking providers.

1.3.2.2.2 Implementation of mobile number portability (MNP)

The ability of subscribers to port their mobile number from one operator to another can present a barrier to adoption of m-banking services if, for example, a customer would like to change service providers in order to subscribe to a different operator's m-banking offering, but is unwilling to give up their existing mobile number. MNP has been introduced in a growing number of jurisdictions, so the need for regulatory change globally continues to decline. However, in markets without MNP or plans to implement it, telecommunications regulators should consider the extent to which a lack of MNP prevents mbanking adoption. In addition to these telecommunications-specific issues, there are regulatory changes outside the telecommunications sector that will affect if and how telecommunications service providers can offer m-banking and/or m-payment systems.

1.3.2.2.3 Implement fund safeguarding

While licensed banks are generally subject to reserve requirements to satisfy potential depositor claims, without legislative changes, funds held by nonbank institutions are not necessarily subject to any similar requirements. Without such protections, the security of customer funds held by a non-bank entity could be seen as significantly riskier than funds held by prudentially regulated bank. Regulations in а economies including Afghanistan, Cambodia, India, Indonesia, Malaysia, the Philippines and the economies of the West African Economic and Monetary Union¹⁰⁰ have been implemented requiring nonbank issuers of e-money to maintain liquid assets at a prudentially regulated bank or sometimes in "safe" assets such as government securities, in an amount equal to the total value of customer funds collected.¹⁰¹ In some cases, these liquidity requirements are bolstered by additional regulations that limit the use of deposited funds or require that deposited funds are split among multiple banks.¹⁰² On a related note, most developing countries do not extend deposit insurance protection to the funds deposited in banks to support e-money deposits, and in cases where deposit insurance does exist, because service providers pool the accounts they service, resulting in bank-held accounts that exceed the deposit insurance coverage limits. Regulators could instead offer pass-through deposit insurance to individual customers, as is the case in certain U.S. pooled accounts, such as employee benefit accounts,, where insurance coverage passes through the plan

administrator to each participant's interest.¹⁰³ Passthrough deposit insurance avoids a situation where pooled bank-held accounts exceed deposit insurance coverage limits by covering each depositor's holdings up to the applicable coverage limit, even if that means that the overall pooled account would exceed the coverage limit. Regulatory changes to ensure the safety of customer deposits would reduce the potential risk of m-banking services offered by non-bank entities.

1.3.2.2.4 Allow for interest and savings

An advantage enjoyed by banks over non-bank providers of m-banking services is the ability to lend the customer deposits they hold, and in return to pay interest on those deposits. So far, e-banking and related regulations have prohibited the payment of interest to customers and, through measures such as the fund safeguarding regulations described above, prevented nonbank actors from investing customer deposits. The unavailability of interest-bearing accounts removes an incentive for take-up of m-banking services, as well as an incentive for using m-banking services as a vehicle for savings. Two CGAP experts have argued for allowing nonbank e-money to earn interest, given that the regulations prohibiting lending have negated the risk that customer funds would be unavailable for withdrawal.¹⁰⁴ By allowing m-banking providers to offer interest, regulators would create additional incentives for the unbanked to join the banking system. Companies, such as Safaricom, are already teaming up with banks to offer their customers interest and saving insurance (See Box 8). But although these models are promising it is still necessary for regulators to see what alternatives can be developed for non-banks to provide interest, as well as insured savings, with their mbanking services.

Box 8: M-KESHO in Kenya

In Kenya, Safaricom and Equity Bank have developed a joint product -- M-KESHO – which provides M-PESA users with an interest bearing and insured Equity Bank account accessible through mobile phones. However, the service results in numerous fees for its low-income customers that may limit it success and popularity. In order to withdraw funds from M-KESHO, a customer must first pay a fee to transfer funds from the M-KESHO account held at Equity Bank to the M-PESA account and then pay a second fee to withdraw cash from M-PESA. These two transaction fees largely undercut any interest gains. Although models like M-KESHO are promising it is still necessary for regulators to see what alternatives can be developed to non-bank based m-banking services to provide interest, as well as insured savings.

Source: Financial Access Initiative, "M-KESHO in Kenya: A new step for M-PESA and mobile banking," (May 27, 2010), available at http://financialaccess.org/node/2968.

1.3.2.2.5 Avoid additional taxation and implement tax incentives

Policies governing the taxation of mobile handsets and services can affect the adoption of mobile service and, by extension, m-banking services. Taxes may include value-added taxes (VAT)/goods and services taxes (GST)/sales taxes that apply broadly across the economy as well as specific taxes on telecommunications goods and services, though taxes on handsets, for example, may be significantly offset by operator subsidies. A 2006-2007 study of taxation in 101 countries found that taxes accounted for an average of 17.4 percent of the total cost of mobile ownership.¹⁰⁵ While the introduction of m-banking services may present an appealing possible new source of tax revenue, government authorities should consider whether taxation of m-banking services - in addition to existing taxes imposed on telecommunications services and equipment - is likely to have a detrimental effect on mobile and m-banking adoption.

1.3.2.2.6 Avoid imposing detailed technical requirements for m-banking services

Although there has been some discussion of the telecommunications regulator's role in requiring or encouraging the development of m-banking systems that are accessible to even the most basic mobile handsets and technologies,¹⁰⁶ this may run the risk of stifling innovation or competition. As has been seen around the world over the past two decades, the telecommunications industry innovates at a rapid pace, such that regulatory frameworks are often characterized as regulating the last service, not the next service. Particularly in the current early stages of mbanking development, both telecommunications and financial sector regulators should be wary of imposing detailed technical requirements on m-banking services that could deter innovation or market entry.

1.4 Facilitating Roll-out and Use of Mobile Banking

As policymakers, regulators and industry consider the utility of m-banking services and the business cases for their introduction, a number of considerations come into play regarding encouraging the deployment and use of such services, beyond the regulatory issues noted above. It is crucial, for example, that both agents and consumers be educated regarding the utility and benefits of m-banking services, and agents are additionally responsible for understanding their roles and responsibilities. In addition, m-banking and electronic payment systems rely upon an ecosystem of technologies and services that enable easy, fast and secure financial transactions. As the popularity of m-banking grows and technologies continue to evolve, regulators and service providers will have to keep pace with technological change while preserving and improving the utility, efficiency, and security of m-banking services.

1.4.1 Education on m-banking and mobile payments

1.4.1.1 Education and training of agents

M-banking is critically reliant on the use of agents to provide services to customers. The parties to whom direct customer interaction is outsourced may or may not be agents of the bank or non-bank on whose behalf they interact with customers in the true legal sense. This can vary depending on the regulatory system and contractual arrangements that are made. ¹⁰⁷ For example, in South Africa, WIZZIT, employs agents who are independent franchisees that purchase starter packs from WIZZIT. (See Box 9).

In other cases, retail agents are local airtime offices for a mobile carrier, or can be a grocer, postal facility or other business that also acts as an agent.

Agents are indispensible for m-banking growth. An agent office can be outfitted with the necessary technology and operate at a fraction of the cost of opening and operating conventional bank branches. This also makes it possible to reach new groups of poorer customers in a more profitable manner. In addition, agents offer customers both convenience and a familiar environment for those who may not be as familiar with banking practices to feel comfortable transacting business.

Agents will need to be educated and trained on the products offered and the services they are providing. Perhaps more importantly, the use of agents has created heightened risks related to providing service. These risks can include theft of an agent's cashbox or if an agent is robbed on their way to or from a bank branch. Efforts to prevent this type of theft from happening may require agents to keep smaller amounts of cash on hand or make more frequent trips to the bank to make smaller deposits.¹⁰⁸ Agents present a variety of operational risks to the provider, as well as reputational risks given that the agent is the public face of the provider.

Box 9: WIZZIT of South Africa

WIZZIT, a South African start-up company established in 2002, has partnered with the South African Bank of Athens to offer its m-banking services.¹⁰⁹ WIZZIT's target customers are the unbanked. The company does not offer its services through branches or separate offices. WIZZIT customers are recruited by Wizzkids -- formerly unemployed people trained by WIZZIT to issue clients a debit card and familiarize customers with the card's use and application.¹¹⁰

One of the service's main advantages is that the m-banking technology works on any handset and SIM card and across all South African mobile networks. WIZZIT customers generally have pay-as-you-go mobile access and 16k SIM cards. For money transfers, it uses the South African inter-bank clearing system, which it accesses as an autonomous division of the South African Bank of Athens. This feature gives WIZZIT account-holders the ability to transact with any mobile user regardless of the identity of their network operator or their bank. WIZZIT has arrangements with the post office and the South African Bank of Athens, which collectively provide customers with approximately 3,500 sites for deposits. Since WIZZIT customers are issued a debit card, cash can be withdrawn at all South African ATMs. Employers can pay their staff by making payments directly into an employee's WIZZIT account electronically.¹¹¹

WIZZIT does note that it operates in compliance with the Code of Banking Practice established by the Banking Council of South Africa.¹¹² The code is a set of guidelines intended to help consumers understand how members of the association relate to their clients, promoting fairness, transparency, and adequate understanding of financial products and services, among other goals.

Agents may face challenges due to liquidity or lack thereof. Retail agents, especially those that are relatively small, unsophisticated and remote may not have enough cash on hand to meet customers' requests for withdrawals and may lack experience in the more complex liquidity management required for offering financial services. To manage liquidity effectively, agents will have to balance several variables, including turnover of cash, ease of access to the retail agent's bank account and processing time of transactions.

Many countries in which m-banking services are offered have rules related to anti-money laundering (AML) and combating the financing of terrorism (CFT). As such, m-banking providers must ensure that their agents comply with such rules. It may be necessary to have these rules adjusted to permit remote account opening with customer due diligence (CDD)/KYC rules with the limited formal documentation often associated with low income or remote customers who do not typically possess all the documents associated with establishing a traditional bank account.¹¹³ The surrounding AML/CFT with subsequent risks transactions can be limited through the use of an electronically enforced maximum allowable transaction and balance thresholds.

1.4.1.2 Consumer education and outreach

M-banking, while offering tremendous benefits to customers, especially those in poor and remote regions, also presents significant risks and challenges to customers. Consumer education and outreach should focus on two areas. The first is ensuring that consumers understand what the service offers, how it operates, and the best ways to utilize the service. It will be critical to educate consumers on the suitable use of services offered; this, in turn, will enhance consumer protection. Consumers will also need to understand how to protect their personal information to minimize theft and enhance security.

Depending on the region where the service is offered, consumers may need to be educated on enrollment, registration and customer access procedures. It may be a new experience for some consumers to see the mobile phone as an instrument of financial management.¹¹⁴ To that end, it will be important to establish adequate consumer protection measures to ensure security of transactions and prevent fraud.

Customer education may need to focus on how best customers can experience and utilize m-banking services. Retail agents may need to provide additional materials to customers outlining what services are offered and how they are used. Further information should be made available if there are customer complaints or a means for resolution of any concerns or problems customers encounter through agents.

1.4.1.3 Credit history

While some observers have identified m-banking services as a means to begin developing credit histories

among formerly unbanked users, there has been little published research in this area to date. One study, conducted in Kenya by USAID, drew several conclusions regarding the potential for building credit history via mbanking services in that country.¹¹⁵ Some of these conclusions are likely applicable broadly across markets in which m-banking services are active, and others that are likely more relevant to developing countries, as indicated in Table 2. It may be that the market and regulations will need time to adjust to and enable the use of m-banking transactions to develop credit history for users, as has been the case with prepaid credit cards in developed markets such as the United States.

1.4.2 Consumer Protection

1.4.2.1 Transaction Security

Ensuring transaction security in m-banking and mpayment systems has multiple aspects, overlapping considerably with existing measures to ensure security in electronic financial transactions. While these responsibilities are not unique to m-banking, they are arguably even more relevant in a mobile context, where handsets can be easily misplaced or stolen.

With respect to telecommunications networks, the threats to m-banking are the same that apply to any

other services delivered over the mobile network. Such security issues include:

- attempts to disable or damage the network infrastructure, including denial of service attacks;
- attempts to limit legitimate users' access to the network, such as through wireless interference;
- unauthorized access to the network; and
- interception, monitoring or alteration of transmissions.

Telecommunications operators and vendors have invested heavily in technologies and processes to minimize security issues on mobile networks, and such technologies can be applied to m-banking services as well. In the case of an m-banking service enabled by the SIM Application Toolkit¹¹⁶, in which the m-banking application resides on a SIM card obtained from the network operator, the security model can be illustrated as shown in Figure 6. In this case, the SIM card contains security keys that are linked to keys in the high-security module (HSM) attached to the wireless gateway, which are in turn linked to keys at the HSM on the mobile financial services provider's (mFSP) network. The entry of a PIN and commands by the user are encrypted between the handset and the HSM, then deciphered and reencrypted by the HSM for transmission to the mFSP.

Table 2: Comparison of example countries			
Broadly applicable	More relevant to developing markets		
Mobile transaction data may be more useful as a market segmentation tool to separate lower- and higher-risk segments.	Licensed and functioning credit reference bureaus must be established – and relevant regulations implemented – before attention can shift to alternative (i.e., non-bank) data sources for credit history, such as mobile network operators.		
There may need to be a longer record history before one can gain a reliable sense of behavior and trends from the data.	Regulations must allow the disclosure of mobile subscription statement and account data to third parties, such as credit bureaus. Regulators may need to amend regulations to require or allow the sharing of data such as mobile transaction data or utility payments.		
The data potentially have predictive value—that is, they may increase the accuracy of credit scoring and risk evaluation models to predict ability to repay or likelihood of default—when combined with mainstream credit bureau data.	A clear and compelling business case is needed in order for MNOs and m-payment providers to share information with and subscribe to a credit reference bureau.		
Source: Telecommunications Management Group, Inc., adapted from USAID Mobile Banking – The Key to Building Credit History for the Poor?			



The Bank for International Settlements (BIS) in 2003 suggested a series of risk management principles for application to electronic banking, many of which are applicable in the more specific context of m-banking.¹¹⁷ A 2008 report reconsidered the BIS principles and their applicability or implications for m-banking.¹¹⁸ The list below presents the principles that are arguably most relevant to the protection of m-banking transactions. Service providers should:

- take appropriate measures to authenticate the identity and authorization of customers with whom they conduct business over the Internet;
- use transaction authentication methods that promote non-repudiation and establish accountability for e-banking transactions;
- ensure that appropriate measures are in place to promote adequate segmentation of duties within e-banking systems, databases and applications;
- ensure that proper authorization controls and access privileges are in place for e-banking systems, databases and applications;
- ensure that appropriate measures are in place to protect the data integrity of e-banking transactions, records and information;
- ensure that clear audit trails exist for all e-banking transactions;
- take appropriate measures to preserve the confidentiality of key e-banking information, commensurate with the sensitivity of the information being transmitted or stored;
- take appropriate measures to ensure adherence to customer privacy requirements applicable to the jurisdictions in which supplying e-banking services;

- have effective capacity, business continuity and contingency planning processes to ensure the availability of e-banking systems and services; and
- develop appropriate incident response plans to manage, contain and minimize problems from unexpected events including internal and external attacks that may hamper provision of services and products.

As both m-banking services and telecommunications networks continue to evolve, there will be new opportunities for both threats to mbanking security and techniques to mitigate such threats. For example, while most m-banking and mpayment transactions in developing countries are conducting using relatively basic handsets, more powerful (3G or 4G) handsets enable more complex security functionality. However, the introduction of additional complexity in both the handset and the banking application can also create additional opportunities for malicious attacks (hacking) or for security failures. As described in Box 10, the ITU has issued recommendations related to m-banking security.

1.4.2.2 Fraud Prevention

Fraud prevention is ultimately the responsibility of the m-banking service provider, regardless of the mbanking model employed. Responsibility for oversight and enforcement of anti-fraud measures depend on the legal and regulatory framework and the m-banking model employed, and may fall under the jurisdiction of agencies including law enforcement, the financial sector regulator or the telecommunications regulator, or some combination of those agencies. An example of a telecommunications regulator with significant responsibility for preventing fraud as it relates to mbanking is found in Kenya, where the Communications Commission of Kenya (CCK) is charged with facilitating the development of e-commerce, including responsibility for developing a sound framework to minimize forged electronic records and fraud in ecommerce and other electronic transactions.¹¹⁹ Fraud can take many forms, but can be generally categorized into four cases (see Table 3), as identified by CGAP: (i) money laundering; (ii) defrauding of customers by agents or other consumers; (iii) agents defrauding the service or system; or (iv) individuals/consumers defrauding agents.¹²⁰

Box 10: ITU Recommendations on M-banking security

In September 2010, ITU-T issued two recommendations related to secure mobile financial transactions, identifying four security levels that address all necessary security dimensions. ITU-T Recommendation Y.2740 describes the principles of security system development for mobile commerce and mobile banking systems, including security requirements for mobile commerce and mobile banking systems, based on four security levels, known as Assurance Levels. Recommendation Y.2740 also outlines probable risks in the mobile commerce and mobile banking systems, and specifies means of risk reduction. Recommendation Y.2741 specifies the general architecture of a security solution for mobile commerce and mobile banking systems. The recommendation also provides examples of implementation models of mobile commerce and mobile banking systems, beginning with enrollment in a mobile payment system and concluding with usage of the payment system, including transactions between discrete systems.

Table 3: Types of Fraud and Possible Countermeasures			
Money laundering	Service providers will need to comply with applicable AML regulations. CGAP suggests proportionate regulation that is effective, but not so stringent as to be a barrier to poor customers who transact small amounts.	The most effective AML approach is for providers to comply with regulations and, if applicable, encourage regulators to develop effective, proportionate regulation.	
Customers are defrauded	Agents can defraud customers, especially in environments in which customers are less-educated and rely on verbal instructions rather than on written material. For example, agents can pretend to make a cash-in transaction or change the fees they charge for providing a service. It is also possible that bank tellers or agents recommend a simple PIN for the customer to use, generally in good faith to help customers who are not familiar with the concept. Despite good intentions, such a situation can enable agents to use the information to defraud the customer. Customers can also be defrauded by other customers who gain access to their PIN or personal information.	Providers can educate customers regarding how the system works, including the importance of safeguarding information such as PINs and the need to wait for official confirmation (often via SMS) that a transaction is complete. Education efforts can include radio, television, posters, graphics, and other alternatives to written material. Providers should also have a call center where customers can call with questions or to complain about potential fraud. Further, providers should have a clear policy regarding reimbursement of individuals who have been defrauded.	
Agents and customers defraud the system	Agents and customers can work together to defraud the service, such as by splitting one transaction into two or more smaller ones in order to work around a pricing structure that charges higher fees for larger transactions. In addition, customers can defraud the system by making direct deposit into a different phone number than their own, in effect "transferring" funds to another person's m-wallet without paying a transfer fee. Also, agents can partner with customers to take advantage of a spread between commissions and fees by making repeated deposits and withdrawals and splitting the difference between commissions and fees.	Providers can develop internal systems to monitor transactions and quickly identify suspicious transactions or transaction patterns, such as repeated similar or identical transactions by a customer a short period, or multiple failures of a transaction by an agent. Providers can also examine their pricing and commission models for vulnerability to fraud.	

Customers (or those posing as customers) defraud agents

Although agents are well trained compared to customers, they are not immune to fraud and abuse by customers. In one example, thieves pretended to represent Safaricom auditors in order to gain access to an agent's accounts and used the information obtained to generate fraudulent SMS messages to the agent to facilitate a cash-out transaction. Providers can continue to invest in rigorous agent training, arguably the best defense against fraud and abuse. Providers should also consider ensuring that handset user interfaces clearly differentiate m-banking-related messages from other functions and messages so that messages from the provider are distinctive and not easily imitated. Providers may also consider compensating agents who are defrauded in order to avoid inadvertently encouraging agents to keep cash limits low, which could ultimately harm customer service standards.

Source: CGAP, Agent Management Toolkit: Building a Viable Network of Branchless Banking Agents – Technical Guide

1.5 Regulator Checklist

Each market will have its own unique policy, legal and regulatory environment with respect to m-banking and m-payment systems. The goal of the checklist below is to: (i) identify the issues and challenges faced by policymakers and regulators with the introduction of m-banking (or the desire to facilitate its introduction); (ii) identify possible action items to address the issue/challenge; (iii) provide representative examples of countries that have successfully addressed these particular issues.¹²¹

Issue/Challenge	Action	Representative Example	
Evaluation of current permissibility for m-banking			
 Is the introduction or deployment of m- banking services permissible under the current financial sector legal and regulatory regime? Have currently permissible m-banking model(s) been identified? 	 If m-banking is permissible, identify potential areas for review or streamlining of regulations to smooth introduction or expansion of m-banking services and provide an appropriate level of flexibility. If m-banking is not permissible, assess how m-banking will impact stability of financial system, and revise or draft applicable legislation and/or regulations. 	Pakistan	
2. Has the unbanked population been identified?	 Develop an approach for quantifying and identifying the unbanked population. Compare populations reached by mobile services and banking services. 		
 Does the government actively encourage the introduction of m- banking services? 	 Identify policy or regulatory changes that could encourage the introduction or expansion of m-banking services. 	Philippines	
4. Is a high-level m-banking policy necessary or appropriate?	 Government develops m-banking policy. Input from sector regulators Define roles of regulators with respect to m-banking, including oversight of competition 	Philippines	
 Is there a process for cooperation or coordination between the telecommunications and financial regulators, as well as other relevant regulators, regarding m-banking? 	 Implement mechanism or requirement for cooperation, such as: Joint commission Training 	Colombia	

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Evaluation of regulation and practices relevant to m-banking			
6. Is telecommunications network coverage and capacity adequate to support m-banking?	 Develop policies to support increased build out by: Facilitating competition Providing tax incentives Implementing regulatory reforms Implementing universal service reform 	Kenya	
7. Is lack of mobile service coverage preventing m-banking adoption?	 Revise and strengthen universal service/access plans to expand mobile coverage. Consider licensing requirements for minimum coverage. 	Ghana	
 Are network security practices sufficient to protect m-banking information? 	 Develop/adopt new standards for financial and transaction security. Revise applicable laws/regulations to reflect appropriate security concerns. 	Pakistan	
 Are device security/encryption requirements sufficient to protect m- banking information? 	 Require use of internationally-accepted secure transaction/transmission formats. 	South Africa	
 Do current network infrastructures enable interconnection and interoperability of m-banking services? 	 Determine if/how to encourage or mandate interconnection or interoperability. 	Ghana	
11. Have undesirable gaps or prohibitions in telecommunications sector regulations been identified and addressed? Do network operators face barriers to entry into the financial services market?	 Review telecommunications sector regulatory framework to assess necessary changes to address m- banking. Identify barriers to provision of financial services by mobile network operators. 	Kenya	
12. Do m-banking services and traditional banking services face the same level of regulation? Should they?	 Determine if there is a need to differentiate the regulation of m- banking and traditional banking. 		
Emerging legal and regulatory issues relevant to	o m-banking		
13. Does the legal/regulatory framework define and enable e-money and e- commerce?	 Conduct a review of e-money/e- commerce (and potentially other related issues) regulation and revise or create new instruments as appropriate. 	European Union	
14. Are banking agents subject to oversight and regulation? If so, who is the responsible regulator? Are there processes for conflict mediation, dispute management, etc. between banks or network operators and their agents?	 Develop or revise regulations to address agent practices and relationships with banks and/or mobile networks. 	Brasil	
15. Are AML/CFT measures applicable and proportionate in the case of m-banking services? Do KYC requirements present disproportionate barriers for the unbanked to obtain m-banking service?	 Determine if changes to existing AML/CFT regulations are necessary in the context of m-banking. Consider suitability of current requirements to m- banking. Consider tiered KYC requirements Consider synchronization between financial and telecommunications sector requirements. 	United Kingdom	

16. Does the current legal/regulatory framework address m-banking transaction security needs?	 Determine if current banking transaction security measures apply to m-banking, and if necessary revise accordingly in order to increase confidence in m- banking services. 	Ghana
17. Are fund safeguarding requirements in place for nonbank-based m-banking services?	 Determine if/how nonbank-based m- banking services are required to safeguard consumer funds/value. 	Malaysia
18. Can users transfer value directly from one m-banking service to another?	 Determine if inability to transfer value is due to regulation or industry. Consider if inability to transfer value constitutes anti-competitive behavior. 	Ghana
19. Are accounting separation measures in place to prevent nonbank-based services from engaging in cross- subsidization involving m-banking activities?	 Review and revise accounting separation requirements to ensure segregation of m-banking activities. 	
20. Can tariffs be regulated to prevent anti- competitive activity?	 Review and revise tariff regulations, for example, by considering that SMS and/or data access tariffs affect the cost of m-banking services. 	
21. Is responsibility for ongoing monitoring and enforcement of relevant laws and regulations clearly assigned?	 Government and regulators should coordinate to clearly define each agency's responsibilities. Legislation Joint working group Memorandum of Understanding 	India
22. Are existing consumer protection/data privacy regulations adequate?	 Review and revise relevant regulations to enable and enhance customer protection in order to increase confidence in m-banking services. 	México
23. Is additional consumer education regarding m-banking/m-payment necessary or beneficial?	 Encourage – or require – customer education efforts. Regulators can reach out to customers directly, or Service providers can be encouraged or required to engage in educational efforts. 	Pakistan
24. Does the current mobile number portability regime enable users to move between m-banking providers?	 Consider if/how introduction or revision of MNP requirements could enhance competition in m-banking. 	Ghana
Source: Telecommunications Management Group (TM	G)	

- ¹ Consultative Group to Assist the Poor (CGAP), "Tilman Ehrbeck interview: Full financial inclusion in our lifetime," (August 19, 2011), available at www.cgap.org/gm/document-1.9.53154/Tilman_Ehrbeck_Transcript.pdf.
- ² Financial Access Initiative Framing Note, "Half of the world is Unbaked." (October 2009) available at http://financialaccess.org/sites/default/files/110109%20HalfUnbanked_0.pdf
- ³ McKinsey & Company, "Capturing the promise of mobile banking in emerging markets," (February 2010), available at www.mckinseyguarterly.com/Telecommunications/Strategy Analysis/Capturing the promise of mobile banking in emergin g_markets_2539?gp=1.
- ⁴ Rasheda Sultana, *Mobile Banking: Overview of Regulatory Framework in Emerging Markets*, Grameenphone Ltd., (2009).
- ⁵ Key ICT indicators for developed and developing countries and the world (totals and penetration rates), available at <u>www.itu.int/ITU-D/ict/statistics/index.html</u>.
- ⁶ Johan Hellstrom, "The Innovative use of Mobile Applications in East Africa," *Sida Review* 2010:12 (May 2010).
- ⁷ Rasheda Sultana, *Mobile Banking: Overview of Regulatory Framework in Emerging Markets*, Grameenphone Ltd., (2009).
- ⁸ USAID, "FS Series #9: Enabling Mobile Money Interventions," (April 2010) at 13, available at <u>http://pdf.usaid.gov/pdf_docs/PNADW294.pdf</u>.
- ⁹ Depending on the specific m-banking service, capabilities could include SMS, USSD or a mobile broadband connection.
- ¹⁰ Consumer may be able to open an account through an agent, depending on m-banking service and appropriate legal/regulatory framework.
- ¹¹ State Bank of Pakistan, *Policy Paper on Regulatory Framework for Mobile Banking in Pakistan, Banking Policy & Regulations Department*, available at www.sbp.org.pk/bprd/2007/Policy_Paper_RF_Mobile_Banking_07-Jun-07.pdf.
- ¹² GSMA, "Mobile Money Live," available at <u>www.wirelessintelligence.com/mobile-money/</u>.
- ¹³ James Bilodeau, William Hoffman and Sjoerd Nikkelen, "Findings from the Mobile Financial Services Development Report," *The Mobile Financial Services Development Report 2011* (2011), available at http://www3.weforum.org/docs/WEF_MFSD_Report_2011, available at http://www3.weforum.org/docs/WEF_MFSD_Report_2011, available at http://www3.weforum.org/docs/WEF_MFSD_Report_2011, available at http://www3.weforum.org/docs/WEF_MFSD_Report_2011, available at http://www3.weforum.org/docs/WEF_MFSD_Report_2011.pdf.
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- ¹⁵ comScore, "Europe Sees 40 Percent Growth in Mobile Banking Through Smartphones," (May 27, 2011), available at www.comscore.com/Press_Events/Press_Releases/2011/5/Europe_Sees_40_Percent_Growth_in_Mobile_Banking_Through_S_ martphones.
- ¹⁶ Kabir Kumar, Claudia McKay, and Sarah Rotman, "Microfinance and Mobile Banking: The Story So Far," (July 2010), CGAP Focus Note. No. 62, available at <u>http://www.cgap.org/gm/document-1.9.45546/FN62_rev2.pdf</u>.
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- ¹⁸ Ibid.
- ¹⁹ Ibid.
- ²⁰ CGAP, Building a Viable Network of Branchless Banking Agents, June 2011, available at http://technology.cgap.org/2011/06/09/need-to-train-your-colleagues-about-agents-cgap-releases-agent-managementtraining-package/.
- ²¹ http://technology.cgap.org/2007/06/12/will-peru-be-the-next-mexico-or-the-next-brazil/
- ²² VisaNet Peru, "Visanet y Movistar lanzan sistema de pago móvil," available at www.visanet.com.pe/visanet_new/detalle_noticia.asp?id=5.
- ²³ Federal Reserve Bank of San Francisco, "Asia Focus," (November 2010).

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²⁴ State Bank of Pakistan, Branchless Banking Regulations for Financial Institutions Desirous to undertake Branchless Banking, (March 31, 2008), available at <u>http://www.sbp.org.pk/bprd/2008/Annex_C2.pdf</u>.

²⁵ Ibid.

- ²⁶ The regulations did note that the government would consider the prospect of introducing non-bank based models at a later stage.
- ²⁷ CGAP, "Does Branchless Banking Reach Poor People?" (June 7, 2011), available at <u>http://technology.cgap.org/2011/06/07/does-branchless-banking-reach-poor-people-the-evidence-from-pakistan/</u>.

²⁸ Ibid.

- ²⁹ Telenor Group, Shaping our Financial Future: Socio-economic impact of mobile financial services, (2011).
- ³⁰ Easypaisa, "Easyload," available at <u>www.easypaisa.com.pk/index.php/en/easy-load</u>.
- ³¹ As of 2009 approximately only 3% of the adult population had formal access to banking services; see Rasheda Sultana, *Mobile Banking: Overview of Regulatory Framework in Emerging Markets*, Grameenphone Ltd., (2009)
- ³² Rasheda Sultana, *Mobile Banking: Overview of Regulatory Framework in Emerging Markets*, Grameenphone Ltd., (2009).

³³ Ibid.

³⁴ Ibid.

- ³⁵ Orascom Telecomm Bangladesh Limited ("Banglalink") is fully owned by Orascom Telecom Holding S.A.E., Egypt, the parent company of the group is Vimpelcom; Citycell (Pacific Bangladesh Telecom Limited) is public limited company and its shareholders are: Pacific Motors Limited, Pacific Traders Limited, Pacific Industries Limited, Far East Telecom Limited, SingTel Asia Pacific Investments Pte Ltd, SingTel Consultancy Pte Ltd, Singapore Telecom Paging Pte Ltd.
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Setting National Broadband Policies, Strategies and Plans



Work in progress, for discussion purposes

Comments are welcome! Please send your comments on this paper at: <u>gsr@itu.int</u> by 7 October 2011.

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1 SETTING NATIONAL BROADBAND POLICIES, STRATEGIES AND PLANS

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OPENING DIALOGUE

with apologies to Lewis Carroll

Regulator to ITU-D:	"Would you tell me, please, which way I ought to go from here with broadband implementation ?"
ITU:	"That depends a good deal on where you want to get to"
Regulator:	"I don't much care where"
ITU:	"Then it doesn't matter which way you go"
Regulator:	" as long as I get somewhere "
ITU:	"Oh, you're sure to do that – if you only walk long enough"

This Discussion Paper is designed to assist policy-makers and regulators in identifying what are essentially the common objectives and end points of broadband implementation policy and regulation. It aims to outline the core structural solutions and regulatory incentives in that policy and regulation. This Discussion Paper seeks to make the journey to a broadband future a quicker and more productive experience by discussing steps that move in the right direction. So please read on ...

1.1 Introduction

This Discussion Paper begins by reprising the fundamental principles that have guided policy and regulatory approaches to ICTs over the past two decades. The evolution of ICTs and the movement toward competition and liberalization have been accompanied by the separation of policy and regulation and the separation of regulation from operations. There has been reliance on market mechanisms to select more efficient structures and to provide better quality of service and choice to the user.

These principles have brought us to where we are today, although government intervention has been necessary to lead to where markets fear to tread. For example, government intervention is routine in cases of socially disadvantaged or uneconomic service areas since there are little or no commercial incentives to become involved in service provision in these areas.

Broadband brings newer, broader and greater challenges, a greater scale of operations and greater responsibilities for government, the regulator, and industry. Trans-sectoral influence of broadband and the sheer investment challenges require us to appraise what we know of ICT in a fresh way so that investments are thoughtfully and carefully implemented in view of a clear and confident strategy for the future.

The case for undertaking broadband implementation on the basis of economic principles must be presented and re-calibrated. Fortunately, there is at least a common direction among most countries in terms of liberalization and sector reform that has assisted advances in the ICT sector thus far. However, there are circumstantial differences in starting points among countries. Hence, policy and regulatory decisions and choices need to be assessed on an individual country level. Lessons can be learned, however, from other countries' experiences. A journey thus begins from each country's unique starting point and moves along an evolving decision tree, guided in part by lessons gleaned from others' experiences at each decision.

Unfortunately, there is no one set of best practices to make the task easy. Countries are in differing stages of development, and there are quite different legacy structures, incumbent strengths, liberalization and competition status, political dictates, and, most importantly, economic wherewithal. These factors combine to create a fascinating global challenge to mapping the way forward.

Whilst there may be no single panacea or best overall practice, there are many useful best examples that provide guidance about the next step forward at particular points in the general continuum of progress. Thus, bearing in mind that the majority of countries are in the developing category, it is important to feature examples from developing countries that are successfully moving forward with broadband implementation. Examples of developed countries are also useful.

The reliance on market forces forms a big part of the received conventional wisdom about managing the ICT sector and moving toward a broadband future. Yet, practical market responses, especially from incumbent operators, can radically undermine the very purposes of competition since the natural market instincts of competitors is ultimately to aspire to a monopoly position or to bring about other perverse results. Policy-makers and regulators need to balance respect for market forces with the need to prevent market failures. Policy intervention is required at periodic intervals to correct for market, structure or policy failure and to set the regulatory agenda for the next five to seven years, say, and thus provide the regulator with a refreshed mandate.

Demographics, life style trends, service experience and technology have a fundamental influence on the adoption and growth of services and markets. After all, the consumer should have the last say about services and applications, and the consumer should be able to depend on the regulator for a certain degree of protection, fair play and oversight of quality in the market place.

1.2 Setting the Context

Recently, ITU has been working extensively on studies related to the impact of good regulation on broadband development in various country circumstances.¹ These studies, particularly the country case studies, hold valuable lessons for the broadband community, and there are fundamentals which can be audited against the competition and social model of broadband planning and implementation. Whilst some of the studies cited may appear divergent to the economic orthodoxy, for instance in proposing service competition on a common platform as opposed to inter-platform competition, it is easy to recognize varying circumstances that bring about such a departure. Inevitably, with market maturity, interplatform competition will emerge as the ultimate solution. So, in the long run, the destination is the same. However, the starting point and intermediate phase may be quite different and may be driven by policy focus considerations such as ICTs, NGNs, broadband itself, or universal service.

1.2.1 The Case for Competition: a Reprise

This section sets out the convergence to a future of competition which influences the industry structure, the formulation of policy and the regulatory framework.

In the long run, the most mature markets, from which end users will most benefit, are those that have enabled inter-platform competition (see Figure 1). In this infrastructure-based competition model, it is not necessarily economic to build more than one fibreoptic network, but infrastructure competition arises from either cable-based DOCSIS² (Data over Cable Service Interface Specification) systems or high speed wireless systems, such as LTE³ (Long Term Evolution), WiMax or WiMAN, or broadband satellite. This model provides a flexible, forward-looking, competitivelyneutral basis for future growth. The United States, the Republic of Korea, and the Netherlands are in the fortunate position of being in this advanced stage of competition, whilst existing industry structure in other countries influences the migration and timing of the realization of inter-platform competition.



This realization appears to be gaining traction around the world.⁴ In Hong Kong China, Canada, Portugal, Argentina, and Brazil, there are implicit moves involving inter-platform competition that formalize the past generation of competitive frameworks. In countries where inter-platform competition has emerged, such as in the Republic of Korea, Japan, Germany, and to a certain extent the US, there has been no noticeable market failure with regard to the development of broadband.

In a service-based competition model, industry players with little infrastructure deliver services to the market by leasing capacity from an incumbent network operator at regulated wholesale prices. Entrants to the market can set themselves up in this way as viable competitors. Once a service provider has successfully entered the market in this manner, and in the right regulatory environment, infrastructure acquisition from the wholesaler can become the first step in the "investment ladder".⁵ So, conceptually, service-based competition – which is common in all countries and models – may be regarded as a transitional step towards inter-platform competition.

If new entrants do not climb up the investment ladder, then the competition model adopted by a country may need to be re-assessed. The competitive model selected by a country is critical to the broadband industry's future development, and an appraisal of industry structure (existence of cable, wireless, etc.) is important in this setting. The situation of developing countries might require broader regulatory intervention in both supply and demand incentives and to provide a different focus on the technologies applied to achieving the successful deployment of broadband. Developing countries, nevertheless, stand to benefit just as much from broadband as developed countries, especially when critical mass of service availability starts to be approached. When critical mass is approached, the effects on GDP and social inclusion increase rapidly.

There are signposts along the road to the future that need to be recognised and interpreted; these signposts arise at points where corrective policy measures can be applied. The ICT ecosystem in general is about to morph into a much more powerful and far reaching influence, with many national and international economic and social effects.

1.3 Policy Considerations

This next section examines policy considerations associated with broadband rollout, and compares some examples of different approaches and responses to the challenges ahead.

1.3.1 Emerging Policy Settings – Addressing the Infrastructure Deficit

Adequate and well-functioning infrastructure is essential to economic development and social needs. Efficient investment in the energy, water, transport and communications sectors has an effect well beyond the contribution to capital accumulation. Good infrastructure facilitates trade, stimulates market integration and competition, fosters the dissemination of ideas and innovation, and enhances access to resources and public services. The benefits are especially important where there are a geographical dispersion of population and remoteness from markets, both nationally and internationally.

Most countries currently have an ICT infrastructure deficit, partly due to historic underinvestment and partly due to an inability to keep up with emerging

demands and opportunities of the information society. Many countries around the world have promoted ICT infrastructure to the top of the economic policy agenda, however. This involves greater government expenditure, structural reforms that draw on public and private investment, and the use of existing facilities through better regulation.

Broadband is trans-sectoral in its nature. The evidence is fairly conclusive that broadband has a positive contribution to GDP and that this contribution is magnified as penetration increases.⁶ Analysis also validates the positive contribution of broadband to job creation for less developed countries and regions, despite the job-destroying influence in some sectors where there is a particularly strong capital/labour substitution and productivity gains. Notwithstanding the benefits of broadband, rolling it out is not a simple matter since broadband requires a very significant investment. Before policy and investment decisions are made, policy-makers across the board, industry, and the community must develop a deep and wide understanding of the related issues. That understanding is best achieved by widespread consultation and negotiation with the affected stakeholders prior to arriving at a national vision as the first element in developing a broadband plan.

At the outset of broadband planning, both developed and developing countries must formulate an

appropriate definition of broadband and the purposes it serves in their broadband planning. This is addressed in more detail in section 1.4 of this paper, which looks at a more fulsome definition of broadband. This definition should be of value in assessing the true benefits of broadband in environments as diverse as the US and Fiji.

Once there is agreement on what broadband is about and how it is characterized, it is necessary to assess possible approaches to drafting a national vision. At this stage, it is important to identify and to elaborate on a number of policy considerations, simply summarised in Figure 2.

The public policy framework for rolling out broadband must take into account the magnitude and extent of the tasks involved and a broad cost-benefit analysis of the measures needed. This framework can be used to assess the costs of the infrastructure required. Alternatively, a top-down approach would entail a budget for the purposes of broadband rollout and а subsequent assessment of priority implementation within that budget. A further approach that is becoming popular is to set targets, such as coverage, speeds of access, and concessions, for which public and private investment may partner to achieve. This last consideration is common to all approaches to a varying extent.



b. Developing the human capacity to ensure a successful deployment and uptake of the use of the infrastructure.

c. Creating the supply and demand catalysts for government, big and small enterprise, and the individual citizen. *Source: Author*

Universal access raises special considerations that must be taken into account in broadband policy given the social, economic and political importance of ensuring universal access to key infrastructure developments. In otherwise uneconomic, underserved or unserved areas, there is a general case for government intervention through various mechanisms. These areas can sometimes be critical to the economy, especially in rural environments. Other disadvantaged parts of society that would otherwise be left as an untapped resource could benefit enormously from training and capacity development, which, in turn, could then exploit broadband.

Broadband does not in itself have an economic impact; it must be accompanied by an accumulation of intangible capital. This is especially true in developing countries. Broadband requires the introduction of processes, organizational changes, training, and accounting for cultural factors. Thus, governments need to emphasize the need for training programs, resource centres, and consulting services where small and medium enterprises (SMEs) can learn to extract the full benefit of broadband.

Other factors that should be addressed in a national vision for broadband include: cyber security; incentives for investment, the development of a regulatory framework that encourages fair and attractive services while boosting innovation; methods of monitoring broadband developments to assist in the formulation of further policy measures in the future; and the initiatives a government foresees for stimulating demand through harnessing government services in the broadband developments.

The ultimate vision or policy statement will capture the future picture of the place of a country in the information society. It should successfully address the digital divide and show the way forward by demonstrating how the government will navigate the economic and social future for its citizens and industries.

The first step in creating a national broadband plan is the prelude to an exciting and inclusive future. The next section provides some examples of policies from developed and developing countries that may be instructive.

1.3.2 Overview of Existing Policies through Selective Examples

Prior to considering the approaches to a national broadband plan, and to assist with finding coherence amongst a diversity of plans and policies, it is helpful to review some existing policies from, in the first instance, more advanced countries or regions. This section will provide an overview of such policies and a comparative analysis of selected examples. These examples include the US, Germany, the Republic of Korea, Japan, Australia, and New Zealand.⁷ This discussion will also point to why seemingly different policies and plans have been devised.

It is also instructive to consider case studies of some developing countries, for instance, Brazil, Argentina, the Dominican Republic, Fiji and Papua New Guinea.⁸ Hong Kong China is also interesting, as it provides an advanced insight into the future of a high density, competitive environment. Further, there are useful examples of ICT policies from Africa, Eastern Europe and the Arab states that are referred to briefly in the Decision Tree discussions in section 1.4.1 below. A review of these cases enables an identification of various similarities and differences between developed and developing countries in formulating broadband plans.

Before proceeding to a discussion of these cases, it is helpful to note that a major driver of policy decisions on funding broadband growth in many countries has been the 2009 global economic crisis. In the wake of this crisis, many governments have implemented policies and programs using broadband deployment to stimulate employment.

(a) United States: Economic Stimulus Program

Both a targeted and a direct subsidy approach have been applied to broadband implementation initiatives in the US.

Following the adoption of the American Recovery and Reinvestment Act (2009), the US created a USD7.2 billion broadband stimulus program focused on providing services to unserved and underserved areas. There are 18 states that lag behind the national average of broadband penetration. Studies⁹ have indicated that the program should eliminate this lag and generate up to 263,800 jobs over the four year implementation time. The jobs are a result of direct network construction and indirect or induced multipliers across the economy over the four year period. The policy is therefore a short-tomedium term response to an immediate economic situation.

(b) Germany: Employment and Economic Growth

Germany has a two-phase general plan for targeted penetration and speeds. ¹⁰ First, the "National Broadband Plan", announced in 2009, aims to provide 75 per cent of German households with at least 50Mbps access by 2014. Second, an "Ultra-broadband" plan for 2015-2020 aims to provide 50 per cent of households with at least 100Mbps access and another 30 per cent of the remaining under-served and unserved population with 50Mbps access by 2020.

It is estimated that the evolution to ultrabroadband will have a significant impact on GDP and jobs. An investment of EUR 36 billion is expected to yield 968,000 jobs. From an incremental economic growth standpoint, network construction will yield additional value-added of EUR 33.4 billion, whilst network externalities will result in an additional EUR 137.5 billion. This demonstrates the raw cost-benefit analysis underpinning the plan that allowed Germany to proceed with confidence in the implementation of its two phase broadband plan.

(c) The Republic of Korea : Holistic Character of Policy and Planning

Many developed countries have a heavy emphasis on "build it and they will come". However, the Republic of Korea helps to lead the way with its "ICT Master Plans" which are designed to facilitate the transition into an advanced information society.¹¹ These Master Plans are five year plans that first began to be adopted 1995. Their objectives range from broadband universalization to becoming a global IT leader.

Planning vectors include not only the deployment of broadband infrastructure but also services, applications and demand promotion policies. The emphasis on demand promotion differs from the plans in most other developed countries, where demand stimulation is left to market forces.

With such a holistic approach, the Republic of Korea is able to address the inter-connected areas of services and applications with the built-out of broadband networks in order to refine a broadband strategy and technology assumptions based on more rigorous analysis.

This underlines the importance of the initial stage of defining a consensus around objectives and values that link technology adoption to economic and social objectives. Once this consensus is achieved, it is then critical to engage policy makers with civil society as part of a public debate towards a shared vision. Following the accepted vision, the definition of targets based on rigorous analysis of investment and social and economic returns can be formulated.

(d) Other Long Range Thinkers

Japan¹², like the Republic of Korea, also has a sector-wide planning tradition. Japanese strategic planning in the broadband area goes back to 2001, with the first e-Japan Strategy. Annual priority policy programs in Japan focus on implementation, such as the universalization of broadband.

Sweden and Estonia provide additional examples of the influence of broad policy planning on broadband implementation and participation in the Information Society. The countries in this category do not appear to have a common link except that they are experimenting in similar ways and thus contributing to regulatory evolution in a positive fashion.

(e) New Zealand : Greater Intervention

In 2010, New Zealand embarked on a number of policy initiatives to overcome the perceived historic shortfalls of market responses to the needs of broadband.¹³

The Ultra-fast broadband initiative involves the investment of NZD1.5 billion in a program of publicprivate partnerships for the construction of fibre-tothe-premises access networks connecting 75 per cent of New Zealanders. In parallel, a Rural Broadband Initiative will involve NZD300 million of direct funding to improve the availability of fibre backhaul links in lessurbanized parts of New Zealand. A Complementary Measures Work Program involves measures to streamline and coordinate infrastructure deployment and also to aggregate demand for enhanced broadband networks.

These initiatives have involved broad consultation processes, and they have been embraced by the private

sector, including the incumbent provider. These are positive signs for future investment and deployment.

(f) Australia: A bold step forward

In 2010, Australia embarked on the construction of a National Broadband Network with a total funding estimated at AUD40.9 billion over 8 years to build and operate a new open access wholesale network. This network will comprise fibre optic connections to 93 per cent of homes and workplaces, with the remaining seven per cent of homes to be provided broadband services by wireless and satellite solutions.

The 93 per cent of homes, schools and workplaces will receive broadband speeds up to 100 Mbps. Other premises will receive speeds of up to 12 Mbps using wireless and satellite technology. The plan will support up to 25,000 jobs over the life of the project.

Funding will initially come from government, which will contribute equity of AUD27.5 billion, with other funding expected to come from operational earnings and private debt. In 2015, the wholesale network provider (NBN Co) will begin raising funds through capital markets, with an estimated AUD13.4 billion expected to be needed to finance the project.

There are some concerns¹⁴ that the plan picks technology winners and represents a re-monopolization of a national access network at the wholesale level, with some effects on competitive backbone provision. There are also concerns that the plan lacks a public costbenefit analysis in advance of policy decisions, backtracks on competition principles, and may cause stranded investments for some operators.¹⁵ There are also some doubts that a government monopoly can operate efficiently.

In response, the government's philosophy is to claim that the plan treats market failure, especially incumbent resistance to investing in broadband infrastructure. The government further argues that its solution to broadband investment will also facilitate the development of competition. The intention is to privatize the asset back into the marketplace on completion of construction and thereby to return to a market discipline (a form of BTO¹⁶ but on an open access basis). In the meantime, the growth of service competition may be better served by the wholesale platform, and could conceptually form the basis for future inter-platform competition.

Developments in Australia represent government intervention not only for purposes of universal access, but in the mainstream development of a national platform for broadband. The experiment will attract a lot of interest and scrutiny in future years.

(g) The Dominican Republic : Bringing Broadband to Rural Areas

A case study¹⁷ of the Dominican Republic reveals some important differentials for developing countries. For instance, where there is limited or no access to basic voice services, the Internet becomes a less expensive solution for voice. Another distinction from developed countries is in the application of universal access funding to achieve not only greater access service, but also to provide and to install terminal equipment such as computers, PDAs, smartphones and other devices that use the broadband connection.

Launched in 2007, *e-Dominicana* is the Dominican Republic's national broadband strategy. This strategy is divided into eight thematic areas: infrastructure and access; social inclusion; education; training; awarenessraising; development of content; digital state; and industry. The strategy addresses coverage and speed targets, as well as consultation with operators, service providers, public institutions, local entities, NGOs and other agencies.

By far the most important part of the strategy is the establishment of community Informatics Training Centres and supplying them with computers. The main purpose of these Centres is to train people to use a computer. Young people are seen as a valuable future resource. Some of these Centres already have connection to the broadband Internet.

This strategy highly recommends to undertake a pilot project as a pre-feasibility test to the plan because, as is the case in many developing countries, there is little primary data to assist planning. However, proxy or secondary data on population statistics and Google Earth maps have been found to be of significant value in planning and evaluating the subsidies and contract schemes that will be necessary. The contracts for the build out of networks are based on public-private partnerships.

In e-Domenicana, technology neutrality is stressed. However, radio advances hold out the most promising solutions for distribution and backhaul to urbanized areas. This stands in contrast to many developed countries where optical fibre is seen as the main national driver, with wireless or mobile as an adjunct or perhaps competitive alternative.

In Summary

Some of the features of the examples outlined above are summarized in Table 1.

Best practices evident in the formulation of broadband policy involve the articulation of a wide consensus which forms the basis for the creation of targets based on a depth of economic analysis. The integration of broadband goals with other service and application areas in the ICT ecosystem is important, as is the definition of actions of government to assist both supply and demand factors.

In devising targets, a range may be more appropriate than hard limits so that markets and consumers have the flexibility to move to the most efficient solutions for their needs. This is particularly appropriate for developing countries.

1.3.3 Drafting a National Broadband Plan

This section considers the possible approaches to formulating a National Broadband Plan. There are

numerous considerations which go into the formulation of a National Broadband Plan, including:

- a. Main characteristics of the Plan;
- b. Different goals to be addressed;
- Need for substantial evidence for decision making;
- d. Means for implementing the Plan;
- e. Entities involved and their roles;
- f. Industry structure and regulatory measures to stimulate involvement;
- g. Models of financing the implementation, based on economic analysis;
- h. The need for cross-sectoral considerations;
- i. Top-down versus bottom-up considerations to setting targets; and
- j. Technology neutrality.

The choices made concerning each of these elements will depend on country and local market circumstances. This will be considered in section 1.4, which introduces the concept of a Decision Tree.

Table 1: Comparison of example countries						
Country	Year	Name of the Plan	Vehicle	Horizon	Goals	Benefits
US	2009	Broadband Stimulus Program	Stimulus Program	Short term	Raise national average	National recovery
Germany	2009	National Broadband Plan	Two phase plan	Medium to long	Dual targets of penetration	GDP growth and jobs
Republic of Korea	rolling	ICT MasterPlan	Broad consensus	Long term 5 yr stops	Global leadership	National growth
Japan	rolling	i Japan Strategy	Broad consensus	Long term	Global leadership	National growth
New Zealand	2010	UFB and RB initiatives	Broadband Plan	Medium term	Economic development	National growth
Australia	2010	NBN Plan	Nat'l B'band Network	Medium term	Infrastructure platform	National growth
Dominican Republic	2007	eDomenicana	Universal service	Short to medium	Extend infrastructure	National development
Source: Author's research						

1.3.3.a Main Characteristics of a National Broadband Plan

A National Broadband Plan encapsulates the realization of the policy vision with a strategic agenda of goals, timing, resources, and the continuous involvement of affected stakeholders in its formulation. This section broadly outlines the considerations that should go into the creation of the Plan.

By its nature, the Plan needs to be forward looking with a detailed outlook of, say, five years, after which technology solutions may have radically changed, but cast in a longer time frame, beyond electoral cycles. It can be expected that the policy framework will be significantly influenced from time to time by politics of the day. However, this influence is usually focused on the targets set and responds to particular sectors of an electorate or to times of economic crisis. It is important that the Plan is essentially robust to the checks and balances brought about by politics. If endorsed by all policy-makers at the time of conception, a National Broadband Plan should become a permanent fixture of ongoing economic development and the embodiment of a shared vision.

The Plan should have goals and broad implementation strategies that lead to a blueprint for their realization. The Plan should highlight the importance and the respective roles of public and private sector participation and the potential for partnerships.

It is generally expected that the private sector should assume primary responsibility for investing in the development of broadband. However, this may not always be the case, and a central role for the public sector may be needed at least for a temporary period. Addressing market failure and the need for intervention with universal service objectives and strategies will be an ongoing role for government.

Government has a critical role to play in setting the framework for collaboration. Government need to foster a clear understanding of the roles of various stakeholders and promote consultation amongst all stakeholders and government agencies (such as the Ministry of Health, Education, etc.) in advance of policy setting and implementation. This inclusive approach recognizes the future widespread benefits from ICTs and broadband.

The involvement of government in broadband development on the supply side often dominates

considerations. However, during implementation, there is an important role for government in assisting demand aggregation and in capacity building in readiness for the broadband opportunities that lie ahead. Demand aggregation through the offering of government services online and capacity building or training through community centres is a distinctively valuable feature of a Plan in the developing country context, as demonstrated by the cases of the Dominican Republic and Fiji, for example.

1.3.3.b Different goals to be addressed

It will be necessary to identify the different goals of the Plan and the means and intervention models through which they might be pursued. Goals may include, for example, universal access and associated guarantees; creating incentives for competition and innovation through government policies and regulatory means; creating new industries, exports and jobs; and economic growth. Other important goals that need to be identified involve benefits for consumers and endusers.

Most Plans address the models of public and private investment and the need for universal access measures through geographic segmentation. In the UK, for instance, Ofcom differentiates between "black" areas (where platform-based competition exists and good broadband service is expected), "grey" areas (where at least one service provider is expected to offer service, though quality may be inconsistent), and "white" areas (where service is not available). In common with the UK, many countries set out the principles of private competition and goals and incentives of the regulatory structure in their equivalent of the black areas, and some grey areas, whilst focusing government investment resources on the market failure of white areas.

As indicated in the previous section, the National Broadband Plan should address the role of government entities in contributing to either the demand or supply side of developments. On the broad front of the influence of the Plan is an articulation of the respective roles of these specific government entities in achieving the penetration goals and successful uptake of broadband.

Broadband rollout targets can be hard limits specified as percentage penetration levels, as is the case in many developed and developing countries, or speeds that represent the boundaries of technologies

that can be reasonably afforded. Alternatively, the targets can be a combination of both these objectives or, most likely, a tiered approach that takes into account geographic factors and likely market supply responses combined with government complementary measures.

Target percentage values vary. In developed countries, they are often set at 50 to 100 per cent, and some dual targets are often created. In developing countries, penetration is a critical factor and starts at lower levels but can be graded up from these lower levels with time. A cost-benefit analysis should precede the setting of targets, with consideration being given to both the economic benefits and the more intangible value elements of social benefit. Other factors such as pricing and the relative importance of the pricing factor to both developed and developing countries, are treated in the second half of this paper.

1.3.3.c Need for substantial evidence

Broadband rollout targets should be transparent and amenable to market and social analysis. They should be economically justified by a cost-benefit analysis and agnostic to political cycles as broadband infrastructure must be seen as a long-term undertaking. Targets should be sound, realistic and reasonable. However, they are not necessarily portable between countries.

Potential demand studies that aim to estimate the level of demand at determined prices that are attractive to the population are required. Once such demand studies are completed, there should be an estimate of the minimum level of investment necessary to satisfy this demand and the potential rates of return required to satisfy investors and operators. For rural and other underserved areas, the next step is to determine the amount of subsidy that might be required to incite investment by industry, followed by consideration of the policy and regulatory incentives to complement industry investment.

In developed countries, the econometric modelling to prepare the ground work for setting targets is based on experience in other countries that are leading the way in broadband deployment, such as Germany, the Republic of Korea, and Japan. The modelling is also based on in-country statistical information, often historically accumulated by the regulator and policymakers in the country. However, there are often barriers to obtaining reliable demand estimates in developing countries, especially in their rural areas. These barriers include the difficulties and costs of obtaining primary service data and the scarcity of historic traffic data. This creates challenges for setting rollout targets. In these cases, demand studies may sometimes be impossible to obtain unless the obstacles can be overcome in some other way.

To overcome these obstacles, some regulators, for example, in Peru and the Dominican Republic, use a practical, less complex, proxy approach that can be applied in countries where there are already some telecommunication networks in rural areas. Since most countries in the world have at least some network rollout in rural areas, this approach is widely transferable. This approach involves superimposing a known, working rural example (e.g., of telecommunications and Internet usage) onto the demographic distribution of all rural communities throughout the country.¹⁸ The uptake of service in a known example provides a proxy evaluation and is derived from a part of society which has some idea of the meaning and relevance of broadband.

Pilot projects also have significant value in countries where there are barriers to obtaining demand studies. Pilot projects can play a vital role in stabilizing the estimate of demand. Case studies of other developing countries that may have already moved ahead in rolling out broadband are also of great value. Both pilot projects and case studies contribute to making up for a lack of historical traffic and service data for econometric analysis. Indeed, these observations are also true of developed countries, which have the benefit of pre-existing data on their country.

Formulating targets requires realistic and future measurable outcomes so that corrective measures might be put in place before too much damage is done. These considerations should therefore be built into the regulatory framework so that industry statistics can ensure an efficient audit of implementation and provide added guidance for future policy decisions.

1.3.3.d Means for Implementing the Plan

Implementing a National Broadband Plan requires consideration of deployment strategies and a facilitating regulatory environment that remains sensitive to the overarching ambitions of the Plan.

The prevailing philosophy of government intervention in underserved markets is conditioned by the history of extending service penetration using universal service policies in wireline communications for voice. Ultimately, the primary funding for broadband should be privately based. However, in the meantime, many markets are not sufficiently developed to offer sound financial investment opportunities and government intervention is therefore necessary to rollout broadband service. There are two approaches available to government in these circumstances. First, government may directly enter the market as a service provider and later privatize operations. Second, government may seek to generate the necessary stimuli for private investment and take a share of the risk through public-private partnership arrangements. In addition, direct subsidies may be applied, especially if the needs relate to Universal Service and there is a fund in place. Both direct entry and public-private partnership arrangements should be seen as a temporary intervention to correct for lack of supply incentives, though more permanent subsidies may also apply to disadvantaged regions or members of the community.

As a more permanent feature, government can make a valuable contribution to broadband rollout through demand-side policies to promote broadband adoption. For example, as an aggregating anchor tenant, it can contribute to demand through government e-services for health, education, public administration, and public safety and through the establishment of training centres to spread broadband expertise and knowledge. The latter is especially useful to SMEs seeking to adapt broadband to their needs. Government involvement in these ways establishes a demand for broadband that is attractive to investors.

1.3.3.e Entities Involved and their Roles

The Plan should specify the roles of the sector Ministry, the regulator and other government agencies that may be involved in broadband rollout. These roles may include providing financial incentives for investment in situations of market failure, for example. The Plan may also address the regulator's responsibility to nurture market and consumer developments in a more dynamic sense. The roles of the regulator, the Ministry, and other government agencies are generally complementary to each other.

1.3.3.f Industry Structure and Regulatory Measures to Stimulate Involvement

The natural market instinct of competitors in a healthy market is to grow the business, increase vertical integration, to innovate on an ongoing basis, and to maintain investment as technologies and network solutions mature. A strong competitive environment produces market forces that ensure these outcomes and that provide related benefits to consumers and end users in terms of genuine choice in price, quality and range of service. Users in the digital world also have needs related to security and privacy, and for these needs, they rely on the policy-makers and regulators to look after their interests.

From the outset, competitive market ideals are somewhat distorted in the telecommunication sector as legacy provision of service has been through what was originally regarded as a natural monopoly of infrastructure provision. The structure of the telecommunication industry is still generally asymmetric at present, with a strong incumbent matched up against new entrants to the business. This is the essence of the regulatory challenge in introducing competitive dynamics into the market.

In many countries, regulators have been given and now use tools for regulating access, interconnection, and market behaviour. These tools often include schemes of negotiation/arbitration and lighter regulatory requirements such as codes and standards. At the same time, the incumbent has quite often honed and applied techniques of denial, delay and disruption to frustrate the growth of competition. This is a natural reaction for a competitor in any market. Because competition is not yet strong enough to discipline the incumbent, the incumbent can game the regulatory process to the frustration of the regulator and disadvantage of the community. In fact, Sun Tsu¹⁹ would have been proud of the efforts of many incumbents.

Unfortunately, many incumbents have applied their creative talents to the protection of their historic position and have purposely avoided significant new investment, which in itself might benefit new entrants. Their innovation has been allowed to dwindle by running down research and development capabilities and surrendering these initiatives and associated international technical influence to the manufacturing sector. In turn, the manufacturing sector has embraced the opportunity, but has been reluctant to enter the policy debate. On the consumer front, it would be true to say that incumbent culture still has a long way to go in realizing customer satisfaction and trust.

Given that the starting point in the telecommunication sector is less than ideal, many preliminary efforts to regulate for a competitive market have foundered and resulted in market failure or otherwise disappointing results. Some countries have resorted to operational or structural separation of the incumbent in order to re-set the industry framework. This has occurred notably in the UK, New Zealand, Singapore and Australia. This has been a determined policy choice to augment the regulatory structure, and "sticks" such as the potential denial of spectrum access have replaced carrots in managing incumbent incentives.

A major lesson of the recent past is that incentives need to be built into the regulation of access, interconnection and market behaviour in order to encourage new entrants to move up the value chain. Entrants need to acquire capital assets progressively as they achieve customers and revenue growth. Finally arriving at extensive competition has the benefit of making the next generation of technology and services a contestable market, which is to the ultimate advantage of users. The concept of the "ladder of investment" is very useful for regulators as they seek to guide service providers and provide them with incentives to continue to move toward investment and competition in infrastructure. In the fixed wireline market, this might be best achieved by requiring an open access wholesale network platform, operating at Layer 2 (data link) of the 7-layer OSI structure.

The way in which a broadband platform may be realized depends on the starting structure of the national telecommunication and ICT industry. Herein lies a further policy choice between either a subsidydriven and programmatic approach on the one hand or a more organic (or freely developing) market-driven approach on the other hand. The Republic of Korea and Australia are both examples of countries that have adopted the former approach while Hong Kong China and India are examples of countries that have favoured the latter approach. Some countries like Sri Lanka have gravitated from an initial programmatic strategy to a more organic approach. It appears that the model adopted by the Republic of Korean is not readily transferrable to many developing countries. The government has a role to play in both approaches, but its role differs in each case.

Hong Kong China offers a refreshing approach that features a deregulated pricing environment. The guiding principles of government policy are simple: "big market, small government" and "market leads, government facilitates". A mini case study on Hong Kong China is available in section 1.5.5 below.

One thing in common with the need for regulatory intervention in all countries is the issue of universal service. Again, a number of policy choices concerning universal service exist. The regulatory incentives and approaches that can provide desirable responses are discussed further in section 1.4.

1.3.3.g Models of Financing the Implementation of Broadband

different The models for financing the implementation of broadband infrastructure are influenced by legacy ICT infrastructure and industry structure, which in turn shape the extent of direct government involvement in the implementation. The choices for government are diverse, but generally include public-private partnerships and the adoption of facilitating measures which government can bring to the investment table. Where competition exists between vertically-integrated operators that manage their own network infrastructures and have sufficient stand-alone capacity for investment and innovation, the roles of government and the regulator are limited to facilitating fair market competition and ensuring timely and prudent access to public resources such as spectrum and property rights of way.

Regulators have a responsibility to allow and to encourage infrastructure sharing amongst competitors. This alleviates cost pressures, especially where replicating broadband infrastructure is not sustainable.

Where private investment is reluctant to enter the market, the government can take some of the risk through public-private partnerships. Such partnerships may involve the incumbent or new entrants working with the government on a contractual basis. These public-private partnerships effectively act as a temporary wholesale monopoly, but they operate on the basis of open access principles, a characteristic that distinguishes such partnerships from the traditional PSTN monopoly. The partnerships are designed to be phased out as competition increases.

New Zealand has adopted an innovative publicpartnership arrangement. According to the terms of the

partnership contract, the State (the Crown) begins with 100 per cent control of the enterprise and is progressively bought out by the commercial partner as uptake occurs. Capital is returned to the Crown through this process, and this capital can then be re-invested in the Ultra Fast Broadband networks being developed. This is essentially a rotating line of credit.

Forms of subsidy also exist in developing countries. In the Dominican Republic, for example, subsidies are applied where market forces are not adequate to deliver network development and services and where public policy concerns justify public funding or redistribution of resources. A particular vehicle, known as an output based subsidy²⁰, is often used, and subsidy auctions are performed.

Many developing countries now impose a universal service levy, and the resulting universal service funds could be applied in the future to bring broadband to underserved and unserved areas under contractual partnership with government.

The experience of Australia and the Republic of Korea with providing subsidized development has been discussed above. In contrast to Australia and Korea, Hong Kong China relies extensively on market forces to address broadband rollout. Notwithstanding the universal service obligation in Hong Kong China, a comprehensive review conducted in 2007 concluded that the scope of universal service should not be extended to cover broadband Internet access. Private industry was of the clear understanding that it would pick up all cases of broadband access as a matter of course in market developments. There are nevertheless some one-off direct social subsidies from government.

The choice of approaches and government responses is discussed further in section 1.4.

1.3.3.h The Need for Cross-Sectoral Considerations

Many sectors and government ministries are stakeholders in the broad vision of the broadband future. In promoting broadband adoption, demandside policies might involve tax incentives, the development of various e-government services, an enabling environment for SMEs, industry, export incentives, and the development of human capacity and resources. The efficient design and implementation of these policies requires an overarching strategy that features wide collaboration among stakeholders and the development of cross-sectoral measures, in addition to education and training initiatives aimed at the broad base of society.

1.3.3.i Top-down versus Bottom-up Considerations in Setting Targets

Setting broadband rollout targets may involve topdown considerations, for example, where a given budget is set aside for broadband developments, or bottom-up considerations. Bottom-up considerations assess the resources that are necessary to achieve a particular outcome. Top-down and bottom-up considerations are addressed in more detail in section 1.4.

1.3.3.j Other issues: Technology Neutrality and a National Champion

Other issues to be considered include the benefits of a technology neutral approach and the risk of selecting a national champion for what will be a protracted period of time in the construction and implementation of the broadband network. It is particularly important for the rollout of service to rural areas that technology choices are not imposed on the operators and service providers that will ultimately be responsible for building and operating these networks. In general terms, it is also appropriate that developing countries give serious consideration to mobile and wireless broadband as a key solution to addressing the digital divide. There appears to be a continuous increase in wireless broadband services in developing countries with the deployment of 3G-enabled handsets and devices.

Amongst developed countries, there are those that are already in a fortunate position to have strong interplatform competition between cable (DOCSIS-based) systems, fibre-optic systems, and wireless systems evolving to the 4th generation with LTE or WiMax. This forms a firm foundation for healthy competition in the marketplace. It has also been observed that whilst regulatory attempts in those countries have been biased towards service-based competition, competition in services has had less impact on developing a competitive market than the inherent facilities-based competition already in existence in their markets; indeed, service-based competition has seen a deceleration of investment.²¹

Likewise, in other developed countries where optical fibre for FTTx and backbone needs is seen as the

wholesale platform for future growth of competition, there is nevertheless recognition of a continuing role for alternative technologies. Wireless, satellite and cable-based technologies continue to have relevance in these countries, and there is an acknowledgement that the market should determine the extent of demand for these platforms.

This discussion highlights the importance of technology neutrality in the formulation of a National Broadband Plan. Not only are the choices about the "right" technology very complex, but ultimately, the most beneficial competitive environment for end-users will likely feature inter-platform competition among multiple network providers.

In Conclusion

The first three sections addressed the fundamentals of competition in the modern environment of broadband. Emerging and existing policy challenges were examined, along with an overview of the characteristics required of a National Broadband Plan,

What is clear is that there is a pressing need for broad consultation against a framework of policy concerns when undertaking a project of the size and importance of national broadband implementation. We can learn much 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. These factors will be analysed in the following section.

1.4 Searching for Best Practice

This section introduces and develops the concept of a Decision Tree as a tool to assist in making choices in the course of implementing broadband on a national basis. It then moves onto the considerations that apply to the decisions to be made as the tree is ascended.

The Decision Tree has six levels of decision points. These decision points serve as a checklist of the elements that should be considered when creating a National Broadband Plan.

In the course of considering the Decision Tree options, a comprehensive definition of "broadband" is set out as a critical element to ensure that goals and strategies will have the most meaningful relevance to both developing and developed countries. After considering the pros and cons of each decision node in the Decision Tree, observations on "Best Practice" are drawn up in Table 2 in section 1.4.9 below. Table 2 also points out some contrasts between developed and developing country approaches and circumstances. This highlights the need for adopting country-specific approaches in order to achieve the full benefits of broadband and its value to future national economic and social development.

Table 3 concludes by presenting a summary of the position of many countries at present. The Table includes both developed and developing countries and draws on the Case Studies that are presented later in section 1.5. The Table also relies on survey material made available by the ITU.

As alluded to earlier in this Discussion Paper, there is no single set of best practices for rolling out broadband. There are numerous levels of complementary decisions that apply to drawing up a National Broadband Plan, and there is a wealth of information throughout the world from countries that have already taken decisions on a number of these levels. Valuable information is also available from other countries that are contemplating such plans and from still others that have some of the challenges ahead of them.

These decision levels are set out in the form of a Decision Tree, which is explained in the next section.

1.4.1 The Decision Tree

The Decision Tree is a decision support tool that uses a tree-like model of decisions and their possible outcomes or consequences.

A Decision Tree comprises three types of nodes:

- decision nodes (represented by squares)
- chance nodes (represented by circles), and
- end nodes (represented by triangles).

The squares thus represent the focus of a fundamental decision to be made. The triangles provide the set of options or solutions that are available to the decision maker. The circles usually sit between the squares and the triangles and they introduce a probability (where appropriate) to assist decision making further. In applying this concept to the creation of a National Broadband Plan, the decision-making process surrounding the formulation of the Plan can be captured by six levels of decision nodes. This is shown in Figure 3, which sets out the tree. The Decision Tree shown is the simplest form possible and does not contain chance nodes.

The Decision Tree is left in this simple form for two reasons. Firstly, the subjective probabilities associated

with any chance node will vary from country to country and are influenced by many variables. Therefore the decision to be made amongst the options available is left to national consideration without any undue influence by decisions already made in other countries.

Secondly, whilst chance weightings could be introduced based on, say, the numbers of countries deciding on particular options, this may not lead to best practice, but only to an indication of herd mentality.



The levels of decision nodes to be addressed are:

- 1. *Foundation*: the initial consideration and consultation that informs and engages broad stakeholder involvement in creating the broadband vision of the future.
- Goals and targets: These should not be set lightly or slavishly. They can appear deceptively simple, but to be set properly they require comprehensive understanding and application of several dimensions, together with an appropriate definition of "Broadband".
- Institutional form of regulation: This relates to the form of the regulator and its responsibilities. For example, should the regulator be independent, converged, integrated (dealing also with service pricing and consumer issues), or industry specific?
- 4. **Regulatory support mechanisms and initiatives**: These are relevant to enabling the best and most practicable solutions for a particular country in order to successfully achieve the vision and outcomes. The culture and attitude of the regulator are important.
- 5. *Infrastructure Investment*: Measures to assist and to encourage industry and service development, e.g., direct investment by government, private industry investment, and public-private partnership schemes.
- 6. *Industry Structure*: The conceptual approach to the ultimate industry structure needed or that which is already achieved and which best serves the needs of the National Broadband Plan.

In ascending the tree, there need not be strict adherence to the numerical sequence of decision nodes. Indeed, many countries have followed a varying sequence. However, Levels 1 and 2 would be the most efficient and logical starting points, as well as the lowest risk for creating a well-informed national plan.

Whilst the end nodes depicted on the diagram represent the nominal range of options available to a country at the decision point level, there can in some cases be a combination of options. At each level there is the experience of at least several countries to consider for formative thinking.

Examples of the options faced by national decisionmakers at each level of the Decision Tree are given later.

1.4.2 An Appropriate Definition of "Broadband"

A critical consideration in the development of a Broadband Plan is an appropriate definition of "Broadband" for Level 2, which in turn will influence the assessments undertaken at Level 1. Even the leading developed countries would benefit from a review of their understanding of the definition.

In earlier days, broadband was characterised by two attributes: "speed" and "always on". This distinguished it from its predecessor, the dial-up service to the Internet. This dial-up service, though, had the virtue of bringing the user experience into consideration.

Most current approaches to defining broadband continue to use measurable capacity and speed as key characteristics, together with penetration. This is incorporated into goals and targets within broadband plans. In addition, dual track objectives are often set, for instance in many European plans. These dual track objectives focus on first generation broadband technologies for universal access goals, while positing next generation solutions with higher speeds for a more limited geography or demography.

These current approaches, however, tend to have lost the sensitivity of the user experience.

In approaching best practices (see Figure 4), it is preferable for broadband plans to include intended outcomes of lasting effects and benefits to users and the experience they enjoy. Therefore, a set of attributes which includes penetration, capacity (but *real* delivered speeds), and pricing comes much closer to the desirable user outcomes, and thus generates a definition of broadband that has greater utility. These attributes should provide a better measure of success in the implementation of broadband and point to those countries that should be regarded as exemplary.

Using this approach to the definition of Broadband, a report from Berkman²² shows that the US has actually slipped to middle ranking in the OECD countries in terms of success in achieving broadband implementation. Similarly, Canada – often thought of as a high achiever based on penetration per 100 inhabitants – shows up as a less successful performer.



A variant to the attribute of *speed* in the articulation of the goals of broadband implementation is that of *anticipated applications*. An example is the Republic of Korea's 839²³ program, where the term "ubiquity" is used to describe goals using various technology growth engines.

These comments provide the context for the choices in Level 2, as illustrated in Figure 5, below. There is a growing awareness that best practice tends towards the right hand side of the diagram.

Trying to define next generation broadband access in terms of technology has its difficulties, though many countries do this. For example, they may focus on the singular deployment penetration of fibre-to-the-home (FTTH). On the other hand, there is a widely held belief that government planning should be technology neutral.

Some argue that hybrid fibre coaxial and fibre-tothe cabinet or fibre-to-the-curb (FTTC) solutions (which cost roughly one-fifth of FTTH) are middle-mile temporary solutions on the way to a full fibre infrastructure. Others see cable systems as the long term basis for inter-platform competition. See Figure 6

Furthermore, wireless technologies are set to provide significant competition for broadband access together with applications that exploit the nimbleness of wireless. For example, applications that manage information through RFID and IPv6 addressing allow people to connect wirelessly in ways that other technologies cannot.





There is thus high risk in tying a definition of broadband to a specific technology since ubiquity and future applications need a more flexible environment. In Figure 7, this would lead to best practice being the safest practice of an open approach to technology and structure with some relevant degree of regulatory support and forbearance. There are quite significant differences in these latter two matters between developed and developing countries. Developing countries will most probably rely much more heavily on future mobile and wireless technologies and a lateral approach to regulatory forbearance. Fiji, for example, demonstrates sensitivity to the interplay between penetration and pricing in its legislation for its new regulator.²⁴ This legislation provides the regulator with a variety of tools for creating regulatory incentives in access and interconnection in order to catalyse penetration and the reach of future broadband applications.



1.4.3 Comments on Access and Connectivity

"Open access" network policies – unbundling, bit stream access, collocation, wholesaling, and/or functional separation – have played an important role in first generation broadband developments.

However, open access for broadband has not been implemented in some jurisdictions. For instance, in the US, it has been argued in the case of broadband infrastructure that forcing incumbents to lease their networks to competitors would undermine the incentive to invest, and that without that investment, the desired outcomes will not materialize. For other very valid reasons, this argument might also apply to developing countries where such regulatory forbearance may encourage or incentivize investment.

On the other hand, the majority of developed countries and developing countries require capacity to be shared through leasing with competitors, who then focus on their own investments and innovations that use that infrastructure. The theory is that more competitive markets will emerge in this way, delivering higher capacity, at lower prices to more of the population.

Evidence from the Berkman²⁵ study supports this outcome. This evidence demonstrates that developed countries with such an open access approach experience more favourable pricing and capacity outcomes. The Berkman study thus supports an open access approach. Wireless policies for the next generation of broadband user experience and the advent of ubiquitous and seamless connectivity are also significant. According to the Berkman study, permitting vertical integration, coupled with open access policies and connectivity, has placed Japan and the Republic of Korea half a generation ahead of the rest of the broadband world.

1.4.4 The Institutional Form of Regulation

An important consideration at Level 3 (Figure 8) is the type of regulator responsible for the sector. The regulator must be competent and compatible with the future broadband world.

The past two decades has seen a very noticeable trend around the world towards the establishment of regulators that are separate from the government and Ministry and independent in their decision making. From only 13 such regulators in 1990, their number has grown to 158 at the end of 2010.

A sub-theme of the creation of independent regulators has been a trend towards converged regulatory bodies and also towards integrated regulatory bodies. A converged regulatory body is one that has responsibility for telecommunications, radiocommunications, and broadcasting in a converged world, whilst an integrated regulatory body is one that has responsibility for the regulation of pricing and consumer issues.



The questions remain as to which regulatory model is the most appropriate and whether the necessary control and oversight over vertically integrated operators with market power can be achieved by a horizontal structure of plural regulators. Either way, the answer is not to change the structure of industry in order to fit regulatory structure but rather to find a regulatory structure that can facilitate the smooth operation of the market and ensure varied, advanced and affordable services to consumers.

Where converged or integrated regulation already exists, such as in the UK, the US, and Hong Kong China, the current attitude is to retain that formulation. Other countries seem to be trending towards integrated regulation, especially given the large investments at stake in future broadband developments where small errors from less coherent and knowledgeable regulatory bodies will be magnified enormously. This trend is evident even in developing countries. In Viet Nam, for instance, a semi-integrated regulatory body was created, whilst Papua New Guinea has recently set up a fully integrated regulatory body. Thus, the best practice in this area appears to lean toward the creation of converged and integrated regulators in order to ensure that the regulatory authority is competent to manage a complex industry featuring very significant investments.

1.4.5 Infrastructure investment

With regard to infrastructure investment, there is a range of options and combinations of options (see Figure 9).

Direct government investment in a wholly owned access platform may be a temporary measure adopted in response to a unique set of circumstances, such as in the case of Australia. Ultimately, the government stake in the platform may be privatized and the enterprise turned over to market mechanisms. This route, however, would not suit most developing countries because of the drain on public funds.

Some form of targeted public investment seems appropriate in most countries, with public funding finding its way into areas that would be underserved or unserved without government intervention. There are also very notable direct investment approaches in some developing countries such as Brazil²⁶. Some governments offer regulatory dispensations to network operators as their contribution to the costs of network provision. Both of these relationships can be structured through public-private partnership agreements.

Other countries are in the fortunate position of being able to rely completely on private investment. Nevertheless, there still appears to be a periodic need for some form of relief or subsidy from government in the face of market failure.



On balance, best practice appears to be some formulation of public-private partnership approach.

1.4.6 Industry Structure

The industry structure that emerges from the National Broadband Plan depends very much on the previous Levels (1-5) of decision making. For developing countries, it may not be possible to realize a broad suite of open network competitive platforms in reality. However, some degree of competition in all platforms is advisable even if it is through an oligopoly. Service competition can be promoted in order to minimize total infrastructure costs.

In developed countries, the fundamental belief that competition brings the greatest benefits has guided regulatory best practice for the past two decades. This belief automatically carries forward to a broadband environment where best practice is to promote interplatform competition and service competition delivered on those platforms. It is also the safest regulatory policy decision to make.

1.4.7 Foundation Level

Whilst the Foundation Level in Figure 11 (Level 1) is the starting point, it reflects the attitude to the higher levels of decision making in the Decision Tree.

The broadest canvass of consultation at the outset of the process offers the greatest prospects for the

ultimate success of the Plan. Thus, consultation needs to go beyond the Ministry involved with communications to include other Ministries. This broad approach to consultation reflects the wide influence and pervasiveness of broadband communications in the future.

Industry should be closely consulted and given the opportunity to provide input to government decisionmaking. Likewise, the public – comprising users and potential consumers – need to be given the opportunity to convey their views and engaged in a learning exercise that will convey the scale of opportunities ahead. The Plan needs to be marketed and sold as a national, inclusive venture.

The Plan should also provide for skill acquisition and training, especially in developing countries. Addressing infrastructure solutions, penetration and access is not sufficient. Competence in using that access to advantage at the local level is an equally challenging part of the Plan that must be clearly laid out. Treated with the right approach, broadband implementation has the ability to fundamentally change people's lives for the better.

The Plan is as much a social contract as a plan of action to develop the industry base. It can be understood as bringing about a stronger foundation for a desirable social and economic future built on the three pillars of effective government, private investment and more active citizenship.





The Plan itself should be subject to a cost-benefit analysis to test the value of the prescription proposed. Government policies, after all, are there to serve the public interest. A policy serves the public interest only if it delivers benefits that exceed the costs, compared with net benefits delivered by any alternative policy.

A social and economic cost-benefit analysis is also an example of responsible government. In his GSR10 paper, Dr Katz²⁷ addresses the impact of broadband and suggests that an investment gap analysis should be performed whenever possible. Exposing such an analysis to broad public scrutiny has a number of benefits that can mitigate risk factors. For example, industry would have the time to assess the sensibility of the proposal and to form partnership investment proposals in response to the proposal. Moreover, public scrutiny allows for a better informed public society, a factor that could affect the take-up of service.

1.4.8 Observations on Best Practice – with Comments on Developing Countries

Much has been said about the Digital Divide and the opportunities offered by broadband. To address the economic benefits alone that infrastructure brings for both developed and developing countries is to miss the point that equality lies at the heart of a successful outcome. For this reason, good development practices should build on the strengths, skills, and ideas of people living in poverty. Broadband therefore extends beyond a technical or business frontier. The extraordinary transformations to date of countries²⁸ such as the Republic of Korea, Taiwan China, Botswana, and Mauritius have been led by states that have ensured health and education for all and that have actively promoted and managed the process of economic growth. In addition, several East Asian countries have embraced the long-term case for equality to prevent social division and to enable a thriving economy. Taiwan China and Viet Nam have combined astonishing growth with high levels of equity. Indonesia and Malaysia have managed to reduce inequality through also government-led redistribution and generation of employment.

The twentieth century delivered very significant progress in health, education, citizen participation, technology and economic growth in much of the world. Yet there is much to be done to achieve the United Nations Millennium Development Goals. The next opportunity is to turn broadband to advantage through well-regarded government planning and implementation. The size of the task is quite staggering, and there is much to learn from others, although approaches adopted in developing countries may need to be different than those adopted in developed countries. With these considerations in mind and in light of the previous analysis in this paper, it is possible to draw up a summary of global implementation best practices. These practices are presented in Table 2 on a step-bystep basis at each decision level, in accordance with tree structure of decision points.

1.4.9 An Overview of Implementation Progress

Table 3 summarizes the current most notable feature or current focus of the implementation of broadband in many of the countries around the world. This table thus allows for the identification of country examples at each decision level. Because of their lead role in many ways, the Republic of Korea and Japan warrant two entries in Table 3 below.

Table 2: Best Practice Observations				
DECISION LEVEL	DEVELOPED COUNTRIES Important considerations	DEVELOPING COUNTRIES Important considerations		
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		

Table 3: Current Implementation				
DECISION LEVEL	COUNTRIES AND THEIR GREATEST FOCUS			
6.Industry Structure	The Republic of Korea, Japan, Germany, The Netherlands, US, UK, Hong Kong China.			
5.Infrastructure Investment	Brazil, Australia, New Zealand, India, Canada, Cyprus, Egypt, Greece, Ireland, Indonesia, Norway, Nigeria, Portugal, Russia, Algeria, Uganda, Botswana, Russia			
4.Regulatory Support Mechanisms	Fiji, Dominican Rep, France.			
3.Institutional Form of Regulation	Papua New Guinea, Viet Nam, Sri Lanka, South Africa.			
2.Goals and Targets	EU, Colombia, Afghanistan, Bulgaria, Austria, Belgium, Denmark, Ecuador, Finland, Ghana, Italy, Luxembourg, Lithuania, Malta, Romania, Hungary.			
1.Foundation	The Republic of Korea, Japan, Chile, Croatia, Spain, Austria, Czech Rep, Slovak Rep, Estonia, , Latvia, Poland, Slovenia, Taiwan China, Thailand, Samoa, Singapore, Oman, Saudi Arabia, Argentina, Honduras, Kenya, Malawi.			
Source: Author				

1.5 Mini-Case Studies

The reference materials used to prepare this Discussion Paper are complemented by a number of mini-Case Studies dealing with Fiji, Papua New Guinea, Argentina, Brazil, and Hong Kong China. Each of these Case Studies is fascinating in its own right. The experiences of these countries with broadband implementation and regulation offers valuable insight into the task of broadband rollout and should be of interest to many other countries in similar circumstances.

1.5.1 Case Study 1: Fiji – The quiet achiever

The Republic of the Fiji Islands comprises an archipelago of some 322 islands (of which 106 are permanently inhabited) and 522 islets. The two major islands, Viti Levu and Vanua Levu, host 87 per cent of the population of 890,000, and one-third of that population lives in the capital, Suva. Fiji is the second largest of the Southern Pacific island states (which do not include Australia and New Zealand) after Papua New Guinea. Tourism is a major industry.

1.5.1.1 The challenges facing SIDS

In his address to the ITU World Telecommunications Development Conference in Hyderabad in 2010, the Minister for Communications posed some very pertinent questions relevant to most small island developing states (SIDS). These questions included whether island states have the economies of scale to support broadband rollout and whether states that comprise a number of islands, some of which host a very small population, are attractive markets for infrastructure investors. He raised the issue of whether these states have the resources to implement broadband, both in terms of tangible assets and human capital, given that many of the best and brightest individuals in these states have left for greener pastures.

The Minister went on to explain that in the absence of the capacity and skills to cope with these challenges, SIDS were vulnerable to exploitation by unconscionable and well-resourced companies seeking explicit or implicit exclusivities. He nevertheless articulated a belief in the immense benefits provided by the energy, research, business acumen and robustness of the private sector. Yet he saw the need in ICT for equilibrium between the public and private sectors in order to create a future based on responsible and fair partnerships.

1.5.1.2 Setting the Scene for the Future: Structure and Regulatory Change

In 2007, the Government set a policy to remove all exclusivities that existed in the telecommunication sector. In January 2008, an agreement was signed with exclusive licence holders (FINTEL for the international gateway through the Southern Cross cable, Telecom Fiji Limited (TFL) for the local loop, and Vodafone for mobile telephony). As a result of this agreement, the following developments occurred:

- Vodafone exclusivity in the mobile telephony market ended on 1 October 2008. Digicel launched services in Fiji on the same day.
- FINTEL exclusivity over the international gateway ended in July 2009. TFL entered the international gateway market in October 2010.
- TFL exclusivity in the local copper backbone ended in February 2011. New entrants have yet to emerge in this fixed market.

The granting of 15-year open (unified) licences allows operators to provide any service they wish. With an open licence and assistance from the Pacific Financial Inclusion Program and with Government policies aimed at empowering isolated communities that are unbanked, Vodafone became the first company in the South Pacific to launch mobile money services (M-PAiSA) on 18 June 2010. Digicel followed suit on 15 July 2010 with the help of the GSMA through the Mobile Money for the Unbanked Fund.

The underpinning legislation for these structural changes was the Telecommunications Promulgation 2008. This legislation adopted all policy relating to the release of exclusivities and also provided for an independent regulator for the telecommunication sector, the Telecommunications Authority of Fiji (TAF). The TAF has the authority to deal with licensing, technical regulation, spectrum, and consumer concerns. Competition functions remain with the Commerce Commission, although there are provisions for interworking between regulators. Responsibility for the legislation and policy advice remain with the Department of Communications within the Ministry. The CEO of the TAF took up his role in March 2011, and the organization is now taking shape.

With regard to spectrum, the National Regulation of Spectrum Decree 2009 allows for a stocktake and audit of allocated spectrum with a view to ensuring efficient use through re-allocation of allocated but unused spectrum. This should eradicate spectrum hogging in a newly liberalized telecommunications sector and lay the ground for major change in the information and broadband sector, recognizing the fundamental role which mobile and wireless has in the future.

1.5.1.3 National Broadband Policy

A Draft National Broadband Policy was drawn up in 2010 following public consultations and will lay the foundations for the broadband future of Fiji. It will drive socio-economic developments towards maximum penetration and usage. It intends to involve Government and regulatory subsidies, initiatives, and fiscal policies, and will couple with the implementation of Universal Service Objectives. The policy will involve consumer awareness, consumer protection, infrastructure development and environmental sustainability.

The newly-created TAF is to make an input to the Draft Plan before finalization. In the meantime, the Government has undertaken the creation of regulatory incentives in order to continue the momentum building towards broadband. For example, as of January 1st, 2011, there has been a removal of duties on the importation of mobile broadband dongles to promote accessibility and affordability. Fiscal and excise duties have been removed on computers, computer parts and accessories, specialized plant, equipment and fittings, and specialized furniture for ICT companies to boost business in the ICT sector. There has also been a reduction of import duty on smart-phones, from 32 per cent to five per cent as of January 1st, 2011.

Within telecommunication regulation, there is provision for the regulator to approve interconnection undertakings that reflect a balance between economic orthodoxy and government policy desires for increasing penetration. Other regulatory matters to receive consideration in future include infrastructure sharing and the efficiencies that such sharing would create.

SMS banking has had a huge impact in the Fiji islands, and is seen in a broad context of education in money management and opportunity for entrepreneurism amongst the young especially.

It is therefore clear that the technology pathway to the broadband future is very much influenced by radio, namely, progressive generations of mobile voice and data evolution (3G, LTE, LTE Advance, Wimax, WiMAN, Satellite), together with spectrum considerations for access and backbone provision. This pathway is also influenced by applications and the reality of needs of the population. In addition, the major industry of tourism has shown a great appetite for mobile communications.

Preparing the nation for a broadband future and the opportunities arising from ICT is a very important aspect of the national Plan. Infrastructure and access alone are insufficient. In terms of the needs of everyday Fijians, community centres will see some re-branding as schools (by day) will become community centres at night where tuition will be available to assist with the use of computer training. The University of the South Pacific (USP) in Suva is very active in this area, with three tiers of programs. The lowest level of program is suited to absolute beginners. Vodafone has established a process of donation of computers to communities. This not only demonstrates good corporate citizenry but also, of course, fuels future demand and is a beneficial good all round.

Fiji has a geographic advantage in relating to other island states in the South Pacific, and sees itself developing as a hub in the information age. A cable spur from the Southern Cross cable to Tonga is under way, and one is anticipated to another major island state, Vanuatu. Satellites play an important role throughout the South Pacific, and the USP makes very effective use of the technology in its educational programs on an international basis.

1.5.1.4 Summary

In brief summary, Fiji has arrived at the broadband take-off point with its regulatory house in order and is ready to take advantage of further infrastructure development through a competitive industry. To extract the most from that future, capacity building is firmly in focus. As at mid-2010, the National Broadband Plan has yet to be finalized. In preparation, the attitude towards technology has been to avoid being overly prescriptive and to recognize the importance of applications that should be targeted and supported for the national good. The involvement of the whole of Government is a key feature of the approach and a support for future broadband.

1.5.2 Case Study 2: Papua New Guinea – A bountiful land

As reported by Holmes²⁹, Papua New Guinea (PNG), with an estimated population of 6,732,000 in 2009 and a land area of 463,000 square kilometres, is the largest of the Pacific Island countries. The capital, Port Moresby, has a population of over 250,000 people, and the extent of urbanization is less than elsewhere in the Pacific. Natural resources are an important part of the economy.

Access to telecommunication infrastructure and services in PNG is, despite recent improvements, among the lowest in the world. Currently, teledensity³⁰ is about 16 per cent. Growth in teledensity has been constrained by several factors: a hitherto monopolistic market structure; limited investment and maintenance; high costs; limited access to credit, particularly in rural areas; a dualistic economy (natural resource "enclaves" versus subsistence living); a highly dispersed population (85 per cent rural); and a challenging topography/ physical environment.

Access to basic telephony has improved significantly since introduction of competition in mobile telecommunications in October 2007. The regulator, NICTA reports that the number of mobile subscribers has increased to about 1,800,000, bringing mobile teledensity to an estimated 26 per cent as of January 2011, while prices for calls have fallen by 60 per cent.

NICTA also reports that in 2011, Internet penetration (mostly dial-up, at speeds below 9600bit/s in some areas) remains extremely limited: there are only about 15,000 subscribers, primarily in Port Moresby. Ten Internet Service Providers are currently operating. Constraints include Telikom's wholesale monopoly (Tiare gateway) and the availability and cost of electricity and computers. Deployment of broadband is minimal and costs high relative to countries with similar incomes; other than WiFi at the access level, broadband wireless services are in the very early stages of development. Public access facilities, both to telephony (e.g. "village phones") and the Internet (e.g., public kiosks/telecentres), are very limited.

1.5.2.1 The Enigma that is Papua New Guinea

Papua New Guinea ranks last among the Asian Development Bank's Pacific member countries on the UN index of human development and human poverty, and is struggling to meet the UN Millennium Development Goals. Yet there is a silver lining emanating from the resources sector.

In 2010, the go ahead was given for a USD15 billion liquefied natural gas development by Exxon Mobil.³¹ First exports are scheduled for 2014, and the project has the potential to lift the GDP (almost USD8 billion in 2009) by up to 50 per cent. This project is complemented by other unrelated resource projects that are either in prospect or under way. However, one very important spin-off is a backbone fibre infrastructure project along the pipeline route (see below).

Given the appropriate application, the resources sector could be the catalyst for immense changes in PNG brought about by public/private development and to be of benefit to the broader fields of health, education, human capacity, business and social development. These are the prospects that excite many people involved with PNG.

1.5.2.2 National ICT Policy

ICT has a fundamental role to play in the social and commercial future of Papua New Guinea. The Government's recently implemented National ICT Policy and the emergence of a new ICT regulatory body in October 2010 are designed to encourage commercial investment and competitive activity in the ICT sector in order to promote broader social and economic benefits in PNG. A key objective is that:

Papua New Guinea must have an efficient ICT infrastructure as thebackbone of ICT policy with the use of technology appropriate to the circumstances of PNG. This will require substantial investment to refurbish the existing network, extend its availability across the country, allow new networks to develop and increase technical capabilities to support high-speed broadband.³²

In accordance with the National ICT Policy, substantial changes have recently been made to the legal framework and institutional structures that regulate the ICT sector. A new National Information and Communications Technology Act (the Act) incorporating these reforms was approved by Parliament in November 2009. These reforms include the establishment of a new sector regulator, the National Information and Communication Technology Authority (NICTA), with regulatory responsibility for the ICT industry. NICTA is a fully integrated, independent regulator with responsibility for licensing, technical regulation, competition regulation (a function merged from the Independent Competition and Consumer Commission), consumer regulation, and spectrum regulation. NICTA took up its remit in October 2010, and its Board met for the first time in March 2011.

NICTA's formative challenges are to create the appropriate and responsive organization structure and to acquire and develop the capacity and skills to successfully manage the regulatory tasks at hand.

The Act also introduced a Universal Access Scheme in PNG that provides for the establishment of a Universal Service Fund (USAF) that replicates successful experiences in other developing countries. The Fund will finance competitive, one-time capital subsidies to create incentives for operators to cover commercially unattractive areas. The National ICT Policy acknowledges that despite the "community service" obligations of licensed mobile operators to provide service in 229 communities, a significant access gap is likely to persist in PNG due to the operational constraints noted below. To address this, the Policy established a more wideranging incentive program in line with international best practices: the Universal Access Scheme that has more ambitious targets including always-on broadband access and voice access outside the mandatory rollout areas.

1.5.2.3 Industry Structure

The telecommunication market is presently served by Telikom PNG Limited (Telikom), the incumbent general carrier, which is licensed to provide national fixed and international services. There is competition in the public mobile services market between BeMobile and Digicel PNG Limited (Digicel) using GSM at 900 MHz and 1800 MHz. In addition, Telikom has commenced a CDMA network, initially for fixed wireless access in Port Moresby, and is currently testing mobile functionalities. There are approximately ten licensees in the value added services market.

On a broader canvass, the Independent Public Business Corporation (IPBC) is a statutory corporation that holds a number of State-owned enterprises (SOEs) for the Independent State of Papua New Guinea (the State). One such SOE is Telikom, which previously held a monopoly over fixed and mobile telecommunications services in PNG. Key issues and recent developments concerning Telikom include the following:

- (a) Prior to 2007, corporatization reforms were undertaken in order to improve Telikom's ability to participate and perform in the prevailing commercial context.
- (b) In 2007, competition was introduced to the mobile telecommunication market. This ended Telikom's monopoly in mobile telecommunications.
- (c) At the end of 2008, Telikom's mobile telephony operations were separated from its remaining operations and partially privatized as BeMobile. Telikom remains a shareholder of BeMobile, owning a 50 per cent stake in the company.
- (d) Telikom has accumulated 370,000 subscribers overall and 80,000 fixed line subscribers. However, Telikom's fixed line and data infrastructures are aged and inflexible, and require significant investment. In addition, Telikom's workforce is not well-equipped for the deployment of new technology.
- (e) Telikom faces a number of challenges, including:
 - limited capacity in major trunk routes;
 - operational difficulties due to geographic and management limitations;
 - below-standard levels of service quality and reliability, partly because of the aged network infrastructure;
 - extensive bypass by licensed and in some cases currently unlicensed VSAT operators;
 - an under-developed wholesale business model;
 - serious under-utilisation of certain assets, particularly international cables;
 - high prices for bandwidth; and
 - some duplication of infrastructure in the deployment of microwave capacity by other major operators.

1.5.2.4 The Outlook for Broadband

The PNG National Executive Council (NEC) has directed the Minister for Public Enterprises, responsible for the IPBC and Telikom, to:

 liaise with both the Minister for National Planning and the Minister for Communications and their respective departments, to formulate an appropriate telecommunication Broadband Policy to complement the National ICT policy; and

- commission a detailed Broadband Implementation Study ³³ for the ownership and operation of broadband backbone assets in PNG, including future network rollout, in collaboration with the Minister for National Planning and the Minister for Communication and their respective departments; and
- report to the NEC on the conclusions and recommendations of the Broadband Implementation Study.

These initiatives aim to:

- significantly increase the capacity and coverage of the domestic backbone or backhaul transmission infrastructure;
- significantly increase utilization of international capacity; and
- promote the creation of an efficient wholesale market.

Additionally, NICTA has refarmed the spectrum in the 900 MHz band and has reassigned this spectrum to existing mobile operators in a way that will provide for additional wireless broadband services within the spectrum available in this band.

1.5.2.5 PNG LNG Fibre and National Broadband Project

In order to advance the development of national broadband capability, as well as to restructure and revitalize Telikom's business, the State (through the IPBC) has agreed to acquire certain rights in respect of 50 per cent of the capacity of an optical fibre link. This link is to be constructed in connection with the PNG LNG project (the PNG LNG fibre cable). The agreement formalizing these arrangements was executed in late January 2011. The PNG LNG fibre cable link will be laid over 750km from the Hides gas field to the LNG plant near Port Moresby.

The IPBC considers that investment in the PNG LNG fibre cable link should be part of a nationwide high-capacity backbone network. This network should seek to:

 improve PNG's national telecommunication infrastructure, including the development of capabilities to support high-speed broadband, and ensure that valuable state ICT assets are held by PNG entities capable of efficiently using and developing those assets.

1.5.2.6 Summary

In summary, PNG is poised to create a broadly considered Plan for broadband implementation. This Plan will rely on assistance from its resource wealth for funding and should create lasting benefits that will be widespread throughout the economy and society. Regulatory solutions are in place, and these are open to competitive infrastructures being created without undue restraints on technology.

1.5.3 Case Study 3: Argentina – Showing the way with preparations

Argentina is Latin America's third largest economy with a high rating on the human development index. Analysts point to the country's foundation for future growth due to its market size, levels of foreign investment, and percentage of high-tech exports as a share of total manufactured goods. Broadband is therefore particularly important to the future.

1.5.3.1 Developments in Broadband

Argentina sets an excellent example of thorough and well-consulted preparations in developing a National Plan, *Argentina Conectada*³⁴ (Argentina Connected). This Plan has elements that should appeal to both developed and developing countries.

In October 2010, the Government of Argentina, recognizing the importance of broadband for social and economic development, launched a major initiative to increase broadband connectivity for individuals, businesses, educational institutions and government offices across the nation. The initiative is built upon the premise that the development of broadband requires not only the availability of basic data transport infrastructure and affordable connectivity services, but also appropriate applications and content, a large installed base of terminal equipment, and the expansion of ICT skills among citizens of Argentina.

An integrated public policy approach to the design and implementation of a national telecommunication plan is thus required to promote such a complex ecosystem. The National Plan was released in October 2010, and combines under a single connectivity initiative several other efforts already under way. In particular, it integrates ongoing programs aimed at digitalizing terrestrial broadcasting, providing ICT equipment and training to public-school students, extending connectivity to remote areas, and establishing public access ICT centres, among other programs.

The Plan is guided by the following strategic guidelines:

- Digital inclusion for all citizens and universal broadband connectivity across the Argentine territory;
- Optimization of spectrum use;
- The promotion of local content and employment in the ICT sector;
- The development of next-generation telecommunication infrastructure;
- The promotion of local R&D; and
- The strengthening of competition in telecommunication services.

1.5.3.2 Where Argentina stands today

Argentina has a long tradition of well-developed public utilities such as water, electricity and telecommunication services. It ranks high within Latin America in broadband adoption. In September 2010, *Argentine Conectada* reported that the number of residential broadband connections reached 4.5 million people (an increase of 30 per cent from the previous year) in a population of some 40 million. About a third of households are already connected.

While this sustained growth suggests the presence of a competitive market environment, a closer examination reveals several challenges that result from well-understood market failures in the provision of broadband services. Among them are:

- The large regional disparities in broadband penetration, which reduce development opportunities for the poorest regions;
- The limited capillary presence of the backbone infrastructure for data transport, which results in high prices and low service quality outside the main urban centres;
- The limited connectivity among public schools, libraries, and government offices;

- The inadequate skills and low penetration of terminal equipment among disadvantaged households, which reduces demand incentives; and
- The limited development of local content and appropriate electronic services, which also reduces broadband demand.

In summary, despite the rapid development of broadband in Argentina over recent years, the government has a key role to play to ensure:

- a) balanced growth of the broadband ecosystem and
- b) wide distribution of the benefits of such growth across regions and social groups. In particular, the State has an important role in:
 - orienting private investments to ensure wide regional coverage of advanced services;
 - making complementary public investments in basic transport infrastructure to promote competition in non-replicable network segments;
 - promoting service affordability and appropriate service quality benchmarks; and
 - stimulating broadband demand through complementary investments in digital literacy, content and applications, research and development, and public access centres.

1.5.3.3 Key Initiatives

The table below presents the key initiatives articulated under *Argentina Conectada* for each of the components of the broadband ecosystem. At the centre of the government's strategy is the creation of a national fibre-optic network backbone operated by AR-SAT (Empresa Argentina de Soluciones Satelitales S.A.), a government-owned corporation with extensive experience in telecommunication services.

AR-SAT will fulfil connectivity demands in the public sector and operate under open network principles in the wholesale data transport market. This strategy is complemented with financial stimulus to local operators in the last-mile segment, as well as the establishment of public access centres across the nation. The goal is to double the available fibre-optic backbone infrastructure and the number of broadband subscriptions within a five-year period (2011-2015).

Table 4: <i>Argentina Conectada</i> : Key initiatives			
Component	Current Situation	Initiatives	
Data transport infrastructure	Low capillarity, few data exchange points for local traffic.	Deployment of federal fiber optic network and NAPs at provincial level through AR-SAT.	
Telecommunication services	Incomplete coverage, high cost and low quality in semi-urban and rural areas.	AR-SAT operation in wholesale data transport segment. Public financing to local operators in last-	
		mile segment. Optimization of radio spectrum use to stimulate mobile broadband.	
		Establishment of public access centres in libraries, community centres and selected public spaces.	
Terminals and equipment	Regional disparities, limited adoption in public schools and SMEs	Laptops to public-school students (Conectar Igualdad program).	
		Financial stimulus to PC adoption (Plan MI PC2).	
Applications and content	Limited availability of educational and e-gov applications, as well as local content.	Financial stimulus to local application and content production.	
		National educational portal.	
		National e-gov plan CIVITAS2	
Human capital	Disparities in ICT skills, limited development of higher education in ICT area.	National digital literacy program.	
		Support to ICT-related higher education.	
		Financial stimulus to R&D in ICT sector.	
		Creation of National Telecommunications Institute.	

1.5.3.4 Execution Strategy

Argentina Conectada was the product of several months of collaboration among multiple government agencies and extensive consultations with the private sector, academia and other civil society organizations. This multi-stakeholder approach is reflected in its execution strategy.

Under the leadership of the Ministry of Federal Planning, Public Investment and Services, the Planning and Strategic Coordination Commission will be responsible for the overall execution of *Argentina Conectada*. In this regard, the Planning and Strategic Coordination Commission will articulate the efforts of several thematic working groups in which multiple government and non-governmental actors participate. The regulator plays a key role in the activity. These Working Groups are as follows:

- Digital Inclusion;
- Spectrum Optimisation;
- Universal Service;
- National Production and Employment;
- ICT Capacity Building and Research;
- Connectivity and Infrastructure; and
- Competition.

1.5.3.5 Summary

In summary, Argentina has a well-developed broadband plan in place that has broad support and involvement of stakeholders. The Plan revolves around the creation of a national backbone fibre-optic network
operated by AR-SAT, a government-owned corporation offering open access at a wholesale level. The strategy is complemented by financial stimuli to local operators over the last mile segment, and the role of the regulator will evolve as the Plan matures into implementation.

1.5.4 Case Study 4: Brazil – The stirrings of a giant

Brazil is the largest country in South America, both by geographical area and by its population of over 190 million. The country has extensive natural resources, and the Brazilian economy is the world's eighth largest. The implementation of a broadband plan thus has major significance in global terms.

Broadband is at the core of service and network convergence, and Brazil sees competition as a main driver to increase broadband service offerings over a wider area and population. Competition will allow reduced prices and increased quality of service for the majority of the country and other actions are seen to be needed to make sure that the whole population has access to these services.

Industry has been increasing in Brazil in response to market growth and increased competition. The latest radiofrequency auctions have required significant investment from operators, and this is reflected in the industry's development as well. Optical network infrastructure has been one of the most significant areas of growth. As a government-owned incumbent, Telebrás is being revitalized by an injection of funding to effectively create an additional player in the wholesale market. Consequently, an increase in the industry's growth is expected for the next couple of years. The new responsibilities of Telebrás are dealt with in a separate section below.

Policy and government intervention assist the evolution of broadband. Government supports the implementation of the National Broadband Plan by setting out the goals and responsibilities for actions to be taken. Pursuant to Telebrás' responsibility under the Plan, the government is currently financing the implementation of the network. Regulatory actions are undertaken by Anatel, as explained in a section below.

1.5.4.1 Establishment of a National Broadband Plan

In May 2010, the President issued a Decree establishing the National Broadband Plan.³⁵ The Plan has the objective of fostering and disseminating the use and provision of information and communication technology goods and services in order to:

- enhance access to broadband Internet connection services;
- speed social and economic development;
- promote digital inclusion;
- reduce social and regional inequalities;
- promote the generation of jobs and income;
- expand Electronic Government services and facilitate the use of State services by citizens;
- promote capacity building for the population on the use of information technologies; and
- expand Brazilian technological autonomy and competitiveness.

The Plan is being implemented, managed and monitored through a Digital Inclusion Program Steering Committee that has the following tasks:

- define the actions, goals and priorities of the Plan;
- promote and foster partnerships between public and private entities in order to reach the objectives of the Plan;
- establish the technical definition for broadband access for the Plan;
- monitor and evaluate the actions for the implementation of the Plan; and
- publish annual reports on the actions, goals and results of the PNBL.

The Steering Committee has the following Thematic Groups (and others may be created):

- Telecommunication Infrastructure and Services, coordinated by the Communications Ministry;
- Applications, coordinated by the Planning, Budgeting and Management Ministry; and
- Content, coordinated jointly by the Culture and Education Ministries.

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Consultation about the broadband plan has been widespread and has taken place through forums open to the public and meetings of the Steering Committee. Consultation focuses on building a general consensus about the country's broadband needs and the appropriate specific targets and goals.

In terms of a cost-benefit analysis of broadband implementation, there has been an analysis to evaluate the sustainability of specific broadband offers in the country (coverage versus retail price, etc.). One of the major objectives of the Plan is to promote competition in the wholesale market in order to reduce prices for end users as a result of economic market forces.

In setting tangible targets for the program, an Action Plan has specific goals. Some are in an initial formulation phase, others are in a discussion phase and others are already under implementation. All these actions are listed on the Plan's website.³⁶ In general, infrastructure and service regulation, financial and taxation incentives, national production policies, content and applications are the main areas for the actions.

1.5.4.2 Responsibilities of Telebrás

To achieve the objectives of the Decree, it is Telebrás' responsibilities to:

- (a) implement the private communication network of the federal public administration;
- (b) provide aid and support to implementing public policies on Internet broadband connections to universities, research centres, schools, hospitals, service stations, community telecentres and other locations of public interest;
- (c) provide supporting network infrastructure to telecommunication services provided by private companies, States, Federal District, Municipalities and nonprofit entities; and
- (d) provide broadband Internet connection services to end users, only on those localities that do not have adequate service offering.

Telebrás will fulfill its activities according to current legislation and regulation, subject to applicable obligations, duties and conditions.

The information and communication technology systems provided in items (a) and (b) above are considered strategic for the purposes of hiring of goods and services related to implementation, maintenance and improvement.

The implementation of the private communication network of the federal public administration provided in (a) above consists of the provision of services, infrastructure and communication supporting networks and data transmission.

The Steering Committee will define the localities that do not have adequate broadband Internet connection service offering as provided in item (d) above.

In the fulfillment of the objectives of the Plan, Telebrás is authorized to use, operate and maintain the infrastructure and telecommunication services supporting networks under the ownership of the federal public administration.

When dealing with indirect federal public administration entities, including public companies or mixed economy societies, the use of the infrastructure provided above depends on a leasing contract between Telebrás and the providing entity.

1.5.4.3 Responsibilities of ANATEL

The national telecommunication regulatory agency, ANATEL, is responsible for organizing all telecommunication services in Brazil, as well as regulating technical aspects of networks and spectrum usage.

Anatel is to implement and execute the regulation of telecommunication services and network infrastructure for supporting broadband Internet connection, guided by the following directives:

- foster competition and free initiative;
- stimulate innovative business models that advance in the use of convergent services;
- adopt fast procedures for conflict resolution;
- impose obligations for the sharing of infrastructure;
- ensure management of public goods and infrastructure, including radiofrequencies, in order to reduce the costs for the broadband Internet connection service; and
- increase broadband Internet connection service offering in the installation of telecommunications\ infrastructure.

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Anatel must observe the policies established by the Communications Ministry.

Anatel has no influence on the choice of technology to implement broadband. In Brazil, regulation is neutral with respect to the technology to be employed in any network. In the context of the National Broadband Plan, where Telebrás has a significant role to play, it is up to that company to decide the technology to be implemented for its own network.

Telebrás is in the process of contracting with vendors and suppliers to build its network. Its timeline is to initiate service in 2011. It is understand that the first stages consist of a hybrid optical network with microwave links to provide wholesale backhaul and backbone. As at mid-2011, this is still a work-in-progress.

There are various regulatory obligations and incentives related to broadband rollout. Examples include: obligations tied to spectrum licences to offer services in a wider range of municipalities; a proposed regulation to promote competition in several relevant markets (where broadband is considered as wholesale), taking into account Significant Market Power; and other proposed regulations to reshape network termination rates and to address service provision and. These latter proposed regulations may contain incentives.

Summary

In summary, Brazil has a well-developed Plan and implementation framework. A key element is the government-owned incumbent, Telebrás, and its revitalization through an injection of funding to effectively create an additional player in the wholesale market. The role of the regulator ANATEL is also well specified.

1.5.5 Case Study 5: Hong Kong China – Some valuable pointers

Hong Kong China offers the chance to fast-forward to a high density, high penetration laboratory with has sufficient autonomy in order to gain some valuable insight relating to broadband as it rolls out throughout the world.

Hong Kong China is one of two special administrative regions of the People's Republic of China. With an area of 1104 square kilometres and a population of 7 million, it is one of the most densely populated areas in the world. Under the principle of "one country, two systems", Hong Kong China has a different political system from mainland China, with an independent judiciary operating under a common law framework. The Basic Law of Hong Kong China stipulates that Hong Kong shall have a "high degree of autonomy" in all matters except foreign relations and military defence, and it governs its political system.

As one of the world's leading international financial centres, Hong Kong China has a major service economy characterized by low taxation and free trade. The lack of physical space triggered demand for denser construction, giving rise to a city that is now noted for its modern architecture and for being the world's "most vertical" city.

Kong China also has leading Hong а telecommunication economy with world-class infrastructure. Digitalized since 1995, the Special Administrative Region has been wired extensively with optical fibre cables, with the vast majority of households covered by this extensive broadband network. The rollout has been characterized by the utilization of practically every type of technology. Hong Kong China is naturally a key regional telecommunication hub and, as such, is the landing point for a significant number of strategically important submarine cables. Television is a substantial market in the economy, with an estimated customer base in 2011 of over 2.2 million households (99 per cent).³⁷

1.5.5.1 Policy settings

General guiding principles for the government are simple: "big market, small government" and "market leads, government facilitates". The role of government is to provide a facilitating environment and to intervene only where there are obvious imperfections in market mechanisms.

The same macro-economic policy applies to the telecommunication sector, which has been liberalized since the 1990s, resulting in one of the most competitive markets in the world. The Hong Kong China government has not provided any direct investment or any forms of subsidy in network construction or telecommunication services provision in the region. There has been no need to make up for a reduced level of consumption and investment by the private sector.

Even in the 2009 global financial crisis, this approach has prevailed, despite the soul searching questions at the time about whether Hong Kong China should depart from its proven pro-market policy. Questions were raised about whether regulatory holidays or financial incentives should be offered to the industry, and whether public funding should be injected to stimulate investment in telecommunication infrastructure.

1.5.5.2 The Role of Regulation

The telecommunication regulator, the Office of the Telecommunications Authority (OFTA), is central to implementation of government policy. It has responsibility for the regulation of competition in telecommunications, licensing, technical regulation, spectrum, and consumer matters. It is thus a completely converged and integrated regulator.

In October 2010, at an International Regulators Forum in Barcelona³⁸, the Director General of OFTA laid out some examples of how her organization had dealt with the trying times of the global financial crisis. She noted the following:

(a) At the height of the financial collapse, in January 2009 OFTA proceeded with a spectrum auction to ensure the timely introduction of LTE, WiMAX and other broadband technology in Hong Kong China. The reserve price was left unaltered and the auction left to market forces.

The auction was a success. A total of 90 MHz in the 2.5 GHz band was acquired by three successful bidders at a price of USD197 million. Private investment continued, and a new LTE technology centre and a state of the art laboratory were set up, creating more jobs.

One of the successful bidders announced deployment of the world's first dual-band network in Hong Kong China in early 2011, with another aiming for service launch by mid-2011.

The regulatory action thus paved the way for new business opportunities for applications developers, content providers and on-line advertisers, which will in turn expand the industry and further spur growth of the telecommunication market.

(b) Because of a sufficiently high degree of facilitiesbased competition, the government does not need to provide funds to finance the development of broadband infrastructure. During the financial crisis, OFTA raised this matter with industry in a review to determine whether this was indeed the case. The majority of industry representations supported the continuation of a pro-market policy. The consensus was that investment and construction of telecommunication networks should continue to be based on the business plans and commercial decisions of the private sector as this would confer the greatest degree of flexibility required for business operations.

That being said, OFTA has contributed a number of facilitating measures to assist the continuous rollout of broadband networks by industry, including:

- The introduction of a registration scheme for buildings connected by FTTH or Fiber-to-the-Building (FTTB) in order to support public awareness of fibre-based facilities;
- A consultancy study into streamlining the landing of submarine cable systems in Hong Kong China; and
- Facilitating the deployment of mobile broadband services through the timely release of spectrum, and allowing mobile operators to use hill-top sites for base stations and backhaul.

There has been sustained private investment and impressive customer take-up of broadband services, as illustrated by the following examples³⁹ (as of October 2010):

- There were seven operators providing fixed broadband services using various technologies at speeds up to 1 Gbps;
- 2.1 million subscribers were using broadband services in Hong Kong China, representing a household penetration rate of 83 per cent as of January 2011;
- About 86 per cent of households were served by at least two self-built networks, and close to 70 per cent were served by three; and
- According to a survey published by the FTTC Council in February 2010, Hong Kong China ranked third at around 33 per cent household penetration among all the economies that have deployed FTTH or FTTB.
- (c) De-regulation of fixed-mobile interconnection charges in April 2009 by OFTA was intended to facilitate cross-platform competition in the era of fixed-mobile convergence. This represents another

key advantage of an attuned converged and integrated regulator that is agnostic to technology choices.

In the past, fixed operators used to receive an interconnection charge from mobile operators. The validity of this charge was seen by OFTA to be very dubious. Whilst initially the fixed network operators cried foul when the interconnection charges were deregulated and wanted a long transition period to minimize the impact, OFTA nevertheless proceeded to deregulate in an efficient manner. In the end, except for a single case of dispute between the incumbent fixed operator and a mobile operator, most fixed and mobile operators have been able to settle on some form of agreement or understanding on an interconnection charge based on the "bill and keep" model.

1.5.5.3 Summary

In summary, with a high density population in an urbanized environment and high penetration rates, Hong Kong China has opted to remain faithful to promarket mechanisms, facilities-based competition, technology neutrality, light handed regulation, and a dependence on totally private investment in telecommunications. As a result, Hong Kong China has been able to maintain consistency, continuity and certainty in its policies for the telecommunication sector and in encouraging innovation. Whilst these circumstances are not reflected in most countries, Hong Kong China nevertheless gives us some understanding of the future dynamics we are moving towards as penetration of broadband increases, and urban population density grows.

Conclusion

Sections 1.4 and 1.5 have provided a framework for analysing the constituent elements of a National Broadband Plan. Examples of progress and decisions made in individual countries against a background of six levels of decision making have been presented and the Decision Tree tool has been introduced, with options that exist at each level of decision making.

The Plan itself is as much a social contract as a plan of action to develop the industry base. Therefore, as stressed throughout this Discussion Paper, the most inclusive and wide-ranging consultation and involvement are necessary to ensure that the monumental investments ahead are based on the collective decisions of the best minds available in government, industry, and society.

There is no single, comprehensive blueprint for best practice, but learning from other countries' experiences at each level of decision-making is possible. This report may assist in the formulation of a Plan by providing some pointers about where to look when tailoring the cloth to suit a particular set of national circumstances – for both developed and developing countries.

CLOSING DIALOGUE

ITU-D to Regulator: "Well, that should assist you with working out the road ahead"

Regulator: "Yes and No"

ITU: *"Excellent. Your answer shows you are now comfortable with the concept of dealing with options"*

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² Data over Cable Service Interface Specification.

³ Long Term Evolution.

⁴ ITU, GSR10 Discussion Paper on Understanding the impact of broadband on national and global economies by Dr. Raul Katz., www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/documents.html

⁵ Martin Cave, Making the Ladder of Investment Operational. November 2004

- ⁶ ITU, GSR10 Discussion Paper on Understanding the impact of broadband on national and global economies by Dr. Raul Katz., www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/documents.html
- ⁷ These cases are discussed in depth in the ITU GSR10 discussion paper on Understanding the impact of broadband on national and global economies by Dr. Raul Katz., www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/documents.html
- ⁸ Some Mini-Case Studies are presented later in Section 1.5 of this paper.
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- ¹⁵ Ibid.
- ¹⁶ Build Operate and Transfer model.
- ¹⁷ ITU, Bringing Broadband Access To Rural Areas: A Step-By-Step Program for Regulators, Policy Makers and Universal Access Administrators. The Experience of the Dominican Republic. By Edwin San Roman, <u>www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR09/doc/GSR09_Backgound-paper_UAS-broadband-DR-web.pdf</u>.
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- ¹⁹ Sun Tsu was the most famous Chinese general of history, whose tactics are now almost worshipped by the corporate world and are translated into the business warriors "bible" in the book titled "The Art of War".
- ²⁰ The Output based Aid (subsidy) is discussed in greater details in the GSR1 discussion paper on Strategies for Financing Universal Broadband Access.
- ²¹ ITU, GSR10 Discussion Paper on Understanding the impact of broadband on national and global economies by Dr. Raul Katz., www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/documents.html
- ²² ITU, National Broadband Strategies Overview. ITU WSIS Team 20/11/2010.
- ²³ 8 services, 3 infrastructures, and 9 technology growth engines.
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- ³⁰ That is, percentage of population with access to a fixed line or mobile phone.
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GSR 2011 Discussion Paper

Open Access Regulation in the Digital Economy



Work in progress, for discussion purposes

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OPEN ACCESS REGULATION IN THE DIGITAL ECONOMY

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Introduction

The digital economy presents unprecedented challenges for ICT policy makers and regulators alike. Previous periods of major technological change occurred in an era of mostly government-owned monopolies – a regulatory model that lent itself to command and control investments. Indeed, in many countries, public ownership of the telecommunication networks was instigated precisely to enable the largescale network investment needed to provide affordable, ubiquitous telecommunication services.

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. So successful has this strategy been that the former monopolists, now largely privatised, have seen market share eroded well below 50 per cent in many countries as well as traffic growth diverted to mobile and other platforms. The picture is similar in the developed and developing world (see Figure 1).

Now legacy networks are proving incapable of supporting the insatiable growth of bandwidth-hungry applications. New investment is needed, and on a grand scale, but the policy and regulatory emphasis on liberalization and competition has in many countries created a fragmented market lacking the scale economies and the regulatory certainty to underpin such large-scale investments. This is not to deny the evident benefits of competition, but some new regulatory thinking is now required for a successful transition to the digital economy.



A number of countries (e.g. Australia, Qatar, Malaysia and Singapore) have embarked on the creation of entirely new national broadband networks (NBNs), which deploy fibre optic technology throughout the core network and, crucially, in the access networks that reach out to the end customers. Investments in these networks are huge (e.g. Australia's NBN will cost AUD43billion (USD45bn)), and this has led to the renationalization of infrastructure so as to obtain economies of scale and preferential Government borrowing rates.

Other countries (e.g. in Europe) are trying to work within the existing regulatory frameworks to find means of improving investment incentives for network operators while maintaining competitive supply. Such a strategy involves lightening the myriad of regulatory requirements that has been imposed on dominant operators (that is, operators with Significant Market Power) as a support or reward for the development of ubiquitous broadband networks.

In developing countries (e.g. Tanzania and Mozambique) that lack the public funds to support a full NBN, but that equally lack existing privately-owned fixed network infrastructure that could form the basis of future digital communications, hybrid solutions are being pursued. These typically involve public investment, typically in the form of low-interest loans, in a fibre backbone network, coupled with various forms of support and encouragement for privately-funded access networks using a range of technologies such as WCDMA, HSPDA and WiMAX.

Whichever strategy is adopted, **Open Access** is the key to success. 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.

This paper assesses what open access means and how regulators can apply the concept in different situations. The paper also highlights a number of case studies that illustrate the practicalities involved with open access. The paper is structured as follows:

 Section 1 examines the need for open access, in particular considering the different requirements for access at different levels of the OSI reference model. It identifies the inherent tension between open access and competitive supply of networks and services, and then uses this analysis to draw conclusions on the appropriate scope of open access in the digital economy.

- Section 2 focuses on open access to network infrastructure, including passive and active elements, and discusses why open access is vital if downstream competition in digital applications and services are to be achieved. It examines open access as an *ex ante* regulatory response to the ability of an operator to exercise Significant Market Power in wholesale broadband markets and considers how the transition to digital technologies may impact the approach taken to open access.
- Section 3 focuses on open access to transport. It questions the need for traffic management and outlines the emerging policies on network neutrality.
- Section 4 considers the role of open access at the digital applications and services level, and argues that policies designed to facilitate demand through education, industry co-operation and e-Government initiatives are preferable to open access obligations at this layer.
- Section 5 concludes the paper by identifying best practice arrangements, especially for developing countries.

1.1 The need for open access regulation

1.1.1 Open access applies to physical networks

Open access is a slippery term. Several definitions exist, each implying a different extent of openness. In a paper prepared for the Global Symposium for Regulators (GSR) in 2008¹, the definition for open access was taken from *info*Dev:

Open Access means the creation of competition in all layers of the network allowing a wide variety of physical networks and applications to interact in an open architecture. Simply put, anyone can connect to anyone in a technology-neutral framework that encourages innovative, low-cost delivery to users. It encourages market entry from smaller, local companies and seeks to prevent any single entity from becoming dominant.² This definition, which dates back to2005, emphasises open access to **all** layers of the network, and suggests that vibrant competition can result from the application of open access principles. This utopian vision of access to all layers of the network, including applications and services, has yet to become reality. The emphasis of policy-makers and regulators alike has been focused on open access to physical networks:

- The Best Practice Guidelines on innovative infrastructure sharing strategies that were adopted by the 2008 GSR³ were seen as "a tool to promote infrastructure deployment, in particular IP backbones and broadband access networks".
- The Best Practice Guidelines for Enabling Open Access that were adopted by the 2010 GSR⁴ defined open access as "... the possibility for third parties to use an existing network infrastructure". The guidelines recognised two forms of open access, regulated and commercial, but again did not suggest that open access applied beyond the infrastructure level.
- Regulated open access, with a few exceptions as detailed in Section 4 of this paper, has focused on access to infrastructure, often to purely passive infrastructure (ducts, poles, towers, etc.). A typical example is that of the infrastructure sharing regulations adopted in Mozambique in 2010 (see Box 1).

Box 1: Infrastructure sharing regulations in Mozambique

The regulatory authority in Mozambique, INCM, published new infrastructure sharing regulations in December 2010 following a period of public consultation. The rules apply to all network operators and require them to provide access to passive infrastructure elements. The basic requirement is to publish a Reference Sharing Offer and then negotiate individual Sharing Agreements with Requesting Licensees. There are also stipulations concerning capacity and quality of service with the aim of ensuring equal treatment for all operators. Pricing should be fair and reasonable and based on defined costing principles.

The approach adopted by INCM gives network operators the opportunity to negotiate commercially satisfactory sharing agreements subject to regulatory guidelines. The existing operators are required to take into account the needs of new entrants, e.g. by maintaining an inventory of assets and building capacity partly based on commitments from other parties who seek access to their infrastructure.

The final regulation has yet to be published on the INCM website.

Source: INCM (www.inmc.gov.mz). Note: The final regulation has yet to be published on the INCM website



Given the current emphasis of policy-makers on the digital economy, which spans broadband networks, digital services and applications of many different kinds, two specific questions arise:

- To what extent are open access proposals of the kind foreseen by GSR08 and GSR10 being implemented in practice?
- To what extent should open access rules be applied above the infrastructure level to include access to services and digital content?

From an examination of recent theory and practice, this paper concludes 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, open access is progressively less important moving up the layers (see Figure 2), 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. Regulatory and policy objectives for Services and Applications in the digital economy should focus mostly on demand-leadership, the protection of public interests, and curbing abuse of market dominance.

1.1.2 Open access is critical for national broadband networks

The Best Practice Guidelines for Enabling Open Access adopted by the 2010 GSR re-asserted the vision and stressed the pre-requisite principles of transparency, effectiveness and non-discrimination. They also recognised that national broadband networks may present a different regulatory challenge. The Guidelines stated that:

...in order to encourage broadband deployment, preserve and promote the open and the interconnected nature of the public internet, regulators may consider mandating dominant providers of national broadband networks, including cable landing stations, to provide open access on a fair and non-discriminatory basis to their network and essential facilities for competitors at different levels of the networks.

Regulators thus recognised in these guidelines that open access is not a means to establish competition throughout the value chain, but that in some circumstances, national broadband networks being the case in the point, it is necessary to accept the existence of a dominant provider and regulate accordingly. The objective remains the same – ensuring that all users enjoy the full benefits of living in a digital era – but competition is not always the best means of achieving it. Indeed, it is precisely where competition is most limited that open access is most critical, so that competition can flourish in the other layers of network and service provision.

Recent work on open access in the European Union⁵ has also focused on the need to ensure fair and transparent access to broadband network infrastructure. The European Regulators Group (BEREC)⁶ has made the following observation:

The term "open access" has arisen in recent discussions at national and at European level on facilitating broadband roll-out, particularly in relation to the roll-out of next-generation access (NGA) networks, in order to provide European consumers with the range of innovative services that NG technology can offer. "Open access" is generally referenced in the context of competitive drivers of NGA roll-out; however, it is also often discussed in relation to the provision of additional currentgeneration broadband services in under-served areas.

These different sources illustrate that there is an emerging regulatory consensus on the requirement for open access to national broadband infrastructure. Even in the most developed markets, the scale and scope of investment required for broadband networks tend to limit the market to one dominant provider. Except in the most densely populated geographic markets, the fibre access pipes represent an essential facility or bottleneck for which duplication is neither commercialeconomically viable. Together ly nor these characteristics strongly support a thesis of a natural monopoly, and this thesis is immeasurably stronger in rural areas and developing countries'. Consequently, regulatory action for broadband networks should be tilted towards ensuring access on fair, reasonable and non-discriminatory terms, rather than towards encouraging infrastructure competition.

1.1.3 Open access needs to retain investment incentives

Open access is especially critical where broadband and NGA roll-out is supported, at least in part, by public

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funding. In such circumstances, mandated open access can play a pivotal role in promoting network investment, in preventing uneconomic duplication of resources, and in strengthening competition. European State Aid rules⁸ (see Box 2) make this particularly clear, so that the provision of public funding to broadband infrastructure projects is dependent on a commitment to open access. Although the term is never defined in European law or regulations, the State Aid Guidelines specify that open access means effective, transparent and non-discriminatory wholesale access to the subsidised network.

Where public funds are involved, open access matters because it provides the means to achieve public and not purely private benefits. Open access advances public interests by enabling maximum service competition per unit of infrastructure investment. Substantial regulatory effort is now being made to mandate open access to passive infrastructure (towers, masts, ducts, etc.) as shown in Figure 3. Infrastructure sharing can create the foundations for competitive supply of services and applications in vertically-related markets. Such competition is achieved through an equivalence of inputs, whereby any rival service provider is able to obtain access to broadband infrastructure on terms and conditions that are materially no different from those enjoyed by any of its rivals, including (if it exists) the downstream arm of the network operator itself.

However, it is equally important that open access is established in a manner that retains incentives for infrastructure investment. Care must be taken, for example, when open access is mandated as a condition of receiving state subsidies for infrastructure investment. The EU Recommendations are particularly concerned with this matter, as strict EU State Aid rules prohibit subsidy of any infrastructure that could (absent the subsidy) be provided under competitive supply conditions. In other words, State Aid must not distort the markets. This means that subsidy should be provided up to, but not beyond, the point at which the broadband investment becomes commercially viable. The means of identifying this tipping point will typically be through an auction, the successful bidder being the company that requires the lowest subsidy to public benefit ratio.

Box 2: European State Aid Rules for Next Generation Access networks

In 2009, the European Commission adopted guidelines to ensure coherent and consistent practice concerning government support of national broadband networks. The Rules describe how public funds can be channelled into broadband investments in areas where private funding is hard to obtain. Distinction is made between competitive areas ("black areas"), where no public funding is required, and unprofitable "grey areas" (where only one broadband operator may exist) or underserved "white areas" (where there is no broadband infrastructure), in which State Aid may be justified under certain conditions.

In order to prove the need for State Aid in the case of next generation access networks whose deployment is still at an early stage, governments and regulators need to take into account both existing infrastructures and concrete investment plans by telecom operators. The conditions for receiving State Aid include detailed mapping of private infrastructure, open tender processes, open access obligations, technological neutrality and claw-back mechanisms. These safeguards are specified in order to promote competition and avoid crowding out private investment, while at the same time fostering a wide and rapid roll-out of broadband networks.

Question	Answer	Africa	Arab states	Asia & Pacific	CIS	Europe	The Americas	Total
Is infrastruc-	Yes	18	12	8	1	24	17	80
ture sharing mandated?	No	13	2	14	5	11	13	58
Is co-location/	Yes	14	12	9	2	26	20	83
site sharing mandated?	No	14	2	11	2	5	9	43
Region size		43	21	38	12	43	35	192

Figure 3: Regulatory efforts towards infrastructure sharing

Source: ITU World Telecommunications Regulatory Database (www.itu.int/icteye)

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Regulators need to be wary of imposing terms for open access that are overly onerous, such as low access prices that squeeze the potential return on investment. Such onerous terms are a disincentive for potential investors in infrastructure. Moreover, to the extent that these terms reduce the return on investment, they increase the costs of the network infrastructure for private investors; this, in turn, ultimately increases the amount of public funds that are necessary to subsidize the national broadband network. In this regard, onerous terms also reduce expected payback on the public investment. Given the proven economic benefits of broadband penetration (see the World Bank research⁹ in Figure 4 and the ITU GSR 10 discussion paper on the impact of broadband on the economy 10), the policy prerogative should be to maximize investment in order to gain the economic multiplier effects. In such circumstances it is likely to be counterproductive for the regulator to drive too hard a bargain on the terms of open access.

1.1.4 Open access is not always the right regulatory tool

If the goal of open access regulation is maximizing competition at all layers of the network, then regulatory authorities need to realize that open access itself may not always be the right solution. As described above, where network investment requirements are beyond the capabilities of the private capital, the desire for open access has to be tempered by the need to support investors (including the State). At the other end of the spectrum, where a fully and effectively competitive market develops, there is no need for regulatory intervention to enforce open access rules. The only regulatory intervention that is required in such circumstances may occur ex-post using competition law principles, e.g. to prevent anti-competitive mergers or acquisitions or to prevent collusion.

In between these two extremes, the need for regulatory intervention requires careful analysis and judgement. This is particularly true in a complex value chain, as in the case of broadband service delivery, because competition might be facilitated at higher levels by a single provider being subjected to open access arrangements at lower levels. Regulators ought therefore to start their analysis at the lowest network layer, implement open access remedies as required, and then work up the layers, taking into account the likely impact of the remedies introduced in the lower layers.

This paper approaches open access on a network layer by layer basis. It does not anticipate open access at all levels. Each layer is analysed separately, with the merits of open access assessed in light of available regulated solutions at lower layers.



1.2 Open access to network infrastructure

Open access to infrastructure concerns levels 1-3 of the OSI model (physical, data link and network) and layer 1 of the open access model presented in Figure 2. This is the area in which open access is best developed and also most critical. Markets naturally comprise a value-chain, in which infrastructure facilities are provided on a wholesale basis to service providers that market them at a retail level. The process of assessing market power, described in Section 2.2 below, is based on the premise that the greatest threat of market failure is at the wholesale level and, if adequate regulatory measures are implemented at this level, then effective competition can materialize at the retail level. In other words, effective solutions at the wholesale layer can obviate the need for open access regulation at higher layers. As the European Commission puts it:

Regulatory controls on retail services should only be imposed ... where relevant wholesale measures ... would fail to achieve the objective of effective competition. By intervening at the wholesale level, including with remedies that may affect retail market, Member States can ensure that as much of the value chain is open to competition processes as possible, thereby delivering the best outcome for end-users.¹¹

1.2.1 Policy and regulatory tools

Many of the policy and regulatory tools required to achieve open access already exist and are well deployed in both developed and developing countries. A range of principles and practices exist to curb anticompetitive behaviour, typified by the EU regulatory framework¹² that has been copied and modified in many other countries. These principles and practices include:

- Transparency, including the provision of a Reference Offer;
- Non-discrimination, requiring the use of equivalent conditions in equivalent circumstances;
- Obligations to provide access, specifically applied to unbundled facilities including the local loop, and the requirement to offer co-location;
- Price controls, which may include limits to cost recovery based on specific costing methodologies such as long run incremental costs (LRIC); and

 Cost accounting obligations, including the requirement for external audits and the submission of separated accounts on an annual basis.

These regulatory obligations can be very successful in achieving open access and facilitating service competition. This is especially important in developing countries where the need for open access may be exacerbated by low demand (creating economy of scale barriers to competition) and limited supply options (creating economic bottlenecks). Infrastructure sharing regulations in Mozambique (see Box 1) provide one example of effective regulation, based on these regulatory requirements.

Regulators seeking to apply such requirements face two specific challenges:

- Typically, regulators may only impose the aforementioned obligations where there has been a determination of market dominance. Moreover, the requirements imposed on dominant operators must be proportionate to the degree of market failure that has been identified. In other words, the regulator must impose the least onerous requirement that is capable of ensuring open access.
- Many existing regulatory tools were developed during the narrow-band era and may therefore require recalibration for use in a convergent broadband environment. It is important to ensure that the open access requirements do not act as a barrier to introducing new technologies, nor act to deter future network investment.

1.2.2 Open access and market dominance

Significant Market Power (SMP) describes the power that enables a service provider to make decisions and to act independently of its competitors and customers. Typically this means the ability to raise prices or to reduce output without being concerned that a material number of customers will exercise the choice to obtain services elsewhere or that competitors will gain a material advantage in revenue and market share by winning over disaffected customers.

In such markets, there is a justification for regulators to take *ex ante* action to address or to limit the potentially harmful effects of the exercise of SMP on consumers. Waiting until after anti-competitive behaviour has become apparent may result in lasting damage to competition. In some cases, there is thus an imperative to adopt *ex ante* measures rather than to rely on *ex post* remedies. In some markets, *ex ante* intervention may take the form of regulated open access.

Before the regulator implements open access, three steps need to be taken:

- 1. The relevant market must be defined. Best practices in market definition are set out in the European Commission's *Market Analysis and SMP Guidelines*¹³. The market must be defined in product and geographical terms. The hypothetical monopolist test is a common and widely accepted approach to assessing the relevant product and geographical market. This test identifies the scope of a market by including only those products and services that may be an effective substitute either for suppliers or for consumers in the event that a hypothetical monopolist raises its prices by a small but significant and non-transitory amount.
- 2. SMP status must be established. Since SMP is concerned with the ability of a service provider to raise prices or restrict output without incurring a significant loss of sales or revenues, the assessment of dominance centres on a forward-looking market analysis based on existing market conditions.¹⁴ Market share, frequently measured by revenues, is often a proxy for market power, although this factor may not be determinative. Generally, undertakings that enjoy a large market share (normally, at least 40 per cent) will be presumed to enjoy market dominance so long as this market share has remained stable over time.¹⁵ This presumption can be rebutted, however. Other relevant factors in the assessment of SMP include barriers to market entry, market concentration, market share evolution, tariff evolution, access to funding, technological advantages, vertical integration, product/services diversification, economies of scale, economies of scope, and countervailing buyer power.¹⁶
- 3. Open access must be a proportionate response to the identified market failure. Regulatory obligations imposed on operators and services providers in response to SMP must match the risk of harm and must be the least burdensome obligation possible that will achieve the end of protecting competition in the market. Proportionality implies that it may be appropriate to impose different regulatory obligations on different operators that enjoy SMP since each of the operator's circumstances may require

varying levels of regulatory intervention. It is also important to consider what, if any, action to take in downstream retail markets where there is SMP, having regard to the actual or likely effectiveness of the regulatory obligations applied or proposed for related upstream wholesale markets

1.2.3 Adapting policy and regulatory tools for the digital era

The major difficulty facing alternative suppliers of retail broadband services is the "last mile" -- access to the customer. The standard regulatory solutions are the provision of unbundled local loops (ULL) and bitstream access, coupled with backhaul facilities from the local exchange to the alternative operator's point of presence. When supported by firm regulatory enforcement, each of these regulatory tools can encourage broadband take-up.

Regulatory economists talk of a "ladder of investment" in which access seekers may ascend one rung at a time. At first, they take bitstream access plus backhaul; then they build their own backbone infrastructure so that they no longer require the backhaul service; next, they deploy their own cables to the local exchange where, using co-location, they provide their own electronics and purchase just the unbundled local loop. They may even become wholesale providers in turn, thereby improving their network utilisation levels and overall return. Each of these steps up the ladder is relatively small so investment risk is minimized, but each rung also offers an improved return on investment and increased control over the end-user service offering.

The ladder of investment sounds good in theory, but in reality, the industry has developed around ADSL technology that may capitalize the regulatory arrangements and become a barrier to upgrading to fibresolutions. This is especially true of ULL, where the point of co-location is often located within the boundaries of the copper network. The implication is that either the dominant operator is restricted in its ability to upgrade to next generation access technology or the alternative operator is left with stranded investment, coupled with the need for further infrastructure roll-out in order to retain its existing customer base. Some regulators (e.g. in Hong Kong, China) are withdrawing from ULL for precisely this reason (see Box 3).

Box 3: Withdrawal of unbundled access regulations in Hong Kong, China

Unbundled access obligations (known locally as Type II interconnection) were introduced in Hong Kong in 1995 with the objective of increasing investment and fostering competition. A review in 2003 indicated that these obligations had resulted in significant infrastructure roll-out, but warned that there was a significant risk that continuing to mandate unbundled access may discourage additional fibre-based competitive access networks, even where these are technically feasible and economically viable.

Accordingly, the regulator OFTA started a process of phasing out ULL obligations over a four year period (completed in June 2008). Withdrawal of facilities at particular locations was subject to a two-year "grandfathering" period during which the regulated interconnection terms and conditions remained in force. Thereafter interconnection was subject to normal commercial negotiation.

Source: OFTA (www.ofta.gov.hk)

The high-density, high-value market conditions experienced in Hong Kong, China are not likely to be replicated in developing countries. Nevertheless, this example illustrates the need for regulatory caution, so that mandated open access does not restrict or inhibit movement towards full broadband connectivity and competition. In general, open access obligations should be subject to change following regulatory review after a specified time period.

The second form of adaptation to existing regulatory tools is far more relevant to developing markets. Existing tools are geared to carving up the spoils of past investment – once an investment is sunk, it is a hostage to regulation. Existing tools are not designed to deliver both new investment in infrastructure and investment incentives at the same time as open access to this same infrastructure. Competition drives both investment and open access but there is a tension between the two. In developing countries, the greater need is usually to encourage investment, e.g. in fibre backbone networks and international cable landing points. It is critically important that the terms, particularly the financial terms, of open access do not unduly dis-incentivize the necessary network investment.

Regulated access prices rarely require access seekers to bear a suitable share of the first mover risk that infrastructure providers take. Based on well-established regulatory principles, such as those of the World Trade Organisation, the access seeker is entitled to unbundled access to infrastructure so that it only has to purchase the network elements it requires. The price for these unbundled network elements invariably do not compensate the infrastructure provider for the risk associated with building a stand-alone transmission or other system in an uncertain demand environment. Standard regulatory approaches to determining risk (e.g. the computation of a weighted average cost of capital) are not up to this task.

Governments cannot mandate private investment; they can only encourage it. But open access can be a discouragement. It is therefore no surprise that governments arrange their own investments in infrastructure (e.g. in New Zealand and Australia) or provide soft loans to a generally compliant private sector (e.g. in Korea and Japan). Developing countries cannot afford this approach, so they need to establish greater investment incentives and rewards through the pricing arrangements associated with open access.

Section 2.5 below presents a profile of the government-funded approach to investment in infrastructure involving structural separation of the incumbent, drawing on Singapore's experience. Section 2.6 illustrates the approach being taken to access to international submarine cables in a number of developing countries.

1.2.4 Regulatory measures for future technologies

By definition, future technologies are uncertain. Will end-to-end fibre technology be essential for nextgeneration broadband service, or will wireless technologies have a role to play? Is wireless the only economically viable option for sparsely populated and low-GDP areas? Whatever the answers, it certainly is not the role of regulation to pick winners (a process with a chequered history and one that is increasingly futile in a fast-changing sector), nor to keep competitors afloat. The proper role of regulation is to keep as many development paths open as possible, and, in particular, to ensure that regulation itself does not create unnecessary roadblocks.

There are many questions, but no easy answers. How does the regulator intervene to achieve the fibrebased future? Is ULL an important step in developing a customer base for high speed internet access or should consideration be given to leap-frogging that step if it has not yet been implemented? What are the appropriate and yet-to-be-exercised regulatory tools to move to the next step in the investment ladder and to achieve open access to fibre-based networks? Are sunset clauses useful or do they kill off investment that has yet to be committed? The answers to such questions need to be contextualized: they depend on the extent to which copper-based networks are already deployed and the number of competitive service providers whose business models rely on access to those networks, in particular access through ULL.

In some ways, the answers are more straightforward in developing countries. A new monopoly contract may be needed in such economies (and in low demand/high cost areas of developed economies). Economic reality dictates that near-monopoly supply is going to develop, whatever licensing regime is put in place. Regulators would therefore be wise to accept the monopoly in exchange for providing open access to passive infrastructure, with a new deal on regulated access pricing to reflect actual costs reasonably incurred. Box 4 illustrates one such arrangement in Tanzania. There should be a time-limit on the charter and designated review points along the way, allowing opportunity for the regulator to change the terms of open access if necessary.

Shifting the regulatory paradigm to respond to technological advancements in the digital era has two specific corollaries:

Regulators need to establish a centralized information system, with a database accessible online, with information regarding passive infrastructure that can be shared (including paths and space available) with the respective prices oriented to costs. This was recognized in the GSR 2008 and 2010 best practice guidelines¹⁷, and has been transposed into national regulations in some countries (e.g. Mozambique). However, it can only work in practice with industry support, which in turn requires a working group to design and to implement the system to meet the needs of all service providers. Appropriate information may not be easy to obtain for historical plant, but there should be a requirement for all newly-created broadband facilities to be entered on this information system, with penalties in the case of non-compliance.

Box 4: Managing the National ICT Broadband Backbone in Tanzania

Based on loans from the Chinese Government, Tanzania embarked on a USD200m National ICT backbone (NICTBB) facility project in 2009. The NICTBB involves rolling out 7000km of a national fibre backbone, in three rings (North, South and West), as well as a metropolitan ring in Dar es Salaam. It provides a fibre optic transmission network that is being operated and managed to provide high speed broadband capability to all parts of the country, enabling businesses, schools, government agencies and households to access modern high-speed telecommunications at affordable prices. The national backbone also connects with the international submarine cables (SEACOM and EASSy) in Dar es Salaam and provides land connectivity to Tanzania's neighbours.

The NICTBB is managed by the national fixed network incumbent, TTCL, but on an open access basis. All service providers have the right to use this capacity and all (including TTCL) are supplied on the same basis. TTCL retains a management fee, which is determined on the basis of a utility-level cost of capital and a government-determined cost recovery period. Transparency of operation in relation to the NICTBB facility includes a number of requirements, namely:

- (a) Accounting Separation the accounting for Backbone operation revenues, expenses and capital costs separately from the accounts for TTCL's other business operations;
- (b) Independent audit of Backbone operation accounts;
- (c) Publication of Backbone operation accounts in a suitable format and publication of the auditor's certificate;
- (d) Equivalence of access and terms and conditions of usage for all Backbone wholesale customers, including TTCL;
- (e) Preparation of a Backbone Reference Offer from TTCL setting out the terms and conditions for access and use of the Backbone facility and services applicable to all wholesale customers; and
- (f) Publication of the arrangements and processes adopted to ensure the commercial confidentiality of Backbone customer information and transactions.

Source: TCRA (www.tcra.go.tz)

Regulators need to re-think the whole approach to assessing costs. Long run incremental cost (LRIC) has been the regulatory standard of recent years for establishing access and interconnection prices, and this pricing standard continues to be appropriate for existing networks, including broadband facilities. However, where substantial new investment in entirely new infrastructure is concerned, costs are not incremental in any meaningful sense, and the application of LRIC is liable to understate actual costs and deter investment. The problem is that LRIC assumes network build at the efficient level for actual demand, but in practice national broadband networks have to be funded on the basis of highly uncertain forecasts. Consequently, price controls, at least in the early years, may be better set on a fully allocated costing basis. Such a costing approach can still be forward-looking (i.e.

based on forecasts of costs and demand) so long as there are annual reviews allowing over- or underrecovery of costs to be clawed back. This way, the balance of incentives will tend to reward investment risk and efficiency improvements.

1.2.5 Case study: the national broadband network in Singapore

Singapore provides an example of extensive government activity and funding aimed at developing next generation access networks, with the ultimate goal of providing high speed broadband for all. A significant degree of separation among industry participants was required in order to ensure effective open access to the infrastructure by downstream operators. After extensive consultation, this separation has taken the form shown in Figure 5.



This supply structure has been designed to provide telecom operators with open access to essential facilities and is based on the following principles:

- Operational separation between Retail Service Providers and OpCo (wholesaler).
- Structural separation between OpCo and NetCo (fibre network).
- Structural separation between underlying infrastructure ownership (AssetCo) and management of the fibre network (NetCo).

At the core of the structure, NetCo is responsible for the design, build and management of passive infrastructure like ducting, manholes, poles etc. In order to make available the promised speed of 100 Mbps-1 Gbps, NetCo has to roll-out a new fibre optic network to all Singapore households, leveraging on the existing passive infrastructure (e.g. ducts, manholes and exchanges) owned by AssetCo. Starting from a 22 per cent broadband coverage ratio, this implied roll-out of new infrastructure to around 800,000 Singaporean households in less than 10 years, and full broadband coverage has now been achieved. NetCo is owned by a consortium of SingTel (30 per cent), AXIA (30 per cent), SPH (25 per cent), and SPT (15 per cent).

OpCo is responsible for the management of active infrastructure facilities like GPON, active Ethernet network elements and OSS/BSS platforms. OpCo provides wholesale network services to retail service providers, which in turn provide service to retail customers. Broadband penetration is aimed to increase from 15 per cent in 2005 to 50 per cent (between 100Mbps and 1Gbps) by 2015, with subscriber numbers increasing from 600,000 in 2005 to over 2 million by 2015. This number of broadband subscribers was, in fact, reached at the end of 2010, although many are operating at speeds lower than 100Mbps. OpCo is wholly owned by StarHub, but OpCo is operationally separated from StarHub's other activities.

In order to achieve the goal of providing broadband access to all Singaporeans using the above model, government funding was made available covering 28 per cent of the investment (USD178m over planned investment of USD664m) needed for OpCo and 36 per cent of the investment (USD513m over planned investment of USD1.42B) needed for NetCo. The remaining funding of over USD1.4 billion is to come from the private sector. The tender process for both NetCo and OpCo included a minimal funding requirement as part of the selection criteria.¹⁸ Singapore has opted for a relatively radical form of separation (i.e. structural or ownership separation) in order to ensure non-discriminatory access to essential passive infrastructure facilities. The Singaporean government and regulator appear to have come to the conclusion that the provision of passive infrastructure needed for the rollout of high speed broadband access is not prospectively competitive and acts as a bottleneck in the market. By separating ownership of these facilities from all market players (including SingTel), this approach removes the downsides of vertical integration from the market structure, though it is not clear at what operational cost to SingTel this was achieved.

Singapore, of course, is a small and affluent islandstate and, as such, cannot provide a template for countries where the provision of services to rural areas is a key policy target. Nevertheless, the approach to structural separation has recently been adopted in New Zealand, and there is no reason why it should not work elsewhere. The case of Singapore provides some interesting points for further discussion:

- Even in an affluent city-state with favourable operational circumstances (e.g., a high proportion of multi-dwelling blocks), significant government funding was needed. This suggests that in most countries, government funding may be needed to achieve a vision of this magnitude.
- Structural separation (in this case, requiring SingTel selling its passive infrastructure) may come at a significant operational cost.
- The valuation of the passive infrastructure becomes a hot topic, particularly because a low valuation results in lower funding requirements. This is a key risk to any owner of existing passive infrastructure.
- There is a risk that the market is satisfied with current speed and/or is not willing to pay a significant premium for a faster service. This is a significant market risk to both government and private investors.
- AssetCo in particular becomes an entrenched longterm monopoly in this structure, with associated risks for efficiency, customer orientation, and innovation.

1.2.6 Case study: open access to Africa Coast to Europe (ACE) submarine cable

ACE is a submarine cable system for West Africa, with landing stations in 20 countries stretching from

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France to South Africa. In each of these countries, a Terminal Party is established to operate the cable landing facility and to own and maintain the cable segments within the country, which comprise a terrestrial segment and an undersea segment from the cable landing station to the limits of national waters. The Terminal Party is composed of one or more Landing Parties, each of which makes a designated minimum investment in the ACE landing point for that country. This investment is in the range \$25-50m, depending on the aggregate number of investors. In most of the African countries, a Special Purpose Vehicle (SPV) has been established to act as the Terminal Party, and investment in the SPV may come from a number of sources, including operators, governments, and international development agencies. For example, the SPV in São Tomé is called SPTC, a limited company jointly owned by the government of São Tomé and the incumbent operator, CST. The government contributes funds into SPTC for the ACE project which originate from the International Bank for Reconstruction and Development.

The SPV in each African country has a strong position, and sometimes an effective monopoly, in the market for access to international capacity. In some countries, there is no other international access via undersea cable, and satellite access is both expensive and severely limited in capacity. This means that the SPV has the potential to act independently of rivals and contrary to consumer interests: in other words it has Significant Market Power. National regulatory authorities therefore need to act to regulate these organizations.¹⁹ Such a process has recently started in Liberia, where the regulator, the Liberian Telecommunications Authority, has commissioned a project to:

- Identify the market to which the international capacity provide by ACE belongs;
- Determine whether the Cable Consortium of Liberia (CCL – the Terminal Party for ACE) has a position of SMP in this market; and
- Introduce regulations to ensure open access to the facilities of CCL, and hence to the ACE cable, in a manner that adequately rewards the investors in CCL and at the same time ensures effective competition in international services to and from Liberia.

This market analysis process follows the EU regulatory framework and is a good example of how regulators in developing countries can adopt best practice regulation from elsewhere and adapt it to fit their circumstances.

One of the challenges faced by the Liberian Telecommunications Authority (LTA) and other regulators in similar positions is to gauge future demand for this new facility. It is relatively easy to identify capital expenditure, depreciate it over the 20-year lifetime of the cable, and add the return on capital deployed based on a regulated weighted average cost of capital (WACC) and annual operating expenditure, which can be estimated as a percentage of the capital investment. However, setting prices requires that this total cost be divided by some measure of demand, typically measured as units of committed bandwidth in E1 or STM1. The difficulty is that demand is highly uncertain and also likely to grow rapidly. If short-term demand forecasts are used to set prices, those prices will be too high and may stunt the realization of demand. If average demand over the longer term is considered, then initial prices will be below cost and the SPV risks under-recovery of investment in the event that the demand forecasts prove optimistic. Appropriate arrangements are therefore likely to involve a price cap with an annual review that allows for any under- or over-recovery to be to carried forward and influence the following year's prices.

1.3 *Open access to the transport*

Open access to transport concerns level 4 of the OSI model and layer 2 of the open access model presented in Figure 2.

1.3.1 Is regulation needed?

As discussed above, the greatest threat of market failure is at the wholesale infrastructure level. 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.

1.3.2 Traffic management

The issue of traffic management arises because demand for broadband capacity may, at least at peak periods and at certain bottlenecks in the network, exceed supply. This situation arises even in the most developed markets, as new bandwidth-hungry applications proliferate and operators cannot roll-out broadband infrastructure fast enough to keep up with this demand. Traffic management is a particular concern for mobile broadband given the constraints of spectrum availability. The long-term solution may be to build more capacity, but in the short-term, it is necessary to ration bandwidth supply. This can essentially be done in three ways:

- On a first-come-first-served-basis. This would limit the number of users who could gain access at peak periods, but those who do gain access would notice no deterioration in their service level.
- By sharing available capacity equally between all active users at any given time. This gives all users equal access to the capacity, but all of them will suffer reduced service quality during periods of high contention rates.
- By giving preferential status to some traffic streams over others. This allows for some users to pay for higher and guaranteed quality of service, while others would suffer a greater loss of service quality during peak periods.

There are no fundamentally right or wrong answers in this debate. However, some answers have been

Figure 6: Main aspects of net neutrality

deemed to be unacceptable if accompanied by evidence of market power and distortion (see Figure 6). In the US in particular, there is a strong and vocal body of opinion that claims "net neutrality" (i.e., the right of all users to equal service quality) as a sacred principle of the Internet. Others take a more relaxed approach, pointing out that it is commonplace for higher quality of service to attract a higher price, and the Internet should be no different.

Figure 6 lists the main aspects of net neutrality and summarizes the range of possible approaches as represented by regulators in the UK, France and the US. It shows that net neutrality rules affect both consumers (in terms of accessibility rights and transparency of traffic management policies) and players in the Internet value chain. In the latter case, the key questions are where, if at all, *ex ante* regulation is required and where the threat of *ex post* competition sanctions is sufficient to discipline behaviour along the value chain and prevent abuse of a powerful market position.

Principle	Ofcom position (UK)	ARCEP position (France)	FCC position (USA)
Accessibility	Pro Users have access to all legal content, services and applications	Pro Users have access to all legal content, services and applications	Pro Users have access to all legal content, services and applications
Transparency	Pro Crucial to disclose traffic management practices to key stakeholders including consumers and online service providers	Pro Crucial to disclose traffic management practices to key stakeholders including consumers and online service providers	Pro Crucial to disclose traffic management practices to key stakeholders including consumers and online service providers
Non discrimination	<i>Neutral</i> No <i>ex ante</i> regulation	Pro Not allowed to discrimi- nate against certain content, services or applications	Pro Not allowed to discrimi- nate against certain content, services or applications
Traffic management	<i>Neutral</i> Only intervene in case of clear abuse	<i>Con</i> Only engage in acceptable traffic management, e.g. for spam or viruses	<i>Con</i> Only engage in reasonable traffic management
Differentiation	<i>Open</i> Potentially possible without imposing minimum QoS	<i>Open</i> Potentially possible given minimum QoS	<i>Con</i> No price or quality differentiation

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Although traffic management is usually presented as a transport layer issue and the action that a network operator may seek to take (e.g., choking traffic and limiting transmission rates) looks like a transport measure, the motivation underlying the adoption of traffic management measures and how these measures are implemented are often about content. Certain types of content require greater or more clearly specified quality standards. For example, voice requires guaranteed continuity and video requires guaranteed bandwidth. There is also a growing concern that the platform operator may be held liable for breaches of intellectual property rights, privacy rights, or other transgressions caused by service providers on the network.

Is net neutrality desirable or achievable? Possibly, but it would be unwise for developing countries to try to adopt the purer forms of net neutrality. In such countries (at least outside the urban environment), both demand for broadband applications and supply of broadband networks are presently limited. There may be *de facto* net neutrality in place. However, demand is much more likely to outstrip supply in the coming years, simply because the barriers to growth are so much higher when it comes to building bandwidth. Some form of traffic management is almost inevitable. If implemented well, traffic management measures could provide the funds necessary for further network expansion.

At heart, the issues of traffic management and net neutrality are about the balance of power between network operators and content providers. Figure 7 demonstrates that only internet companies such as Google, Amazon and Facebook have reported any significant growth in revenues over the past 10 years. A more equal distribution is clearly desirable, not in the least so that operators can fund the bandwidth explosion that internet content requires. Traffic management is one way for network operators to force the issue. In this sense, traffic management is primarily a commercial matter, and regulators would do well to keep out of it wherever possible.



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1.4 Open access to digital services and content

Open access to digital services and content concerns levels 5-7 of the OSI model (session, presentation and application) and layer 3 of the open access model presented in Figure 2.

1.4.1 Is regulation needed?

Assuming that the regulatory measures described in the previous sections have been implemented, there is likely no requirement for *ex ante* regulation in these parts of the value-chain. Open access in the lower wholesale levels will ensure a vibrant, competitive market for digital services and applications. Service providers will be able to access the broadband network facilities that are required for distribution of their content.

Markets for digital services and content possess none of the three essential criteria for *ex ante* regulation identified by the European Commission. They do not have:

- High barriers to market entry. Service providers generally face far lower barriers to market entry compared with network operators. Although barriers for some forms of content (e.g. blockbuster movies) are significant, rival content can be produced relatively cheaply, and the Internet significantly reduces scale advantages in areas such as distribution.
- Lack of a trend towards competition behind those barriers. Competition behind market entry barriers is likely to be intense as many small providers seek to innovate and obtain a competitive edge in an open market.
- Characteristics that suggest that competition law is insufficient to control abuses of dominance.²⁰ If there are issues of dominance, they cannot be predicted in advance and are therefore not conducive to *ex ante* regulation. Any potential issues can be resolved through the application of *ex post* competition law. Examples include prohibitions on bundling proprietary software such as webbrowsers and enforced opening of operating systems.

The above suggests that the market for digital content is and should continue to be disciplined by commercial forces rather than regulatory intervention. This does not entirely preclude the role of regulation in digital services and content. Some countries identify content that is in the broader public interest and that must be available on a free access basis to end users, usually through free-to-air broadcasters, but increasingly also through a range of digital platforms. All sorts of events may be included in the list of such content, including important sporting and cultural events. This form of regulation is beyond the scope of this paper. However, regulators should note the importance of restricting the scope and scale of the content for which free access is mandated, as this type of regulatory intervention will distort the commercial contracts between network and content providers and could distort economic welfare.

The main role for governments and policy makers is to create an environment in which the creation and distribution of digital content can flourish so that the associated socio-economic benefits and industry gains can develop. This role involves a potentially wide range of incentives and support mechanisms (see section 4.2 for examples), which combine to stimulate demand and thus to achieve returns on the huge investments required in broadband networks. By getting this part right, it is possible to obviate the need for public money to be spent on network roll-out. This is a critical success factor for developing countries in particular.

1.4.2 Regulatory tools to promote digital demand

Figure 8 compares the take up and availability of broadband services in eight developed countries. With the exception of the Republic of Korea and Singapore, take-up is very much lower than bandwidth availability. This suggests that demand stimulation programs are important, and may have been neglected by regulators and policy makers.

Market players may be expected to take on many of the demand stimulation activities. But there is also a role here for government authorities. It is worth noting, for example, that the two countries with the highest take-up of broadband (Singapore and Korea) are also the countries with the most extensive government-led demand stimulation programmes. Box 5 summarizes the characteristics of the major Korean programmes and demonstrates the need for a multi-faceted approach. This is also the theme of the OECD Policy Guidance for Digital Content²¹ which suggests three broad types of regulatory action:

Policies that promote an enabling environment (e.g. stimulating digital content creation and dissemina-

tion, facilitating research and development, ensuring capital funds are available, and addressing skills shortages and training requirements);

- Enhancing the infrastructure (e.g. policies that encourage investment, improve applications, and enhance accessibility of digital content); and
- Fostering the business and regulatory climate (e.g. encouraging innovative business models, ensuring a non-discriminatory policy framework, and recognising the rights of creators and users of digital content).



Box 5: Selected Korean demand stimulation initiatives

- Establishment of an agency (the National Internet Development Agency) to promote the Internet, conduct policy
 research aimed at further developing the use of Internet, and cooperate with international organizations concerning Internet governance.
- As part of the Digital Divide Act of 2002, provided free computers and a free, five-year Internet subscription to 50,000 low-income students with good grades, and provided a further 500,000 low-incomes students with extracurricular training in computer use.
- Established 8,263 Local Information Access Centres throughout Korea where the public can access the Internet for free, distributing free used PCs to the disabled and to those receiving public assistance, and education and training programs for the elderly and disabled.
- Established "PC Bangs", LAN gaming centres in which users can play multiplayer computer games with others.
- As part of a "PC for Everyone" initiative, purchased 50,000 PCs and provided them to low-income families on a fouryear lease with full support for free access to broadband for five years.
- As part of the Ten Million People Internet Education Project, provided Internet education to about a quarter of South Korea's citizens.
- The One Million Housewife Digital Literacy Education Project trained a million housewives in 18 months. The government offered 20-hour, week-long courses to housewives for only about \$30 and provided subsidies to 1000 private training institutes across the nation.
- Established an Educational Broadcasting System, transmitting high school education programs via the Internet. Because students need broadband access in order to get their assignments and access education programs, these schemes also encourage parents to get high-speed access for their children.

Source: Author

The key attribute of demand stimulation programmes in Korea is that they fit within a master plan for developing the ICT sector. Each master plan covers a period of around five years, and includes linked measures for public and private investment (split roughly 50/50), demand stimulation, universal access and industrial policy. For example, the current master plan is the u-Korea Master Plan, Phase 2 (2011-2015), based on an ultra-broadband convergence network with speeds in excess of 100Mbps. The demand-side measures have been designed to:

- Stimulate and aggregate usage of broadband by public bodies;
- Promote and support the growth of e-commerce;
- Provide public services (e-tax, e-learning, etc.) online and educate and support consumers in their use; and
- Establish digital literacy initiatives to overcome the digital divide.

In the UK, Ofcom recently surveyed a sample from the 30 per cent of households that do not use (broad-

band) Internet to find out why.²² The results are as follows:

- 55 per cent of those surveyed do not see the relevance of the Internet or do not have the skills to access it.
- 30 per cent could not afford to pay for a PC and the monthly broadband subscription required to use the Internet.
- 14 per cent could neither afford to use the Internet nor see its relevance;
- Only 1 per cent did not use the Internet because broadband was not available to them.

Affordability is clearly a big issue (even bigger in developing countries), but is beyond the scope of this paper.²³ This leaves the questions of how to increase ICT skills and how to increase the perceived value of using the Internet. Figure 9 lists the different types of projects that government authorities have used in other countries to meet these two requirements without distorting market mechanisms.

Category	Measure
Measures aimed at disadvantaged groups	 ICT literacy programs for: unemployed people older people, e.g. to promote independent living disabled people Free PC and Internet subscriptions to low income groups
Programs aimed at schools and use the universities	ICT literacy programs for pupils ICT literacy programs for teachers Free PC and Internet subscriptions
General measures to stimulate demand	Tax breaks for purchase of PCs Deployment of broadband Internet access points in public buildings such as hospitals, libraries and government offices Grants to stimulate community deployment of next-generation access broadband Grants to set up a privately run Internet cafes Aggregation of broadband demand when public bodies procure telecoms services
Measures to make the Internet more attractive to content providers and safe for end users	Measures to prevent illegal copying and file sharing Measures to protect end user privacy and identity security Measures to remove barriers to secure e-payments while preserving security Measures to remove any unnecessary restrictions on access to Internet applications and content Measures to protect children using the Internet from harmful content

1.5 Conclusions

This discussion paper has highlighted the importance of open access regulation in the digital economy and the key issues to be addressed by regulators, especially in developing countries, when implementing open access. From a review of theory and practice, the following conclusions may be drawn about "best practices" in open access:

- Open access is critical for facilities that have the characteristics of economic bottlenecks, i.e. facilities that cannot be economically duplicated.
- In the digital economy, the scale and scope of investment in national broadband networks means that these resources cannot be viably replicated, so open access is necessary.
- Where public funds are committed to broadband infrastructure investment, there is further justification for open access arrangements to maximize the economic benefits across as broad a base of users and suppliers as possible.
- The terms of open access should allow fair and equivalent access for all digital service providers,

but they should also provide a reasonable rate of return for the infrastructure owner and manager.

- Open access is not an economic requirement in the transport and content layers: competition can thrive in these layers if open access is ensured at the infrastructure level.
- Traffic management may be required to establish an economic balance between the supply of bandwidth and the demand for applications that use this bandwidth. However, this is primarily a commercial matter, and *ex ante* regulation is not generally required.
- There remains an active role for policy makers and regulators, to create the environment in which dynamic digital content creation, dissemination and maintenance can thrive.
- Countries with mandated open access to broadband infrastructure supported by government-led initiatives to stimulate demand will be in the vanguard of the digital economy.
- The above conclusions apply with greatest force in developing economies where competitive markets are more fragile and their future success is dependent on supportive policy and good governance.

- ² InfoDev, "Open Access Models: Options for Improving Backbone Access in Developing Countries" (2005) at www.infodev.org/en/Publication.10.html
- ³ *GSR08*, "Best Practice Guidelines on innovative infrastructure sharing strategies to promote affordable access for all" (2008), at www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR08/PDF/GSRguidelines08_E.pdf
- ⁴ GSR10, "Best Practice Guidelines for Enabling Open Access" (2010), at <u>www.itu.int/ITU-D/treg/bestpractices.html</u>
- ⁵ See the Commission Recommendation on Regulated Access to Next Generation Access Networks (2010), at http://ec.europa.eu/information_society/policy/ecomm/library/recomm_guidelines/index_en.htm
- ⁶ BEREC, "Report on Open Access", February 2011, at <u>http://erg.eu.int/doc/berec/bor_11_05.pdf</u>
- ⁷ Although competitive infrastructure provision is viable in urban and metropolitan areas see the discussion in www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR10/documents/GSR10-paper1.pdf, p28.
- ⁸ European Commission, "Community guidelines for the application of State aid rules to the rapid deployment of broadband networks (2009), at <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OI:C:2009:235:0007:0025:EN:PDF</u>

¹ Cohen Tracy & Southwood, Russell, "Extending Open Access to National Fibre Backbones in Developing Countries"; ITU (2008) at www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR08/documents_presentations/Session_5_Cohen.pdf

- ⁹ World Bank, Information and Communications Development, 2009, p6 at http://issuu.com/world.bank.publications/docs/9780821376058
- ¹⁰ ITU GSR 10 discussion paper on the impact of broadband on the economy, by R. Katz, at: www.itu.int/ITU-D/treg/Events/Seminars/GSR10/documents/GSR10-paper1.pdf
- ¹¹ 2007/879/EC, "Commission Recommendation on Relevant Markets"
- ¹² European Commission, Access Directive 2002/19/EC at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0007:0020:EN:PDF
- ¹³ EC2002/C165/03 at <u>http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2002:165:0006:0031:EN:PDF</u>
- ¹⁴ European Commission, Market Analysis and SMP Guidelines, ibid.
- ¹⁵ *Ibid.* at para. 75.
- ¹⁶ *Ibid.* at paras. 78-80.
- ¹⁷ GSR 2008 Best Practice Guidelines on innovative infrastructure sharing strategies to promote affordable access for all,(2008) and *GSR10*, "Best Practice Guidelines for Enabling Open Access" (2010), at www.itu.int/ITU-D/treg/bestpractices.html
- ¹⁸ All figures quoted in this profile are sourced from IDA.
- ¹⁹ Guidelines for this purpose have been published by the West African Telecommunications Regulatory Authority (WATRA) at: www.itu.int/ITU-D/projects/ITU_EC_ACP/hipssa/events/2010/WA5.2.html
- ²⁰ In developing countries, competition law is often not well developed, so a lower evidence threshold may apply in these cases.
- ²¹ OECD, Policy Guidance for Digital Content, 2008 at <u>www.oecd.org/dataoecd/20/54/40895797.pdf</u>
- ²² See Ofcom, Accessing the Internet at Home, 2009 at http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbathome.pdf
- ²³ Readers are referred to the following papers for *info*Dev (2010) material on improving affordability of broadband connectivity: "Building broadband: Strategies and policies for the developing world" at <u>www.infodev.org/en/Publication.756.html</u> and "Broadband for Africa", at <u>www.infodev.org/en/Publication.526.html</u>.

GSR 2011 Discussion Paper

Strategies for Financing Universal broadband Access



Work in progress, for discussion purposes

Comments are welcome! Please send your comments on this paper at: <u>gsr@itu.int</u> by 7 October 2011.

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1 THE MORE THINGS CHANGE, THE MORE THEY STAY THE SAME: STRATEGIES FOR FINANCING UNIVERSAL BROADBAND ACCESS

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1.1 Executive Summary

Chatting, tweeting, blogging and browsing are becoming the norm for the 1.6 billion users globally who were able to access Internet in their homes by the end of 2010.¹ However, over five billion people have never experienced the Internet, let alone participated in the impending "broadband revolution" or have only experienced it through public or shared access. The mobile voice story however is very different. Mobile voice and SMS, now considered "basic" in many countries are available to over 90 percent of the global population, and 80 percent of people living in rural areas.² The challenge in this area relates to affordability.

While countries strive to close the ever narrowing mobile voice gap, and start to grapple with access to Internet, they are also forced to tackle a new development in the ICT sector – the emergence of high speed broadband networks.³ It is anticipated that a 'broadband revolution' will facilitate access to information carried over high speed networks, yet today broadband only reaches a small segment of the global population. The disparity in broadband⁴ access is wide. Penetration sits at 34 percent and 36 percent in North America and the European Union ("EU") respectively. This can be compared to 3.4 percent in Latin America and the Caribbean, 1.7 percent in Sub Saharan Africa and 0.1 percent in South Asia⁵ – mind the gap!

In light of the divides that still exist across technologies (e.g. mobile, fixed, Internet, broadband), across regions and within countries, universal service and access, an old concept, which seeks to narrow the divide between the haves and the have-nots, has

unfortunately, not lost its relevance. It is however time to reassess it. With two decades of experience with shared access, infrastructure funding, end-user subsidies, and most importantly market reform, the time is ripe to critically consider what strategies have worked and those which have not, particularly with respect to universal access funding, which remains a key challenge. This will enable the development of effective strategies to tackle the challenges posed by low levels of affordability and insufficient rollout of networks in "high risk," rural and remote areas on the one hand; and take advantage of the opportunities in technology, presented by advances and developments in society on the other.

This paper deals briefly with universal service and access concepts and principles, but is concerned primarily with the financing of universal access. As a starting point, that a public financing mechanism is introduced in a liberalized market indicates the existence of a market access gap - a gap between what the private sector can deliver and what is needed by the public - arrived at through a thorough analysis of the relevant market based on national definitions of universal service and access and agreed targets in a country. The premise of universal access projects is that they are deployed in high risk areas or to low income users and communities where without a financial incentive to invest, operators or other suppliers will not provide the services. As such, creative public or public private partnership ("PPP") financing models are required to encourage the rollout of networks and services in such areas and in so doing meet the socioeconomic objectives of the country.

Table 1: Mind the Gap, Access across the World, 2010					
Region	Internet Subscriptions	Mobile Broadband (Active) Subscriptions	Fixed Broadband Subscriptions	Mobile Cellular Subscriptions	
Africa	10.8	2.5	0.2	45.2	
Arab States	24.1	10.2	1.9	87.9	
Asia & Pacific	22.5	7.5	5.5	69.2	
CIS	34	11.2	8.3	134.8	
Europe	67	41.3	23.8	117.7	
The Americas	50.7	24.1	14.2	94.5	
Source: ITU Key Global Telecom Indicators for the World Telecommunication Service Sector www.itu.int/ITU- D/ict/statistics/at_glance/KeyTelecom2010.html					

This paper begins with a discussion of the scope and objectives of universal service and universal access, particularly in an age of broadband and Next Generation Networks in Section 2 and notes that despite shifts in society and technology, in many ways, the more things change, the more they stay the same. Section 3 considers the policy and regulatory building blocks that should be in place in order to facilitate the execution of sustainable universal access strategies, and the establishment of viable and credible options for funding universal access through a combination of public and private funds.

Section 4 of the report starts to look specifically at the funding models that exist; while Section 5 considers the question of how such funding can be structured through equity investments, PPPs, and various types of financial incentives and subsidies. It also considers what scenarios are appropriate for the different models of funding in Section 6, i.e. funding to stimulate supply or demand. In section 7, the report discusses Universal Service and Access Funds, one of the most popular funding models that has been employed, however with mixed results. The strengths and weaknesses of USAF models and approaches are discussed with the intention of providing lessons for other types of funding based on subsidies and incentives. Finally, in Section 8, the approach to measuring the success of a funding strategy by assessing its "return on investment" is canvassed.

1.2 Contextualizing universal service and access

"Universal access" and "universal service" (jointly "UAS") are age old concepts that predate the information and communications technologies ("ICT") sector. According to the International Telecommunications Union ("ITU"), Universal Service means that every household or individual in a country has the opportunity for telephone service.⁶ Universal Access means that everyone in a community can gain access to a publicly available telephone, although not necessarily in their homes. While the basic notions have stood the test of time, the concepts are evolving in light of changes with respect to technology (i.e. ICT has move beyond the 'telephone'), applications (i.e. offerings other than simple voice) and society (the development of highly mobile populations, increased urbanization, globalization, and increased levels of education in most countries).

This part of the paper looks at some of the changes in UAS principles and approaches over the past 20 years and notes that UAS is firmly rooted in the market liberalization context and that despite the changes in the environment, its rationale is fairly consistent.

1.2.1 The More Things Change...

1.2.1.1 Expanding the Scope of Universal Service and Access

Over the past two decades, the scope of universal service and universal access, which describe the level of ICT inclusion has widened. Historically inclusion related to basic voice (including access to emergency services and access for people with disabilities); today however it is increasingly being re-conceptualized to include Internet – and even broadband – and to address issues around digital inclusion.

Box 1: Broadband as part of the UAS Strategy

Today, over 40 countries include broadband in their universal service or universal access definitions. These include:

- In February 2000, the Estonian *Riigikogu* (Parliament) enacted the new Telecommunications Act, adding Internet access to its universal service list. It has also been indicated that internet access is a legal right.
- India was one of the first countries to include broadband in the mandate of its universal service fund in 2006.
- The United States which has had a complete re-think of universal service financing; now the universal service fund has helped increase broadband penetration by providing funding for new lines in rural areas.
- In 2001, Greece amended its Constitution to provide that all persons have the right to participate in the Information Society. The State is obliged to facilitate access to electronically transmitted information, as well as to the production, exchange and diffusion of information.
- In Switzerland broadband has been included in the scope of the Universal Service Obligations since 2008 the universal service provider charged with USO must provide a broadband connection to the whole population, via DSL or satellite or other technologies (at least 600 Kbit/s downloads and 100 Kbit/s uploads, and monthly subscription < CHF 69).
- In Finland broadband access is a legal right and recent national legislation extended USO to cover broadband with the objective of a basic 1Mbit/s broadband connection available to all by 2011.
- Similarly, the Constitutional Court of Costa Rica declared internet access a fundamental legal right in September 2010. The government has thus been urged to adopt the necessary measures to promote its universal service in the country.⁷

Source: Author, based on Press Releases and Articles

The scope of universal service and access varies across countries that are at various stages of development with different, social, political, technological and institutional contexts (see Figure 1). The basis for including a particular service in the scope of national definitions of "universal service" and "universal access" is generally related to the uptake of the service in society in general and its importance in order for people to participate meaningfully in society. To remove the subjectivity from this decision, the 2002 EU Universal Service Directive provided that in order to be included in the scope of a UAS policy, a service has to satisfy two tests:

- In the light of social, economic and technological developments, the service has the ability to become essential for social inclusion; and
- (2) Are normal commercial forces unable to make the service available for all to use?

Meeting just one of the two criteria is not sufficient. As early as 2006, mobile telephony was considered but not included in the scope since although it met the first test, i.e. it had become essential, it failed the second – normal commercial forces were able to make the service available in the EU. At the time, broadband was also not eligible for inclusion in light of the fact that in 2006 absence of access could not be said to imply social exclusion given the low level of broadband penetration in Europe. There have however been shifts in this approach in Europe; recently in France proposals have been made for the government to develop a social tariff for broadband internet access for low income households. French draft legislation entitled Reinforcing the Rights, Protection and Information of Consumers, proposes the implementation of a social tariff through a labelling regime to make consumers aware of ISP products and services that form part of the tariff scheme.⁸

In a developing country context, mobile voice services would pass the first test, and only in certain rural and underserviced areas would it not pass the second test. Therefore although UAS strategies include mobile voice, they should be limited to areas where the gap exists. The reality is that using innovative means, 2G and more recently 3G mobile networks, service and applications have done wonders for access to ICTs. In fact, in developing countries they are being used to achieve many of the same functionalities that broadband enables including banking, mobile money and now e-commerce in Kenya, Bangladesh and Afghanistan. Whilst consumers would get a better experience from broadband, it is far from being a requirement for social inclusion and commercial forces have yet to be given time to deliver in light of pending mobile broadband spectrum licensing processes.

In many developing countries, where initial universal service and access targets have yet to be met, the challenge of universal broadband access is being tackled alongside the challenge of ensuring access to more basic services including affordable voice and Internet using narrowband networks. The debate around whether or not to include broadband in the scope of UAS is an important one. The inclusion of broadband in both developed and developing countries is not based on the fact that it is already 'essential' but rather on the *potential* that it will become essential in light of the potential socio-economic benefits. Governments are increasingly recognizing the critical role of broadband and the Internet - the belief is that the benefits for society as a whole appear to be much greater than the private incentives to invest in high speed networks.⁹ In addition, the benefits of broadband are reaped when there is a critical mass of users.¹⁰

The economic and social impact of broadband is well researched and documented. An increase in broadband penetration is said to have a greater impact on economic development than a concomitant increase in access to other telecommunications services that preceded it, including 2G mobile. Recent research on the impact of broadband argues that in low and middle-income countries every 10-percentage point increase in broadband penetration accelerates economic growth by as much as 1.38 percentage points.¹¹ In addition to the economic impact, the network externalities resulting from broadband penetration include the promotion of access to information - thus promoting transparency and good governance; innovation, the growth of service industries, job creation and employment, the mass customisation of products and new forms of commerce and financial intermediation.¹²

1.2.1.2 Facilitating Demand as well as Supply

That said, in developing countries it has to be understood that broadband for all is a long term strategy and the main beneficiaries, in the short term, of the broadband revolution will be businesses. Because broadband networks need to generate traffic to lower their costs and increase their profitability, and in light of the fact that broadband is an ecosystem in which users play a central role, stimulating demand is 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. Demand side interventions include funding access to content, applications, services and even training. This is important to promote digital inclusion. As with the evolution of 2G and 3G, it is recognized that broadband for the mass market, accompanied by low cost services and importantly devices, will be introduced over time and only as operators, vendors and equipment manufacturers broaden their consumer markets.

1.2.1.3 Reconsidering Approaches to Funding

Universal Service funding trends have changed along with the ICT environment in which they are practiced. Most of the changes are related to the impact of the introduction of competition and market reform on the sustainability of funding models that prevailed in a monopoly or duopoly environment. The initial practice of promoting universal service through the cross subsidization by monopoly operators of line rentals and local call charges using revenues derived from more pricey international and long distance calls in an era that pre-dated rate rebalancing, gave way in the mid-1990's to the establishment of a first generation of Universal Service Funds mainly for supporting access to basic voice and public telephony in developing countries like Peru and Chile. As competition increases, reliance by incumbents on access deficit charges to fund 'uneconomical' areas has since been found to be unsustainable, as have asymmetric interconnection charges to promote rural operators, in many cases.

The first generation Universal Service Funds have paved the way for more modern Universal Service and Access Funds ("USAF" or "Fund") which recognize the important role of competition and no longer assume that the fixed line incumbent is the sole (or even necessarily any) universal service provider. India, Chile, Brazil and the United States have reviewed their Funds to broaden their scope to enable them to take a converged approach.¹³ The newly conceptualized Funds rely increasingly on an Output Based Aid approach to funding to ensure transparency, fairness and the efficient and effective delivery of UAS objectives.

1.2.2 The More Things Stay the Same?

Notwithstanding the changes in the ICT market, particularly the broadening of the scope in many countries and the increased focus on demand side considerations in designing universal service and access projects, the fundamentals of universal service and access have not changed. In particular, some of the constants include:

- Availability, affordability and accessibility -are still the pillars of UAS;
- Market reform and good regulation remain the foundations for UAS policy and strategy;
- UAS interventions have to be competitively and technologically neutral; and
- The UAS funding question persists.

1.2.2.1 The three pillars underpinning universal service and access – availability, affordability and accessibility – remain critical

Infrastructure still needs to be available in inhabited parts of the country through public, community, shared or personal devices – i.e. where people live, work and play. Additionally it needs to be accessible to all people, regardless of location, race, gender or disability. All consumers should be able to afford communications services. In addition, "awareness" and "ability" are fast becoming central tenets of universality as the Internet and broadband services are included in the scope of universal service and access *enabling the use* of ICTs is a factor.

1.2.2.2 Market reform and liberalization should be the first step to meeting US/UA targets.

The principle that good regulation and market reform are the first approaches that should be taken to achieving universal access remains unchanged. The "mobile miracle" has clearly demonstrated the potential of the private sector to deliver services where demand warrants it. Regulatory strategies supporting UAS such as the promotion of infrastructure sharing, the reduction in interconnection rates, the lowering of taxes on services and device, and the issuing of spectrum at reasonable fees, should complement private action to address gaps. The traditional market gap analysis described in the Figure 1 is therefore still relevant, although the size of the gap may vary across technologies, especially in low income countries (Figure 2).

Universal service and access financing still assumes that as a first step, policy and regulatory strategies have been put in place to create an environment which promotes access in the "market efficiency gap" where network reach is commercially viable. Strategies and funding should focus on areas like the "smart subsidy zone" where there is or is likely to be insufficient competition with respect to the rolling out of networks and services unless a one-time subsidy is provided, and the "true access gap" where on-going financial support is required in order for the area and beneficiaries to be served.

1.2.2.3 Universal service and access interventions should be competitively and technologically neutral and should not distort the market.

Using a market gap analysis assists to ensure that USOs and USF financing are not employed in competitive market segments. In the case of Next Generation Networks and broadband projects (whose deployment is still at an early stage, yet it is critical that the public has access to the services on an urgent basis for them to participate effectively in society), assessment of market access, efficiency and true gaps alone will not lead to the identification of areas needing attention. The EC recognizes that these high investment networks tend to profitably cover only part of the population since they are demand driven and more likely to be rolled out in high demand areas including urban areas, densely populated regions and areas with high income users.

To guide broadband investment, which tends to be investment *ahead* of the market, the EU has published State Aid Guidelines which follow a colour-coded map of areas that should be awarded funds. The State Aid rules cover any form of public funding, including subsidies, tax rebates and, in some cases, the public ownership of firms. State ownership constitutes state aid when equity participation or capital injection by a public investor does not have sufficient prospects of profitability.¹⁴

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Areas with no broadband infrastructure are considered "white," those with one network are classified as "grey" areas, and "black" areas have at least two or more broadband network providers. Funding in "black" areas is unlikely to be justifiable in light of existing competition (Figure 3). As in the case of the market gap analysis, when making public investment decisions, countries have to take into account not only existing NGN infrastructure but also concrete investment plans by telecom operators to deploy such networks in the near future. The rules prohibit any form of public funding that distorts or threatens to distort competition in an attempt to ensure that public participation does not crowd out private investment. In fact, it must also not crowd out the government's own market reform process and initiatives.

Box 2: When to provide public funding for broadband, EU example

To ensure that funding does not distort the market, the EC Criteria for Determining an Areas Eligibility for State Aid for Broadband is:

- White areas: no broadband infrastructure exists and none is likely to be developed in the near future. Support measures for broadband deployment in these areas are most likely to be considered compatible with state aid rules;
- Grey areas: only one broadband operator exists. Measures may be compatible if no affordable or adequate services are offered or are likely to be offered to satisfy the needs of citizens or business users and if no less distortive measure is available. The Commission accepts that state aid may be the only alternative where the area is underserved and the inherent profitability of investment is low;
- Black areas: at least two or more broadband network providers are present and broadband services are provided under competitive conditions. Any state intervention in these areas will be viewed negatively as there is in principle no need for intervention, unless the member state is able to establish a clear market failure.

Source: Author and Communication from the Commission – Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks (<u>http://eur-lex.europa.eu</u>)

1.2.2.4 The question of how to fund universal service and access persists

The age old question of how to finance the deployment of networks and the provision of services, whether narrowband or broadband, in underserviced areas and to underserviced communities remains. The general consensus has not changed - private capital should first be used to address the gaps identified. However, increasingly, in light of the greater financing requirements of Next Generation Networks, and also bearing in mind the drying up of liquidity following the 2009 global financial crisis, there is a return to public funding. Three particular models continue to stand out – equity investment, private public partnerships ("PPP") and financial incentives (See Section 5.1, Public Funding). 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. Notwithstanding this, the rules for and principles underpinning such funding, as will be explored in this paper, remain the same.

1.3 Flavours of Public Funding

There are many 'flavours' of public universal access financing. Public funding can be done solely by governments or in collaboration with NGOs, donor organizations, and the private sector which have jointly and separately been financing ICT sector investment for decades. It is important to note that there are a number of different funding partners and vehicles available to fund universal access projects and the appropriate structure and partners depend on the type of project and its objectives in many cases. *No single* funding model is appropriate for all universal access projects, or for all countries.

The shift away from the role of governments in providing infrastructure to private sector participation as the main way of structuring and funding the ICT sector in the 1980's was premised on the fact that the public sector had competing priorities for funding coupled with the belief that the private sector could:

- Better handle risks associated with high value and long term investments which are characteristic of ICT infrastructure projects;
- Secure debt and/or equity sourced from a variety of investors whose main interest would be to increase take up and usage to drive revenue from services which will contribute to their return on investment.
- manage the complex structuring, funding and contracting arrangements related to infrastructure rollout
- ensure efficient delivery of services, particularly in a competitive market

Left to commercial forces the market has delivered well in some areas, and has failed to reach others. An important nuance in UAS funding is that the failure of the private sector to deliver on its own does not necessitate the public sector "taking over" the commercial function of service delivery. Rather, it necessitates the public sector developing 'in cash' or 'in kind' strategies to incentivize its telecommunications operators to deploy networks and provide services (i.e. "play"/in kind) or to provide funding for willing operators to address those markets (i.e. "pay"/ in cash).

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

There is, however, a specific universal service and access framework checklist that will facilitate the selection of an appropriate funding model. The minimum policy and regulatory decisions required in this regard are:

- (1) Any legal requirements relating to public financing mechanisms should be considered. Examples include EU State Aid Rules, South Africa's PPP Manua¹¹⁵, the legal scope and mandate of a USAF if one is in place, and national or municipal supply chain regulations that would apply to ICT sector procurement;
- (2) Country specific definition of "universal service" and "universal access;"
- (3) Determination of national targets with respect to UA and US; and
- (4) Determination of access gaps¹⁶ and a related decision on what constitutes "underserviced areas" and who are eligible beneficiaries.

The above four decisions provide parameters for the public funding of universal access projects and a "roadmap" for project financiers to assess the relevance of projects in the context of the legal and policy context, and defined socio-economic objectives. The first criterion relates to the legal mandate of the financing mechanism, and any rules surrounding the public funding of ICT. It is probably the most inflexible of the identified criteria. Quite simply, projects that fall outside of the legal mandate or scope of the Fund or other forms of public funding cannot be eligible for financing.

The other three criteria exist in visions, strategies and policies and can evolve over time. An understanding of UAS definitions, targets, and identified gaps assist funders with the prioritization of projects. For example, if universal access (as opposed to universal service) is defined as a priority in a country, and it is furthermore defined as access to voice and data services through Multi-Purpose Community Centres; then projects geared at meeting this objective can be considered eligible for financing, and would be prioritized ahead of projects that enable personal access through, for example the provision of subsidies to categories of individual users.

1.3.1 Public Funding: In Kind and Indirect Contributions

Governments have a range of instruments at their disposal to narrow market gaps or accelerate roll-out of broadband. In a way, governments too are faced with a decision on whether to pay in cash or in kind. Instead of playing in the market, and thus risking distorting it, it is government's primary role to make an "in kind" contribution in the UAS policy space. The government need to put in place institutions, policies, rules and regulations to promote competition which will enable operators to play their role in providing services and thus indirectly fund universal service and access. Regulatory and policy approaches that assist in lowering capital and operational costs include regulations relating to–

Tax breaks and discounts – Governments indirectly fund the provision of universal service and access by making interventions that directly affect operators' cash flow, such as allowing for lower or deferred license fees, and providing tax incentives. In 2003, Kenya's Department of Finance, in line with measures taken in Tanzania and Uganda zerorated tax on all computers and other ICT equipment imported into the country. In the 2009/10 financial year Kenya's government furthermore took bold moves in the 2009/10 financial year and committed to allowing ISPs to offset against their taxable income the costs incurred in acquiring the right to use undersea cables over a 20 year period, provided tax deductions of 5 percent on software; and exempted all handsets from VAT.¹⁷ These incentives should stimulate the supply of computers, reduce costs and increase PC penetration to stimulate broadband use.

- Infrastructure sharing Australia, Saudi Arabia, Tunisia and Nigeria facilitate infrastructure sharing as a way of ensuring effective use of existing networks, and encouraging the entry of new players. It is mandated in countries like Greece, Italy, South Africa and Spain. In India, it has been specifically linked to the universal service and access tendering process, with TRAI recommending in a 2007 study that operators installing base stations in rural or remote areas should be offered a one-time subsidy from the USOF provided the installed infrastructure is shared with at least one other operator.¹⁸
- Facilitating access to rights of way As much as 70 percent of the upfront costs of constructing fibre optic cable networks are related to civil works.¹⁹ Governments can lower the costs of accessing public infrastructure such as roads, pipeline or electricity transmission lines through reducing fees, providing clear and rapid application processes for rights of way, and also by entering into Private Public Partnership arrangements with operators where state owned entities in the

electricity and railway sectors, for example, own rights of way ad infrastructure.

Assigning spectrum - timely assignment of spectrum is key to enabling the delivery of universal service and access, particularly in light of the fact that the solution to ICT access to date has been primarily mobile. In many developing countries and especially in rural areas, it is likely that wireless broadband will continue to outstrip fixed. Assigning spectrum through flexible allocations which are technology and service neutral is important for enabling last mile access. This should be done through open and transparent licensing processes, in some cases coupled with an obligation to provide access in rural areas and to underserviced communities, will facilitate universal service and access. Broadband Wireless Access (BWA) spectrum has been linked to the provision of services in rural areas in Peru where the regulator, OSIPTEL, allows high powered use of the 2.4 GHz band for wide area Wi-Fi in rural areas.

Government's response to universal service is not black and white. "In kind" or policy interventions as discussed above are a first option and can enable operators to conduct business in a cost effective and stable environment, but governments can also 'pay.' The German model (Box 4) demonstrates that in some countries governments can 'play' through regulatory incentives as well as 'pay' through financing broadband.

Box 3: Electricity Company & Infrastructure Sharing, Kenyan case

Kenya Power and Lighting Company (KPLC) was granted a Network Facility Provider licence (Tier 2, with regional spectrum) by the regulator enabling it to construct, install and operate an electronic communications system which may in turn be leased to licensed operators. KPLC has indicated that it has 18 pairs of fibre for leasing and has so far leased three through infrastructure sharing agreements signed with licensed operators Safaricom (20 years), Wananchi Group (5 years) and Jamii Telecoms (5 years) signed in 2010. The agreements allow them access to KPLC's fibre optic network that runs on the national electricity grid. KPLC's model enables ISPs to connect to them to reduce their time to market, and the need to duplicate costly broadband infrastructure.²⁰ Their infrastructure sharing model provides a supplementary revenue stream for KPLC. The three infrastructure sharing contracts signed to date are worth KES 828 million (USD 7.2 million) and may potentially provide access to 1.3 million customers on the national grid.

Source: Author based on Jamii Telecoms Press Release, March 2010 (http://jamii.co.ke/home/?p=235)

Box 4: Broadband Financing in terms of the German Broadband Strategy

In Germany, broadband expansion is to be done through:

- Capitalizing on synergies in infrastructure construction across the country
- Guaranteeing supportive frequency policies
- Committing to growth and innovation-geared regulation
- Providing appropriate financial support

As with all financing, broadband financing in Germany exists in the policy and regulatory context. Funding it to meet national targets and as such is for two purposes – (1) connecting households without broadband access; and (2) connecting households with broadband access below 1Mbit/second. The maximum subsidy is 200,000 Euros per project; up to 90 percent of the profit gap can be funded. In addition, funding can be made for technical and consulting services obtained from third parties – a maximum of an additional 100,000 Euros is available for this per project.

In the general fiscus, there is a scheme enabling people to claim tax deductions for laying cables to homes – the plan is to expand this to any installations connecting broadband to buildings and distributed within houses and apartments.

Source: The Federal Government's Broadband Strategy (Germany)²¹

1.3.2 Public Funding: Cash Contributions



The fact that public money is being used to find ICT deployment means normal funding mechanisms have failed. It means that internally generated funds, equity contributions (in exchange for shares), debt funding through commercial banks, vendor funding, and partnerships with donor agencies²² have not delivered and need to be combined with government support to be present. Importantly it does not mean that they have to be *replaced* by public money. In some cases public support through loans, partial equity and government guarantees to enable traditional funding mechanisms to work. The failure of the private sector through these mechanisms necessitates that for 'high risk' or 'unprofitable' areas or to address certain categories of users, public money must be used.

1.3.2.1 Allaying fears, keeping public funding neutral

It is important to recognize that where underserviced areas that are considered uneconomic to serve or where there is little or no existing infrastructure are properly designated, government participation as an investor is less of a concern. Hence the importance of defining these areas upfront (through public consultation) and designing Universal Access Programmes that set out clear objectives and targets so that it is clear that public funding is not conflicted. Uganda's Rural Communications Development Fund Programme²³, and Canada's Broadband for Rural and Northern Development Pilot Program²⁴ are examples of programmes that are designed upfront and agreed to, clearly identify their socio-economic objectives and as a result do not generally attract much criticism from the perspective of their policy objectives.

Government loans and grants – and, for that matter, any type of public financing -become more problematic when the effect of the financing may be to distort competition. Where public funding is used to develop networks and services in areas with existing networks, there is generally more resistance to such approaches. This is not to say that such funding is always anticompetitive; however where this is the case, primarily in the case of the funding of broadband networks, clear guidelines are needed as set out in the European Union where countries have agreed to provide public funding for broadband in terms of Europe's Recovery Plan. Public funding has to be provided in accordance with Guidelines on the application of EU state aid rules to public funding of broadband networks²⁵.

1.4 *Public Funding Models*

Government financing of universal access networks includes at the most 'intrusive' level of support equity participation, as well as other mechanisms such as subsidies, grants, loans, and guaranteed purchase of services. Three main models of public or government funding for universal access are:

- Ownership or Equity Participation in broadband projects, as seen in Australia, Brazil, New Zealand, Malaysia, Sweden and South Africa;
- Public Private Partnerships, such as the broadband infrastructure deployment projects undertaken in France, Thailand, Kenya and Tanzania; and
- Provision of financial incentives and subsidies as seen in many Latin American countries through the use of first-generation Universal Service Funds, and also as seen in China, Japan, the USA and EU through broadband stimulus packages.

1.4.1 Ownership or Equity Participation

The government 'ownership or equity participation model,' in terms of which government plays a direct role in the rollout of infrastructure, is an approach that in many ways seems the antithesis of the privatization efforts that have accompanied market reform and liberalization in many countries. Investing equity involves cash contributions up front that may be recovered in the long run (e.g., as dividends) to the extent that the ventures are commercially successful. In this model a public company, for example a national or municipal utility, undertakes the construction and the operation of the broadband network.

In Australia the government has deployed and operates a national broadband network, and has committed A\$46billion in funds for this project, the highest public funding commitment globally (See Figure 3).²⁶ The national fibre to the home (FTTH) network will provide wholesale services on an open access basis. In Sweden, a state owned fibre backbone is combined with municipal networks. Brazil's model sees the government owning the fibre backbone and being a retailer of last resort as well. In the South African case, the national signal distributer has had its mandate increased to include being a national broadband network, in addition, under the Department of Public Enterprise, and national infrastructure company has been established and its ability to provide retail services has been debated and currently not included in its mandate.

The government ownership model sees government taking the investment 'risk' usually reserved for the private sector. The risk however is related to the return. If government's desired return is related to social and economic objectives, rather than a financial return on investment, then the risk relates to the non-achievement of those objectives such as universal access, job creation and increase productivity. However, in light of the liberalization of the sector and the fact that the return is normally defined in terms of financial return which in turn impacts sustainability, then one of the core principles of public investment is that such risk should not be managed using tax payers money.

1.4.2 Private Public Partnerships

The role of Public Private Partnerships in the development and implementation of universal access projects is recognized as an effective means of achieving universal access objectives. PPPs recognize the broad range of skills, expertise and resources needed to successfully execute universal access projects whether they are telecentre projects or higher investment fibre networks. As narrowband and broadband internet access begin to fall within the scope of universal access definitions and targets these partnerships have begun to include more than just network operators and government; PPPs now include equipment suppliers, vendors, manufacturers, academics, civil society and communities. This is in recognition of the fact that increasingly, in underserved areas, bottom up approaches to project development and implementation are key.

1.4.3 Financial Incentives and Subsidies

Financial incentives and subsidies remain a key approach to financing universal service and access, although the form and framework has changes over the last five years in particular in light of the lessons learned from USAFs, the growing importance of broadband, and the impact of the global financial crisis on the liquidity of telecoms companies. Subsidizing investment requires cash outlays up front that will never be recovered. If there is an expectation for the recovery of the monies, a loan or long term debt financing would be granted. Whereas producer subsidies, i.e. subsidizing operators to rollout infrastructure, are likely to be one off, subsidizing users (i.e. schools, elderly, people with disabilities) involves long-term and repeated payments. Two main approaches to providing financial incentives and subsidies are:

- Universal Service and Access Funds
- Stimulus Packages

1.4.3.1 USAF

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. Over the past 15 to 20 years, the model of a mainly industry-financed Universal Access and Service Fund has been implemented in many countries – primarily those in the developing world and emerging markets with only 9 Funds operational in Europe and the Americas.27 Presently, Funds or plans to establish Funds exist in over 66 countries. Operators are required to contribute from 0.1 % of revenues in France to over 10% in the United States. Most countries have contributions of between 2 % (Nepal) and 5 % (Colombia, India).

Funds are firmly situated within the ICT sector and seek to ensure the affordability, availability and accessibility of networks and services to all communities. The first generation of USAFs was implemented in Latin America (e.g. Peru, Chile) and in Africa by the Ugandan Rural Communications Development Fund ("RCDF") who followed a similar model. While these models were successful, in the last decade there has been a move towards using the principles of Output Based Aid ("OBA") to finance investments targeted under UAS policy, particularly in developing countries. OBA is an innovative approach to increasing access in a manner that seeks to ensure that money is well spent and that the benefits go to the identified beneficiaries by linking the payment of aid to the delivery of specific services, outcomes or "outputs."

Funds are relatively easy to establish, through passing legislation and making USAF regulations which amongst others set out a minimum contribution by operators to the Fund, but history has shown us that they are much harder to implement and maintain. This is the case whether USAFs are administered by a regulatory authority as is the case in countries like Uganda, Sri Lanka and Malaysia, a separate Fund administrator as in Tanzania, Nigeria, Peru and the United States or in a few cases the responsible Ministry as is the case in Colombia and Korea. This is discussed in Section 7 which focuses on Fund experiences and lessons learned which are applicable both to Funds and other types of public funding.

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Funds are considered an independent and transparent mechanism to implement and maintain universal service and access initiatives while continuing and promoting market reforms. The objective of USAFs, which typically offer once-off, start-up subsidies for designated areas, is to finance the expansion and/or maintenance of designated networks/services on a geographic, population or other basis that would not otherwise be commercially sustainable. Commercial sustainability is determined through economic analysis prior to project development, and in specific the assessment of market gaps. USAFs provide financing primarily through subsidies in order to compensate designated universal service providers who have in most cases elected to provide the identified networks and services in return for a subsidy or special regulatory, policy or licensing concessions.

Technology evolution and the deployment of NGNs will lower the costs of communication for users and, ironically, will also in all likelihood erode the revenue base (mainly operator levies) used to fund universal service and access programmes. This is in light of lower cost voice services and affordable access technologies.²⁸ As such, if it is found the Funds are still relevant despite the challenges that they have faced

(see section 8: Reflecting on Lessons from Fund Management), for them to remain sufficiently financed it is important to broaden their sources of funding to include other sources ranging from general taxation revenues and end-user taxes to spectrum and license fees. Broadening the scope of contributors to the Fund is one approach that can be taken, this could result in new players, Internet Service Providers and licensed applications providers having to make contributions. However, it is equally important for governments to recognize that Funds are but one approach to financing universal service in situations where the market cannot deliver.

1.4.3.2 Stimulus Plans

Like USAFs, Stimulus Plans seek to provide initial funding to encourage private sector investment. The stimulus plans, however have as objectives the creation of jobs and the stimulation of economic output. The impact of universal access to broadband is not limited to the impact of the ICT sector, as may be the case with respect to Funds; rather stimulus plans and packages including broadband access are aimed at achieving broader economic objectives. The United States grant of \$7.2 billion to deploy broadband in underserved areas, the Portuguese 800 million Euro credit line fir the rollout of NGAN as part of its 2.18 billion Euro stimulus plan to boost the economy, and the Finish funding of one third of the NGN rollout costs can be seen as stimulus plans. In addition cases in New Zealand, Malaysia and Ireland are evidence of stimulus plans that promote ICT investment to improve the economy – jobs, productivity, efficiency and competitiveness.

Important to note is that where USAFs are explicitly focused on rural and remote infrastructure development to improve access, stimulus package funding may be better directed at investment in advanced and industrialized regions in order to yield a stronger impact in the short term.²⁹ This may be contrary to universal service and access objectives of the sector, but aligned with broader socio economic targets such as those linked to job creation.

1.4.3.3 Criteria for assessing a funding mechanism

As indicated in the Organisation for Economic Development ("OECD") report *Rethinking Universal Service for a Next Generation Network Environment,* the funding approaches that are available should be considered on a case by case basis and should be thoroughly assessed against a number of criteria, such as economic efficiency, equity and competitive entry as well as against current practice where the infrastructure and service providers directly fund universal service.³⁰

1.5 How big is the gap?

There is no uniform response to the question of 'how much' is needed to fund universal service and access. However, an indication of "how much" must precede a decision on "how." That is, it will assist in determining what type of funding mechanism is appropriate. Projects can typically be broadly divided into two types with different funding approaches and requirements:

- Supply side projects addressing infrastructure gaps in high costs areas which typically include rural and remote areas. The required funding for infrastructure should match the gap between the level of investment a private company would be willing to make in wired broadband, wireless broadband, mobile or multi-purpose community centres, for example, and the investment required to provide the service.
- Those aimed at addressing user needs and demand side considerations which include the needs of institutions (e.g. schools and clinics) as well as targeted population groups such as people with disabilities, low income users and the elderly. Included in these needs are training, and relevant content and applications. For users, funding should cover the gap between the retail price and the 'affordable' rate as determined through a means test, or other objective evaluation criteria. For other user related interventions, funding should stimulate demand.
- Networks are not monolithic; nor are users so how do governments decide what to fund when it comes to both categories of beneficiaries? The approach is to determine where the most impact can be made, and what the most sustainable approach is to using public funds to finance ICT supply and demand. Strategies that address infrastructure and user needs – which need not be mutually exclusive and can in fact be complementary – are discussed in turn.

Box 5: Criteria for Assessing a Funding Mechanism

The strengths of a funding mechanism can be assessed relative to:

- economic efficiency financing US/UA should not distort competition
- equity costs should be similar for people with similar abilities to pay, contributions should be fair and reasonable
- competitive neutrality financing should not discriminate in favor of any company
- technology neutrality financing should not discriminate in favor of any technology
- certainty specific, predictable and sustainable arrangements
- transparency information relating to the process of selecting projects and financing arrangements should be publically available
- cost effectiveness -- introduction and on-going management of the funding scheme should be cost effective *Source: DSTI/ICCP/TISP(2005)5/FINAL, Pg. 50 (OECD)*

1.5.1 Supply: Financing Infrastructure Gaps

The funding set aside by various governments to meet the shortfall has varied and ranges from the USD 27 billion set aside by the Australian government for its state owned open access national fibre to the home (FTTH) network to the \$2.8 billion committed by the French government to using PPPs to assist with the rollout of shared and open-access networks. The extent of the funding needed to meet universal service and access targets relating to addressing infrastructure gaps, whether or not they include broadband rollout, depends on the particularities of each market. This includes issues relating to technology choice, existing infrastructure, competitiveness and the policy and Assuming regulatory environment. the same technology choice, macro-economic and geographic factors such as population distribution and topography as well as consumer demand will also affect the funding available in a given market. For example:

fibre-to-the-home or building will be faster in countries like Korea and Hong Kong where high rise buildings are commonplace. In the UK it has been argued that deployments have been slow relative to other European countries as 85 per cent of people live in single-family homes.³¹

Infrastructure – civil engineering costs for laying fibre can be reduced substantially if infrastructure sharing is in place and at a municipal level operators are allowed to, or even mandated to, share existing routes or ducts. It has been argued that the early deployment of fibre in Paris, France can be partially attributed to the relative simplicity of laying cable through the city's sewer system. The same approach is being rolled out in the Southern African Development Community ("SADC") with plans for continental expansion by i3 Africa which will start in South Africa and will spend between ZAR 5 billion (USD 725.4 million) and ZAR 6 billion on the network — approximately one-third of the cost usually associated with a FTTH rollout by

Table 3: How much is Universal Broadband Access Worth?							
	Universal Broadband Access Policy Framework				Public Funding Model, State Sees Itself As:		
	Broadband Programme	Targets and Service Details	Estimate of Investment Expenditure	Tackling Unserved Areas	Financer of Infrastructure	Owner/ Operator of Infrastructure	Demand Stimulator
Australia	New NBN	≤ 100 Mbits/s for 90% by 2018; ≤ 12 Mbit/s for the remainder	Yes (Est. A\$46 billion)	Yes	Yes	Yes	-
Germany	Federal Gov. Broadband Strategy	1 Mbit/s nationwide by 2010; ≥50 Mbit/s for 75% by 2014	Yes (Est. €36 billion)	Yes	Partly	-	-
Finland	National Broadband Strategy	1 Mbit/s for 100% by 2010; 100 Mbit/s for 99% by 2015	Yes \$131m (est.) total NGN project cost	Yes	Partly	-	Yes
United Kingdom	Digital Britain	2 Mbit/s as a universal service by 2012	Yes	Yes	Partly	-	-
Japan	Next Generation Broadband Strategy 2010	"Ultra High Speed" for 90% by 2010	Yes	Yes	-	-	Yes
Sweden	Breidbandsst rategi for Sverige	100 Mbit/s for 40% by 2015; for 90% by 2020	No (Est. € 864 million)	Yes	-	-	Yes
Korea (Rep.)	Ultra Broadband Coverage Network	100 Mbit/s for 14 million users by 2012; then Gbit/s upgrade	No	No	Partly	-	-

• Population and housing patterns – deployments of

utilising metropolitan sewerage and water networks, negating the need for expensive civil works. The i3 FTTH network will connect up to 2.5 million homes within the next four to five years at minimum connection speeds of 100 Mbps.³²

 Population distribution – high population density in Sweden contributed to their Next Generation Access (NGA) leadership in Europe and the Swedish government will support rural rollout. Countries like Mexico and Portugal which have relatively high broadband access are densely populated.

1.5.1.1 Infrastructure: Deciding where the need is

Making a commitment to fund "the rollout of broadband networks" is not a clear commitment. Public funding models including ownership, financing incentives (including USAF), and PPPs (national, local, municipal) can be used to develop networks which consist of four main infrastructure components, i.e.:

- International connectivity, which links the network to other international networks usually using gateways and satellite technology or undersea cables. There has been significant investment in undersea cables by governments in Africa in partnership with the private sector which has seen the deployment of the EASSY Cable and The East African Marine System (TEAMS), amongst others over the last 3 years. Access to this part of the network lends itself to private investment of a PPP model in light of the network and technical expertise required to successfully deploy the network, the costs associated with rollout and the need for rights of way and landing rights which can be provided by governments;
- National or domestic backbone networks, which are also known as "long haul" networks. They carry traffic between major points of interconnection, usually major cities in a country, using satellite, microwave and fibre-optic across the country. The investment in this part of the network is mainly private sector driven, and in many countries there is some level of competition with mobile and fixed line operators deploying their own backbone networks. From a government perspective regulator incentives such as infrastructure sharing are key contributions to lowering costs, in addition USAFs are increasingly used to fund the extension of the backbone, a case in point is Pakistan's USF

that is working with the Pakistan Telecommunications Company Limited to ³³ Sri Lanka 's government is working with its incumbent through a PPP model to extend the backbone ;

- Metropolitan connectivity, which can also be referred to a "middle mile" or "backhaul" is the part of the network that connects communities to the backbone. Generally municipal connectivity exists in urban areas, although capacity may require upgrading, and rolling out metropolitan network in rural areas in a priority to ensure accessibility across a country. Municipal PPPs have been used to address this gap successfully in Knysna in South Africa, and in the Pirai municipal network in Brazil.
- The Brazilian case is important in that its success lay in part in the demand driven by the municipality itself which served as an 'anchor tenant' to ensure the sustainability of the rollout project. The project included e-government, education and public access, with a range of application support and development activities.³⁴ In a recent German case (2009) municipalities were set to invest in and own specific ducts to encourage broadband deployment in underserved areas. Such dedicated multi-fibre ducts were made available to broadband network operators to deploy their networks, thereby encouraging infrastructure based competition.
- Local connectivity or local access networks, which are also called the "last mile," are the part of the network connecting the end user to the network. Delivered either wirelessly or using fixed technology such as fibre or xDSL, it is the most expensive link in the broadband supply chain. There are several regulatory and policy interventions that have been made to support the reduction of costs at this level, local loop unbundling, and spectrum assignment and permission of trading are two such approaches.

Each part of the broadband supply chain faces different challenges in terms of its availability and ease of deployment. As a result, a uniform approach to financing broadband cannot be taken – the part of the network that is being funding is another dependency that affects the response to the question of "how much."

Box 6: Approaches to Funding Infrastructure

Finland – "Last mile" is off limits

The cost of the investment in universal broadband access in Finland is estimated at EUR 200 million, of which the state will pay up to a third, municipalities, regions and the EU another third, and telecommunications companies at least one third. Under the model, the public support would be paid to the builders of the networks. However, in Finland, public money is not on offer for subscriber connections – that is, the two last kilometres. Bringing 100 Mb fibre optic or radio link connections all the way to people's homes would raise the costs by EUR 480-780 million. Connections between homes and the optical fibre network are expected to involve the traditional copper cables or wireless connections. Speeds of both copper and wireless connections are expected to increase considerably in the coming years to dozens of megabits a second.

Pakistan – Funding the National Backbone (Capex and Opex)

Pakistan's Fund noted in 2010 that 30 percent of the 400 Tehsils in the country did not have any fibre connectivity. Extending fibre cables to all Tehsils would assist the telecommunications service providers in extending services to those areas. Contracts have been awarded for Optic Fibre Projects to provide a subsidy of PKR 6.7 billion in total. These projects will ultimately lay 8,313 kms of fibre optic cable and through the projects awarded so far 5,324 km of optic fibre cable is being laid.

Universal service financing tends to focus on the provision of subsidies for infrastructure, with Funds such as that in Pakistan being limited to providing money for Capex initially. Recently, in light of the realization that projects must be sustainable, a total cost of operation or ownership approach is followed. Thus where infrastructure is funded, it may also require elements of Opex such as human resources, energy and transmission costs, to be covered in order to make the project sustainable in rural areas where these costs may be higher than in urban networks.

South Korea – Mandatory Obligation

In South Korea, the leading operator was obliged to provide broadband access as part of a universal service obligation to a minimum standard of 1.5Mbit/sec. The upgrading of existing networks is expected to cost about EUR 25 billion over the next 5 years which is to be partially funded by the South Korean government through direct subsidies totalling EU 1 billion. Private investors are expected to invest in the difference and are being incentivized to do so through tax incentives and cheap loan facilities.

Qatar – National Broadband Network

The Supreme Council of Information and Communication Technology (ictQATAR) announced in March 2011 that Qatar's government has established a new company – Qatar National Broadband Network Company (Q.NBN) – with a mandate to accelerate the rollout of a nationwide, open, and accessible high-speed broadband Fibre to the Home (FTTH) network. Although it is a government led initiative, Q.NBN is an independent company, holding the relevant licenses to permit it to rollout a national broadband network. It will focus solely on the deployment of a passive network infrastructure, efficiently leveraging existing and new infrastructure in Qatar. This initiative is part of the strategy to achieve the goal of having ninety percent of Qatari households and businesses with broadband access and an open-access fibre network by 2015.

Source: Author. Information compiled from Pakistan Fund Website, <u>www.usf.org.pk/project.aspx?pid=6</u>; ICT Qatar ictqatar.qa/en/newsevents/news/qatar-national-broadband-network-company-established; and Deutsche Bank Research, http://mpra.ub.unimuenchen.de/22909/1/MPRA_paper_22909.pdf

1.5.1.2 Supply: Getting the most out of Infrastructure Funding

Public investments in infrastructure need to have the maximum potential benefit. As such, in many countries governments put conditions on publically funded networks to derive the maximum 'return on investment'. Key principles to be borne in mind when infrastructure projects are financed publically include that the:

- network should be open (open access) and provide universal coverage in the area concerned.
- amount of the compensation for rolling out the network cannot go beyond what is necessary to cover the additional costs to deploy the network in non-profitable areas.

Putting good money into projects designed in a context of bad policy is a risky exercise. To avoid this, in

Sweden, financing of rural broadband networks is linked to the following conditions:

- a requirement to provide the network on a nondiscriminatory, open access basis to third parties for 7 years from project completion;
- a requirement to provide passive and active infrastructure (ducts, dark fibre, and bitstream access included)
- a requirement to provide access to at least three operators at infrastructure level
- a claw back condition in the contracts avoids "overfunding." It requires the recipient of the subsidy to pay back part of the financing if the demand in the area exceeds expectations making the subsidy unreasonably high (claw back is maintained for 5 years after the network is operational). This is particularly a risk in the case of broadband funding where demand is unclear.

1.5.1.3 Demand: Financing End User Needs

For end-user subsidies, a number of factors will impact the required level of funding, which is unlikely to be 'smart' or once-off, as in the case of infrastructure funding, but will rather be recurring and continually provided as long as the user remains in the same group – i.e. connectivity for a person with a disability, an elderly person or low income. Where the beneficiary is a community or institution this remains true as in the case of an e-rate subsidy to schools. In the case of subsidies for end user devices such as laptops and personal computers, a once of subsidy is more likely – this however does not address the total cost of ownership as it discounts the on-going maintenance and repair costs. Different approaches can be taken to identifying beneficiaries for end user subsidies such as:

- Self-selection targeting projects are designed to ensure that the outputs that have been chosen by the beneficiaries receive a higher share of subsidies. Thus a 'sliding scale' of subsidies is possible in terms of this approach. For example, progressively higher subsidies can be provided for more basic services or services that those who can afford would not necessarily want (e.g. basic and low cost devices or services).
- Means test targeting where beneficiaries are determined based on affordability using income, a proxy means test, or sometimes living standard measures (LSM) such as the availability of a dwelling. It has been argued that this approach is most effective in middle income countries,

particularly where an existing social grant or welfare system in place which can be used a point of reference. A key risk with this approach, and many user based approaches is that users can move from one 'level' or 'status' to another – whether the means is determined by income or access to a social grant, making monitoring and implementation of this type of targeting by the funder more complex.

1.5.1.4 Demand : Where End Users are Institutions

In some cases end users may be institutions and not individuals. Chile, Colombia and Ecuador offer examples of countries that have publically financed school connectivity, mainly in areas where there is no existing access. In most cases where connectivity at schools is funded, the financing of devices such as computers, laptops and dongles is incorporated into the connectivity plan. In Ecuador this is in line with the national strategy which seeks to provide the majority of schools in the country with Internet connections. The telecommunications regulator (Commission Nacional de Telecomunicaciones, or CONATEL) included school connectivity on the annual plan that identifies UAS targets for funding from the Fund. 62 The Fund, FODETEL, has financed a number of school connectivity programs, including a US\$ 469,000 project providing broadband connections and free Internet access to 74 schools in the Cantón Montúfar Municipality.³⁵ Such activity should also be well measured, focused on areas and communities with potential for sustainability in the medium term, and designed to be responsive to market forces, with several types of financial instrument that respond to entrepreneurial need, while not distorting or misdirecting embryonic and still emerging markets.³⁶

Pakistan's USF does not fund schools directly, but has effectively aligned its infrastructure financing programme to the financing of school connectivity. In the Pakistani model, as part of the universal access strategy the successful bidder is given obligations regarding connecting educational institutions and communities. Included in this is the obligation to provide each higher secondary school, college and library in the area covered with the subsidy free connection, free broadband access for the first year, 5 personal computers in a Local Area Network and the training of 2 trainers.37 The same approach can be taken for other public institutions such as clinics and hospitals.

1.5.1.5 Demand: Funding Content and Applications

Most public financing, particularly through USAFs, has prioritized the rollout of infrastructure, and recently this infrastructure consists of wholesale transmission and broadband networks. In order to maximize the use of these networks, relevant content and applications must be available for consumers to use - this however is an area of funding that most USAFs have not delved into. The Kenya ICT Board which facilitates access, but is separate from the Universal Service Fund in Kenya, has several programmes to support local content development through the issuing of subsidies. It furthermore provides subsidies to support the development of applications, and for the subsidization of laptops for university students which will enable them to access the internet. As ICT sector strategies focus more on broadband uptake, it becomes critical that mechanisms are developed to promote the development of relevant, user friendly, culturally and linguistically sensitive information. Financing of content and applications can include funding:

- Local content production
- User friendly and graphics based interfaces
- Local content in local languages
- Shared content (e.g. tourism, education, egovernment) that is locally relevant, where possible to a community level

A key aspect of successful demand side strategies, particularly those related to the promotion of relevant local content and applications, is the level of government buy-in and participation. Where government has become an "anchor tenant" for broadband networks in rural, underserved and unserved areas, it plays a key role in that it stimulates demand for broadband services. A rural municipality, for example, can use broadband to connect its main public school, library and post office. In so doing it stimulates demand, but also becomes a large customer, thus contributing to the profitability and sustainability of the broadband network.

1.5.1.6 So the question of "how much" is relative

In summary, there is no single answer to the question of "how much." The scale of funding required has a significant bearing on the type of financial instruments used, and on who is able to provide such funding. As an example, the deployment of a low cost

WiFi based municipal network with a payback period of two years can often be covered out of local government or municipality revenues. In contrast, deploying a multi-million dollar fibre optic cable system with a payback period of 10 or more years requires long-term financial commitments.³⁸ Depending on national universal access and service definitions, a combination of these types of projects is needed for countries to achieve their national universal access and service targets and meet the Millennium Development Goal (MDG) targets and World Summit on Information Society (WSIS) commitments that are to be achieved by 2015.

Importantly, in making this decision, it should be noted that non-infrastructure projects are also key. In certain projects such as those promoting applications and content, or those stimulating demand such as 'erate', telecentres or schools programmes, ideal funding may not include any infrastructure. CAPEX will relate to equipment and furniture. However in these cases funding of OPEX is even more critical.

1.6 Level of Subsidy: Providing the 'right' amount

Over time, and through experiences in other jurisdictions, it has become clear that the determination of the level of subsidy can be a complex exercise. Increasingly, process is being used to assess the level of subsidy rather than cost analysis on its own. Experience with cost based approaches to the determination of subsides have shown that the information asymmetry that exists between the government funder and the operators can affect the final determination of cost and lead to inefficient financing of projects. Cost analysis requires the regulator or government to have information on:

- Market data which is below national level, preferably on the area in which the service is to be provided.
- ICT access which is more micro than readily available information on national penetration levels, i.e. public phones within the project area, telecentres/multi-purpose community centres, mobile access (network coverage, population coverage), mobile service (subscribers), fixed lines, internet access (home, business, and shared), and broadband access (home, business, and shared).
- Geographical information on the project area terrain (mountains, hills, valleys, forests, deserts, etc) which will impact network planning and the

costs of constructing a network, as well as the technology choice

- Population centre's and total population total population of the region, area, major population centres and levels of urbanization
- Network planning and costs which are based on amongst other things, the terrain, the network plan needed to cover the area to serve the estimated demand (i.e. cell size), which in turn determine the number of base stations that need to be built, amongst others.

Proper cost analysis requires a range of skills that the regulator may not have including network planning, and cost analysis. Even in developed countries like Australia and the United States (See Box 7) where regulators are relatively well capacitated, operators have far better knowledge of the costs of their own operations. To address this asymmetry, and the risks associated with relying only on operator data, particularly when it may be in the operators' interests to inflate costs in light of the potential subsidy that may result, least cost subsidy approaches have been taken to financing universal service and access in many countries.

1.6.1 Least Cost Subsidies

Where a Universal Service Provider is not designated up front, Fund Administrators have to find ways to determine who will be responsible for providing infrastructure or service on a project by project basis.³⁹ Determining the level of subsidies, and the recipient, is now commonly done through conducting a competitive bidding process or reverse auction for a least cost subsidy. The approach broadly is for the regulator, universal service fund administrator or Ministry, as the case may be, to follow a 5 step approach:

 Define the scope of funding which includes the national objectives, target area or population, and levels of funding available for the public subsidization programme or project, whether it is funded through a Fund or a Stimulus Plan offshoot.

Box 7: Changing Approach, US and Australian examples

Shifting Away from Detailed Cost Modelling

Because of the complexities related to cost modelling, while it is acknowledged that it assists regulators, Fund Administrators and Universal Access Project Financiers to assess costs and arrive at the maximum subsidy, it is no longer a requirement to engage in costly, time consuming and often complex cost analysis to arrive at a costbased subsidy; rather reverse auctions coupled with benchmarking, or use of cost modelling tools can be used to enable them to award least cost subsidies.

United States

The United States recently reviewed its US funding system for high-cost areas. Over the past decade, total highcost funding has quadrupled to US \$ 7 billion per year. As part of the review, the Federal-State Joint Board is considering introducing auctions, based on the experience of developing countries, but modified to suit the United States' conditions. This will determine the amount of funding that would be available. Many commentators believe that auctions are better than administrative approaches for this purpose

Australia

In Australia, the move away from a cost modelling approach in the last decade required a legislative amendment. In 2000, an important amendment to the legislation was introduced – the formula for calculating the Net Universal Service Cost, which was previously the fundamental element of USO subsidy calculations, was not included in the amended legislation. The amendments do not prescribe any methodology for calculating or otherwise establishing, USO subsidies. Rather, the legislation simply provides for the Minister to determine USO subsidies, having regard to advice of the ACMA⁴⁰. The Minister may determine subsidies for the supply of services under the USO in a universal service area for up to three years in advance using a number of approaches including least cost subsidies/competitive bidding.

Source: HIPSSA/SADC Toolkit on Universal Service Funding and Universal Access Fund Implementation (2011)

- Prepare and publish, through an open tender process, a Request for Proposals or Invitation to Apply for the subsidy. This can be a one-step or a two-step process, depending on whether there is a need for a pre-qualification phase. This type of bid has been issued by the USPF in Nigeria, the Universal Service and Access Agency in South Africa, the USF in Pakistan and the USOF in India over the last few years. It is important that the tender is competitively, technologically and service neutral so that the outcomes are unlikely to distort competition.
- Evaluate bids in response to the request. The bids can compete on service as well as on price – the objective being to provide the most for the least subsidy from the government. A winner is selected through an open and consultative process.
- Contract the winner using an outcome based approach (see box XX).

Monitor and evaluate the investment to ensure the expected 'return' in both social and financial terms as discussed in Section 9.

1.6.1.1 Keeping the funding requirements low

Based on global experiences, primarily in developing countries and emerging markets, some key strategies have been identified to get operators to rollout services for as little subsidy as possible – in some countries the subsidy has been as low as zero. This was the case in the Dominican Republic where frequency spectrum was used as an incentive and a win-win situation was created when the competitive bidding process culminated in a zero subsidy. In Chile, where the competitive tender allowed new entrants and offered new licences, Chile's successful bidder

accepted zero subsidies and used the process as a means to enter the market and access spectrum. In this case, linking the universal service objectives to something that the operators wanted (license rights) to provide to be incentive enough such that the financial incentive (subsidies) was secondary. The Fund thus achieved its objective by working with the regulatory regime and without disbursing funds for that project.

Other strategies to encourage bidders to compete and bid low subsidies thus reducing public support include:

- The proper design of attractive bidding areas, sometimes called bidding "lots"
- Bundling opportunities to encourage economies of scale. This would enable successful bidders to provide adjacent services to the one bid. This may not be applicable in countries such as Tanzania, Malaysia and the United Kingdom where a converged framework is in place or under development, this is a lesser consideration where licenses are technology and service neutral and operators may provide any service using any technology – as such bundling internet services and voice services, or public payphones with internet POPs may be inherent in the licensing regime and thus in the bidding process.
- Coupling the award of the subsidy with other licence rights. For example, offering reduced cost use of radio frequencies to the winning bidder. In the SADC region, access to frequencies such as WIMAX in the 2.5/2.6 GHZ and 3.5 GHz bands is coveted. In many countries, these technology opportunities could be used to facilitate universal service;

Box 8: Overview of OBA					
Output Based Aid Principles	Benefits of Output Based Aid				
 Ensure that the subsidy is linked to specific measurable targets Contract services out to a third party which receives a subsidy to meet the stated objectives The Fund pre-finances the project (in tranches) until delivery Link payments to delivery Subsidies must be performance based – payment is made only after services are rendered and audited 	 Transparency increases efficiency and effectiveness Performance risk is carried by the provider (recipient of funding) and accountability is increased The subsidy (and possibly subsidy award mechanism) incentivize the private sector Results can be tracked and measured through a focus on outputs/ results 				
Source: World Bank					

- Allowing the winning bidder to provide other services (i.e., a service-neutral approach); and
- Mandating infrastructure sharing, both for transmission and access such as towers for mobile networks, which will reduce the costs for the successful bidder, and increase efficiency.
- Competitive least cost subsidy bidding is used as a project selection method in many Sub-Saharan African countries such as Malawi, Tanzania, Mozambique, Madagascar and Lesotho,⁴¹ and in South America, Colombia, Guatemala, Dominican Republic, Peru and Chile. Nepal and India are amongst the Asian countries that have used this approach.⁴²

1.6.1.2 When to use least cost subsidies

While least cost subsidies represent a good approach, it should be noted that this approach is not a 'once size fits all' approach; it should only be used for certain types of projects such as–

- Where large capital investments in networks are required;
- Where large sums of subsidies to be disbursed (e.g., starting from several hundred thousand dollars to several million); and
- Where companies are subsidy recipients.

For projects such as user subsidies or smaller scale projects, lengthy and expensive least cost subsidy processes may not be necessary. Telecentres and Multi-Purpose Community Centres may in certain areas be an example, especially since the costs are easier to derive. In such cases fixed subsidies may be appropriate.

1.6.2 Fixed Subsidies through an open tender

While minimum subsidy allocation has been proven to be an effective OBA-based mechanism to finance projects, other approaches can also be improved that encourage efficiency. For example, the Fund can indicate that a certain amount of funding is available for projects relating to a specific universal service challenged. The Fund Administrator sets a fixed subsidy and awards the funds to the operator that provides the most comprehensive service for that subsidy – this approach is likely to work for smaller projects where the costs can be assessed ahead of time with reasonable accuracy by the Fund Administrator, and for "bottom up" projects where costing information can be provided by the project initiator (usually at community level).

As such, in the case of a smaller project, if X amount is available, the operator that can provide the most internet connections, computer labs, of connect the most clinics, for that amount would be awarded the project. A business plan would have to be provided to allow the Fund Administrator to confirm the viability of the project, and the award would still need to be accompanied by a contract and service agreements (See Figure 5). Fixed subsidies are also appropriate when the Fund is dealing with non-infrastructure projects, i.e. projects for financing users' needs, as is the case increasingly for broadband projects looking at the demand side. These Funds would include fixed subsidies to elderly people, or people with disabilities who would be entitled to a monthly or annual subsidy to cover usage costs. The subsidy is likely to be given to the operator and a discount issued to the consumer for ease of administration.

The concern that has been raised relating to this approach is that it risks being seen as not transparent. This is in light of the fact that finance is likely to be provided on a first come first served basis; or on the basis of subjective "competitive bidding" criteria such as the impact of the project, the track record of the project initiator, the lowest requested subsidy or the perceived economic and social impact of the project. This, in the case of small, bottom up and user needs projects, should be weighed against the lack of efficiency, potential bureaucracy and complex processes associated with reverse auctions and smart subsidies. Regardless of the approach, the principles of OBA should be respected.

Figure 6: Key Bidding Documents

Process Initiation (to Open the process)

- Expression of Interest or Request to pre-Qualify
- Request for Proposals (RFP), also known as the Bid Documents, Tender, or Invitation to Apply (ITA)
- •Copy of Draft License (if new license required/being offered)
- Copy of Draft Financing Contract (t governing the payment of the subsidy)
- •Service Agreement (can be combined with Financing Contract) specifying targets and milestones
- Model Performance Guarantee

• A bid bond /bank guarantee provided by the bidder, ranging from 1 to 5 per cent of the maximum subsidy, to deter companies that are not serious bidders.

In Process Documents (For decision making)

- Mandatory Application Forms
- Company registration documents, founding documents, Articles of Association, and other legal documents
- Detailed Business plan setting out the project approach, financial plan, marketing plan, risks and mitigation, subsidy details, community involvement, etc
- •Detailed Technical Plan setting out rollout plan, geographic and population targets, technology plan, etc.

Completion Documents (For Project Implementation)

- •License (if applicable, and only if financing is linked to regulatory process) – a licence to rollout the infrastructure, operate the new network or provide the services if the bidder was not already a licensee
- •Financing Contract (governing the payment of the subsidy by the Fund)
- •Service Agreement (can be combined with the Financing Contract) – the contract (or Annex to the Financing Contract) which specifies the targets and milestones, technical performance requirements, services to be provided, quality of service, etc, as well as penalties and remedies for failure to perform.
- •Performance Guarantee to deter successful bidders from not complying with requirments/obligations

Source: Author

1.7 Learning from Experience – Reflecting on Lessons from USAF Management

1.7.1 Why Funds Work?

Public financing of universal service and access through means other than direct investment and ownership has been going on for twenty years when USFs were first introduced in Latin America. Much has been learned since then about what works in terms of public funding and what doesn't. Despite the myriad of options available for financing projects using public money, the case of universal service funds is instructive and lessons have been learned in over 60 countries that have Funds in place. In light of this a specific section of this paper dedicated to Funds is warranted. The range of USF implementations and experiences makes it possible to identify trends and principles that may be applicable for public financing in general across a broad range of countries.

Significant literature exists of fund establishment and management. In summary, the key principles of a successful Fund are accountability, transparency and efficiency. These principles support the key pillars to ensure sustainability of a project sponsored by the Fund, are similar to the pillars identified for OBA in general and can be summarised as follows:

- Alignment with the national regulatory and policy framework
- Good governance
- Technology neutrality in the design and implementation of projects
- An emphasis on market orientation, sustainability and entrepreneurship⁴³
- Total Cost of Ownership ("TCO") approach and thus incorporation of support for applications, content and training and capacity building in addition to networks and services.
- Increased transparency through explicitly tying subsidies to targets and defined outputs of a programme, or in the absence of a programme then a policy;
- Increased accountability achieved by shifting performance risk (and thus project risk) to service

providers through amongst others well-crafted Service Agreements and contracts;

- Increased engagement of private sector participants, their capital and their expertise by encouraging them to meet identified gaps, often in partnership with the Fund;
- Encouragement of efficiency and innovative approaches through the design of projects which allow the service provides to design their own solutions through least cost subsidy schemes;
- Increased sustainability through the provision of once-off subsidies that are then linked to sustainable long term service provision;
- Decentralized, bottom up planning and project definition⁴⁴
- Innovation and localization of projects and processes; and
- Effective monitoring through the alignment of payments to agreed deliverables/outputs by the service provider.

The above highlight the need for financiers to 'start with an exit strategy.' Through the above-mentioned elements of the project set-up, from inception to contracting to payment of subsidies upon delivery, the financier ensures that their exit from the project is clear upfront and that the project has increased potential of being sustainable.

The principle of defining an exit strategy is easier to achieve when networks or infrastructure are being subsidized than when subsidies flow to end users groups (e.g. schools, or persons with disabilities). In the case of end user group subsidies the likelihood of an 'on-going' subsidy is higher – the question in this case is generally related to availability and affordability.

1.7.2 Fund Challenges

Experience has shown that Funds are not the only public financing solution, nor, in some cases, are they the best one. A Fund's success is premised largely on its establishment and management. A successful Fund has to be built:

- at the right time, and
- on a solid foundation.

The *right time* is important – a Fund that is built outside of the right policy context without taking into account the liberalization of the ICT sector in a given country, the level of competition and the types of players in the market is unlikely to succeed. If the decision to establish a Fund is made, a Fund should be established as part of the market reform process, and as other forms of funding universal service and access like access deficit charges and cross subsidies are phased out. Countries implementing Funds also have to take into account the existing universal service and access framework, and must consider whether there is a framework for mandatory obligations. If so, important decisions on whether operators will be expected to "pay" or "play" or both should be made - these considerations will affect the structure of the Fund, its collections and its approach to disbursement.

Building a Fund *on a solid foundation* is critical. The institutional framework and governance model is important and regardless of the location of the Fund, i.e. in the Ministry, regulator, or independent, it should have at a minimum its own dedicated:

- Full time Fund Administrator/CEO;
- Board of Trustees or Board of Directors;
- Bank account; and
- Reporting procedures

It has been recognized that some of the shortcomings of Funds include the high administration and capacity requirements for the Government to administer this regime effectively. This is true in terms of Fund establishment where the Fund is a separate organization; it is also true with respect to disbursement of USAF monies. In countries where the Fund is part of the regulator, shared resources are used which can reduce the Fund to a department or unit, and thus reduce its priority if the regime is not properly administered.

Box 9: Why Some Funds Do Not Work

Some of the pitfalls of public financing have been evidenced in the implementation of USAFs in various parts of the worlds. There exist examples of Funds, in particular, which have:

- determined levies, over-collected and under-spent;
- determined levies and overspent, i.e. provided subsides for unsuccessful projects, or for inefficient use in projects;
- become involved in project implementation, through rolling out telecentres and in some cases networks;
- not made their collections, and disbursements public on a periodic basis; and
- submitted funds to a central fund in Treasury/Ministry of Finance where ICT sector contributions have been used to subsidise non-ICT sector projects (e.g. road projects, property projects)

By their very nature, and in light of the fact that they collect significant amounts of money from the ICT sector, Funds attract attention and risk. The most commonly identified risks facing publically funded projects include⁴⁵:

- Implementation of projects that distort the market;
- Creating dependence on on-going funding (subsidies that are not "smart");
- Potential abuse of funds;
- Potential mismanagement of Funds;
- Favouritism; and
- Project failures which waste resources.

Source: Author and ICT Regulation Handbook

1.7.3 Disbursement Backlogs

Disbursing funds has been found to be a challenge that is equal to, or in many cases greater than collecting them. It is argued that between 1998-2006, only 26 percent of USAF funds collected globally had been redistributed to the ICT sector for use on universal access projects.⁴⁶

Regulatel, ⁴⁷ the regulators' association in Latin America, found that in the 13 Latin American countries with Funds, the amounts collected ranged from USD 1 million in Ecuador to USD 1,8 billion in Brazil at the time (now reported at over 5 billion).; and only 7 of the 13 countries have actually disbursed money from their funds. Notably, unlike the other countries which have disbursed under 45 percent of the money collected, Chile, Mexico and Paraguay had spent over 95 percent of the money collected. The picture painted in Sub Saharan Africa is a similar one.

Emerging markets such as Inia, Pakistan, Mexico, Brazil, Nigeria and Ivory Coast have fared well in respect

of the ability to disburse the monies in the USAF. In addition, in the EU where public aid has been provided in terms of the Recovery Plan and through mechanisms other than USAFs, disbursement levels to date are quite high. In 2010, the European Commission adopted a record number of 20 decisions covering aid for broadband development in, among others, Catalonia, Finland and Bavaria, authorising the use of over €1.8 billion (USD 2.55 billion) of public funds for broadband development.⁴⁸ Excluding national funding (provided by a specific country on a country by country basis), between 2007 and 2013 a total of €2.3 billion (USD 3.25 billion) was allocated to broadband infrastructure investments and €12.9 billion (USD 18.3 billion) to information society services through the EU Structural Funds,; and a further €360 million (USD 510 million) was issued through the Fund for Rural Development and used for broadband funding. The EIB invested in 2009 €2.3 billion (USD 3.25 billion) (a total of €12 billion (USD 17 billion) in the last decade) in broadband infrastructure.

Table 4: Spending the Money					
Sample Disbursement of Universal Service Funds					
Country	Collected (USD)	Disbursed (USD)	Comment		
Brazil	5.21 b	3.54 b	-		
Hungary	13.2 m	12m			
Côte d'Ivoire	28.14 m	16.65 m	National Rural ICT Project		
Nigeria	246.66 m	196.66m	Accelerated mobile expansion programme, ICT enabled learning programme, rural broadband internet programme		
Rwanda	6.6m	3.68 m	One Laptop Per Child		
Mexico	75 m	65 m			
Australia	148.59 m	148.59 m	-		
India	6995 m	2305 m	Rural phones, broadband connectivity support and mobile services support		
Japan	693.1 m	693.1 m	-		
Malaysia	1.35 b	1.05 b	Community broadband centres and libraries		
Source: ITU World Telecommunications Regulatory Database, based on country responses to the annual telecommunications/ICT					

While disbursement of funds is an achievement, it is important to understand what makes some countries able to disburse monies to projects swiftly and effectively. It seems that the common characteristics of markets with disbursement success stories such as Sweden, Pakistan, Finland and India include

clear rules,

regulatory survey.

- effective public consultation processes, and
- transparent administrative processes.

In addition good governance is important – since its dismantling in 2010, the Pakistani Fund has not made

the same level of progress with respect to universal access and service.

It is critical that financing is provided in line with the good governance principles discussed earlier. In the United States, despite high levels of disbursement, utilization of funds by the Fund has been plagued by concerns around governance, prioritization and efficiency with respect to the use of the funds. The USA is reforming its Fund to address concerns, particularly in High Cost Areas, relating to the reasons for the increase in subsidies in high cost areas over the past decade for these very reasons.

The disbursement approach will depend on the project being undertaken. This is important to note upfront and in the operating manual to ensure transparency, clarity and stability in the framework. In Uganda the level and process framework was decided upfront, and based on the level of subsidy required. A higher subsidy (above \$100,000) requires:

- A larger project
- A more complex, more open process for larger subsidies (open tender)
- Fewer Bidder eligibility restrictions (international and local)

In another case, in Ireland, the UAS scheme design for the provision of broadband using public financing involved detailed considerations of the requirements that should be placed on the successful tendered, and how these would affect the broadband market (so as not to distort it).

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In developing countries the disbursement problem does not tend to be one of overfunding specific projects, in part due to the fact that unlike the United States, most developing countries and emerging markets have adopted the least cost subsidy approach to financing projects. In developing countries the challenges around disbursement have related primarily to fund management and administration and have included issues such as under-spending, carrying over funds from year to year, and depositing funds with national Finance departments which has led to the funds being used to finance non-ICT projects and initiatives.

1.7.4 Speed of Financing

Another challenge with respect to the utilization of the Fund is the speed of financing. In Latin America, Regulatel found that there are 5 main reasons for countries being slow to finance projects, namely:

- where the Fund is located with the regulator, the regulator doesn't prioritise universal service;
- the speed of the political process, governments fail to pass enabling legislation, or hold back approvals for funds to be spent;
- the time needed to design, evaluate and assess and implement projects is significant;

- Since the projects are often considered 'public investments' they are subject to lengthy approval processes as any other process utilising public funds;
- disbursements may be subject to additional constraints from third party organizations such as the IMF and World Bank

These challenges are not unique to Latin America and have been evidenced in specific Fund cases in Sub Saharan Africa and Asia.

1.7.5 The Future is Expensive

Recently, as countries have begun to focus on infrastructure rollout including broadband and fibre optic network rollout, and the rollout of Next Generation Networks it has been found that while these projects will increase universal access from either a supply side (e.g. fibre optic networks) or a demand side (e.g. telecentres, school or clinic connectivity), the monies available in the Fund, or anticipated to be collected by Funds, are not likely to be sufficient to finance rollout. As a result, for larger and more costly projects, regulators and policy makers are finding that Funds 'don't work' or where they have not been tested it is likely that they 'won't work' - they are not appropriately placed to finance or otherwise support the projects - and alternative funding mechanisms become necessary.

Thus, even where Funds remain relevant, it is recognized that they are not well suited to address all universal service and access challenges, due to high investment requirements and particularly high cost infrastructure projects. The risks set out above are true of financing of universal access projects in the ICT sector generally regardless of the type of funding.

1.7.6 The Bright Side

Rather than seeing the potential weaknesses of Funds as an indication that they are doomed; or considering that the presence of other financing options is a challenge to the viability of a USAF model, these additional sources of universal access funding can be seen as partners of Funds – their role is complementary to that of the national USAF. Whether the commitment to provide access arises from license conditions, a Public Private Partnership contract, or a concession or contract arising from a USAF bidding process, it is clear that the private sector is considered the main delivery arm for universal access. The role of the public sector, in the form of the regulator in the case of license conditions, the relevant national, provincial or local/municipal government department in the case of a PPP, or the Fund Administrator in the case of a USAF project, is to provide vision and guidance to meet social and developmental needs, to act in the public interest, and to select appropriate partners to work with in achieving such objectives.

As such, in addition to fulfilling their current mandates where this has not been done, as stated in the ITU-infoDev ICT Regulation Toolkit, USAFs in the next generation could move in two main directions, namely:

- An increase in importance and role as a facilitator and coordinator which acts as stimulating force for the market, piloting innovative rural service and application concepts, creating demand for advanced ICT connectivity and services (e.g. through financing broadband access for schools, more direct support of users and applications) and an enabling environment; and
- A funding mechanism for broadband networks into rural and unviable areas through support both at the retail end (e.g. shared access), as well as at the wholesale end (e.g. through intermediary network facilities such as backbones, wireless towers and other passive infrastructure).

These approaches will be most effective if pursued in collaboration with other ICT sector financiers such as NGOs and development partners which can furthermore play a critical role in financing and facilitating applications and capacity building rather than network reach.

1.8 Monitoring and Measuring: Ensuring a Return in Investment ("ROI")

Financing universal service and access must be approached in a strategic and coherent manner for it to be effective and deliver the desired ROI which can be defined by the public sector in terms of not only revenues, but social and economic impact. Universal service and access funding's role does not end at the allocation of monies regardless of what type of funding is provided and through what model, i.e. a PPP, equity funding or public funding- the UAS financier should follow the projects that have been implemented, monitor them and evaluate them. Only through an analysis of the effectiveness and efficiency of the funding and the related projects can a proper assessment be made. This includes considering what was expected to happen, and the unintended consequences, both negative and positive, of projects driven by public funding.

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1.9 Conclusion

In conclusion, while the technologies that are being introduced today are new and their applications are innovative, it is increasingly clear that the fundamentals relating to achieving and financing universal service and access remain essentially the same. Unlike in the 1990's when universal service funds were first being developed, and alternative funding models were still being explored, ICT sector policy makers, regulators and Fund Administrators now have almost two decades of experience with universal service and access policy and with financing universal service and access to draw upon as they tackle the challenge of bridging of the impending broadband divide.

This paper has introduced the various types of ICT financing and in particular has considered the different flavours of public funding and how they apply in a broadband context. It has demonstrated that while properly constituted and managed Funds are a viable option, they are not the only option for financing high cost networks in what are considered 'high risk areas'; nor are they the only approach to financing the demand side – users, devices and content. A positive return on investment depends on having the private sector play its part in rolling out, and where feasible, self-financing broadband rollout. Achieving high ROI relies furthermore on having the right policy and regulatory framework in place – one that does not distort the market. Thus equity investments, financial incentives and subsidies, and PPPs can best be applied only where the market is well understood, where it is clear what supply side and demand side levers need to be pushed in order to get the desired result.

To achieve this, in addition to good governance and good project design, monitoring and evaluation are key. These are factors that have been present in successful USAF frameworks, where Fund Administrators have had successes in collecting sufficient funds, and disbursing them in a manner that is aligned with the universal access and service strategies and definitions in place, and to meet the national goals and targets which increasingly include access to narrowband internet and broadband.

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- ² The World in 2010, ITU <u>www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf</u>
- ³ Throughout this paper, reference to broadband implies a speed of over 256 Kbits/sec which is the minimum broadband definition.
- ⁴ Defined as over 256 Kbit/second.
- ⁵ World Bank based on TeleGeography and Wireless Intelligence Databases
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GSR 2011 Discussion Paper

E-WASTE AND RECYCLING: WHOSE RESPONSIBILITY IS IT?



Work in progress, for discussion purposes

Comments are welcome! Please send your comments on this paper at: <u>gsr@itu.int</u> by 7 October 2011.

The views expressed in this paper are those of the author and do not necessarily reflect the opinions of ITU or its Membership.



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LIST OF ACRONYMS

BAN	Basel Action Network
BFR	Brominated flame retardants
BPO	Business process outsourcing
CFSK	Computers for Schools Kenya
CD	Compact disc
CEC	Commission for Environmental Cooperation
CRT	Cathode ray tube
DfE	Design for environment
DNA	Deoxyrebonucleic acid
DVD	Digital versatile disc
ECDM	Environmentally conscious design and manufacturing
EPA	Environment Protection Agency
EPR	Extended Producer Responsibility
EU	European Union
GPS	Global positioning system
ICT	Information and communication technologies
IT	Information technology
ITU	International Telecommunications Union
LCA	Life cycle analysis
LCD	Liquid crystal display
MEA	Multilateral environmental agreements
NAAEC	North American Agreement on Environmental Cooperation
NAFTA	North American Free Trade Agreement
OECD	Organization for Economic Co-operation and Development
PAHs	Polyclic aromatic hydrocarbons
PC	Personal computer
PCB	Ploychlorinated biphenyls
PBDEs	Polybrominated diphenyl ethers
PRO	Producer responsibility organization
PVC	Polyvinyl chloride
RoHS	Restriction of the use of certain hazardous substances
UK	United Kingdom
UNEP	United Nations Environmental Programme
TFT	Thin film technology
RSP	Respiratory suspended articles
SME	Small and medium enterprises
STB	Set top boxes
TV	Television
VAT	Value added tax
VCR	Video camera recorder

WEEE	Directives on Waste Electrical and Electronic Equipment
WSIS	World Summit on the Information Society
WTO	World Trade Organisation
WTPF	World Telecommunication Policy Forum

EXECUTIVE SUMMARY

This paper commissioned by the International Telecommunications Union (ITU), investigates the rising concern about e-waste globally. It seeks to explore some of the factors that are contributing to a rapidly increasing quantity of e-waste. It also brings out some of the adverse consequences brought about by e-waste to human health and the environment and makes a case for an urgent need for comprehensive response to the e-waste problem. While some countries have in place elaborate mechanisms for handling electronic equipment after its useful life is over, others have no plan in place.

In discussing the relationship between e-waste and the ICT sector, this paper seeks to identify whether the nature of the relationship places a special role on national regulators for the ICT industry. As ICT devices and networks become ubiquitous and applications and services based on ICTs continue to grow, this paper suggests the necessity of making e-waste management a consideration at the center of the design of ICT policy. This is a significant departure from the current situation where 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/transition countries.

The paper explores various approaches that have been adopted in handling e-waste. It seeks to identify and discuss best practices that can be adopted at policy and regulatory levels either through assumption of voluntary obligations or mandatory requirements in the law. It seeks to identify 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.

This paper introduces two policy principles in detail – recycling and extended producer responsibility (EPR) into the ICT policy arena. 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 tries to encourage 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). This paper explains what each of the two policy principles involve in detail, and touches on likely barriers in the path of implementation.

At the heart of this discussion, the objective is not to prescribe solutions for adoption. Indeed the paper dialogue recognizes that any effective e-waste management ecosystem must address the local context at the core of its design. This means that a highly mechanized recycling system, for example, is likely to fail in an economy that needs to create jobs for its population. The financing mechanism of e-waste is not clear particularly for developing countries where ICT goods are imported through third parties, making it difficult to implement EPR. Due to this unstructured method of supply, this paper seeks to provoke a discussion on possible funding mechanisms that are sustainable. It proposes a careful consideration of the need to balance the push for access to ICTs with the practicality of harnessing the resultant e-waste which is the dark side of these innovations, in a manner that is sustainable for the long term.

While most data and information was available from Europe and North America, a deliberate effort has been made to draw information from other regions in the world in order to sustain balance in the research content and in the buildup of thematic areas under consideration.

In order to facilitate formulation of e-waste management ecosystems that are sensitive to individual country situations, this paper aims to create awareness and generate constructive debate. Subsequently, the exchange of ideas and information will create a collaborative platform that will be a valuable aid in decision making at the strategic policy and regulatory level going forward.

As a buildup **of analysis**, this paper proposes a checklist of critical aspects to be considered in the establishment of a roadmap for the management of e-waste. These factors can be considered as a guide in engagement of various stakeholders in the formulation of e-waste ecosystems. The checklist is designed to enable ICT regulators identify and leverage on critical regulatory aspects within the scope of governance of e-waste at the local, regional and international level.

In making policy and regulatory recommendations, this paper advocates for the need to identify players in the e-waste space in order to ensure optimal inclusion (given the fluid nature of the ICT ecosystem) in engagement for policy architecture and subsequently in allocation of roles and responsibilities. It makes some recommendations towards adoption of unique approaches such as regional harmonization initiatives that would be particularly beneficial for jump starting developing countries on the path of e-waste management. In concluding, this paper will be a success if it is able to:-

- a) Raise awareness on the dangers of e-waste;
- b) Encourage the consideration of e-waste management in the design of ICT policy;
- c) Create an urgency for the adoption of strategic policy and regulatory approaches that are sensitive to local context; and
- d) Encourage a move to more concerted cooperation in handling e-waste at the regional and international level.

1 E-WASTE AND RECYCLING: WHOSE RESPONSIBILITY IS TI?

Author: Mercy Wanjau, Principal Legal Officer, Communications Commission of Kenya

1.1 Introduction

The information and communication technologies (ICT) sector has experienced unprecedented growth in the last decade. This trend has been boosted by market liberalization and augmented by convergence, new technologies and resultant innovations such as mobile phones which continues to be the most rapidly adopted technology in history. While sector growth has been experienced worldwide, the impact has been exponential in developing countries. Today the mobile phone is the most popular and widespread personal communication technology on the planet, with an average subscription world rate of 78 per 100 inhabitants in 2010. The subscription for the developing world stands at 70.1 in the same period, a very close match, given the wide disparities that existed for fixed lines in yester years, and the differences in terms of social and economic development¹.



It is estimated that there are approximately 5.4 billion mobile subscriptions globally, an increase from 719 million, in year 2000. The 751% increase viewed alone, speaks of amazing achievements in terms of ICT access and bridging the digital divide. This interpretation however would be very narrow as the factors leading to ICT access are bound to interact with

the environments in which they operate. In this case, a critical analysis of mobile subscriptions by level of development, should trigger alarm bells as the sharp increase in ICT access is inordinately skewed towards developing countries as illustrated in the pie chart below. Why the concern?



While increase in access makes innovation and digital opportunity available, it also spews poison in the form of electronic waste, or e-waste. This is because the sharp increase of e-waste has not been matched with policy and regulatory mechanisms designed to cope with the influx of e-waste in developing countries generated from usage within and from illegal trade related dumping. Huge populations and the environment are now unduly exposed to the devastating effects of unmitigated handling of e-waste. This dismal situation spins a tragic story for many in the developing world who unknowingly make a choice between poverty and poison². Unfortunately, many people who have to pay the price never get to have a say in the matter.

The situation is bound to get worse.

Indeed, ICTs have become so integrated with our way of life to the extent that they are identified as a primary tool of getting certain things done. Governments all over the world have identified ICTs as a key element in the delivery of services to their citizens and in the expansion of business as they seek more prosperity for their citizens³. The uptake of broadband networks (which provide high speed access to the Internet) is pushing for the replacement of massive copper infrastructure. It is also leading to adoption of a multiplicity of electronic devices, prompting consumers to buy a new phone, a new computer, a new program which will become obsolete by the time we can figure out how to install it. A newer, better, and more expensive version will be already on the market, lessening the value and the appeal of versions released just prior⁴. The statistics on mobile broadband penetration in 2010 demonstrate a growth in uptake globally $^{\circ}$. The same upward trend in Internet penetration in households by level of development attests to the steady adoption of these new technologies by both the developed and developing countries in 2010.

Box 1: Defining e-waste

E-waste is a generic term encompassing various forms of electrical and electronic equipment (EEE) that are old, end-of-life electronic appliances and have ceased to be of any value to their owners. A practical definition of e-waste is 'any electrically powered appliance that fails to satisfy the current owner for its originally intended purpose'.

Source: UNEP, www.unep.fr/scp/waste/ewm/faq.htm#1

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Chinese child sits amongst e-waste





E-waste is one of the fastest growing waste streams today and it is growing at three times the rate of municipal waste globally 6 . Only 13% of e-waste is

reported to be recycled with or without safety procedures⁷.In February, 2010, UNEP released a report titled, *"Recycling – from E-Waste to Resources,"* in

which it called for the urgent need to prepare developing countries for the surge in e-waste⁸. It used data from 11 representative developing countries to estimate current and future e-waste generation – which includes old and dilapidated desk and laptop computers, printers, mobile phones, pagers, digital photo and music devices, refrigerators, toys and televisions. For PCs, TVs and refrigerators, on average, a linear increase was found. Mobile phone waste however demonstrated an exponential growth.

The report highlighted that by 2020 China's e-waste from old computers will have jumped by 200 to 400 percent from 2007 levels and by 500% in India. The report further indicated that by 2020, e-waste from discarded mobile phones in China will be about 7 times higher than 2007 levels and, in India, 18 times higher⁹.

The issue of e-waste as an emerging telecommunications policy and regulatory issue has received recognition at the highest level of governance in ITU. The ITU Plenipotentiary Conference, 2010 held in Guadalajara, Mexico, resolved that ITU would continue to demonstrate its leadership in conjunction with other agencies on the role of ICTs in climate change and protection of the environment ¹⁰. Resolution 182 recognized the role of ITU 'to promote awareness of the environmental issues associated with telecommunication/ICT equipment design and encourage energy efficiency and the use of materials in

the design and fabrication of telecommunication/ICT equipment in order to promote a clean and safe environment¹¹. The resolution also invited Member States, Sector Members and Associates to promote recycling and reuse of telecommunication/ICT equipment¹²;

Item C7 of the Plan of Action of the World Summit on the Information Society (WSIS) under C7 (20) continues to encourage 'government, civil society and the private sector to initiate actions and implement projects and programmes for sustainable production and consumption and the environmentally safe disposal and recycling of discarded hardware and components used in ICTs^{/13}.

Previously, at the World Telecommunication Policy Forum (WTPF) 2009 held in Lisbon, Portugal, ITU Secretary General Dr. Hamadoun Touré noted the rising concern over e-waste among the growing challenges that are reshaping the telecommunication industry, and emphasized that the Forum had come at a pivotal time, to define opinion on the future direction of the industry¹⁴. The Forum called on ITU *'to continue to study methods for environmentally safe disposal and recycling of discarded ICT equipment and facilities'*.¹⁵



Source: ecosystemdiscovery.com

Finally, the issue of e-waste has also been widely treated on the series of ITU symposia on ICTs, the environment and climate change¹⁶, as well as in the 2011 and 2010 editions of the WSIS Forum¹⁷. These fora have already highlighted the challenges that the accelerated adoption of ICTs will present for human health and the environment if the environmentally sound management of ICT equipment is not applied. Another angle highlighted by the participants of these events have been the need to strengthen the link between the ICT and environment sectors at the national level needs, and the need to engage the private sector to addressing e-waste. The assumption into the ICT sector in many countries, however, needs to be examined a bit more critically. This concern has arisen particularly in developing countries that continue to experience such rapid growth in the sector such that they do not have the opportunity of time to sequence complimentary mechanisms to handle the resultant ewaste.

1.2 What is e-waste?

e-Waste for short – or Waste Electrical and Electronic Equipment (WEEE) – is a generic term embracing all types of waste from old, end-of-life or discarded appliances containing electrically powered components. It includes computers, laptops, TVs, DVDs and other consumer electronics, fridges, freezers etc which have been disposed of by their original users¹⁸. WEEE is regarded as hazardous based on the characterization of the inherent constituent components including heavy metals such as lead, mercury, silver, cadmium and other hexavalent chromium elements.

Public perception of e-waste is often restricted to a narrower sense, comprising mainly of end-of-life ICT equipment and consumer electronics. Technically, however, electronic waste is only a subset of WEEE. The composition of the various subsets is not standard globally, and may differ between countries and regions.

According to the OECD, any appliance using an electric power supply that has reached its end-of-life comes under WEEE¹⁹. The classification under EU legislation is as illustrated in the table below.

In this paper, reference to "e-waste" is in relation to electronic waste generated from ICT Equipment and the infrastructure associated with it.

Classification under the EU WEEE Directive

Large Household Appliances

Washing machines, Dryers, Refrigerators, Air-conditioners, etc.

Office, Information & Communication Equipment PCs, Laptops, Mobiles, Telephones, Fax Machines, Copiers, Printers etc.

Entertainment & Consumer Electronics

Televisions, VCR/DVD/CD players, Hi-Fi sets, Radios, etc

Lighting Equipment Fluorescent tubes, sodium lamps etc. (Except: Bulbs, Halogen Bulbs)

Electric and Electronic Tools

Drills, Electric saws, Sewing Machines, Lawn Mowers etc. (Except: large stationary tools/machines)

Toys, Leisure, Sports and Recreational Equipment Electric train sets, coin slot machines, treadmills etc.

Medical Instruments and Equipment

Surveillance and Control Equipment

Automatic Issuing Machines

Source: http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:037:0024:0038:en:PDF



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

1.2.1 Statement of the problem

The information technology revolution Has made us smarter, faster, and more globally savvy. It has also seeped poison. Newsweek²⁰

Electronic waste can cause widespread environmental damage due to the use of toxic materials in the manufacture of electronic goods. Once the electronic item is no longer needed by the user, it is disposed off. In developed countries, a mechanism for the return or collection and recycling of this electronic waste is often in place, ensuring that such items are handled appropriately, hence safeguarding the environment and human health from adverse effects. But this is hardly the reality in most developing countries.

In developing countries, disposal in landfills releases hazardous materials into the waste stream with no special precautions in handling and recycling methods to avoid the known adverse effects on the environment and human health. Informal recyclers handle the disposed goods manually, sustaining cuts and bruises in the process, as they lack protective clothing and appropriate equipment. Often children and women are involved in these processes alongside the men in a bid to eke out a livelihood^{21, 22}.

The crude processes are carried out in back yards, in the open air or in poorly ventilated enclosed areas. What is not immediately apparent is the undue exposure to pollutants; heavy metals, toxic gases, biologically active materials (mimicking human/animal hormonal activity), slow poisoning chemicals, acids and plastic additives. These have both chronic and acute effects on the human system when exposed at variant levels in the human environment.

Below is an illustrative table of the health effects resulting from toxic constituents of e-waste.

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Woman working in e-waste yard in Asia



Source: www. loe.org

E-waste and its effect on health			
Source of E-Waste	Constituent	Health Effects	
Solder in printed Circuit boards, glass panels and gaskets in Computer monitors	Lead (PB)	Damage to central and peripheral nervous systems, circulatory System and renal system. Affects brain/cognitive development of the young.	
Chip resistors and semiconductors	Cadmium (CD)	Irreversible damage to human health. Accumulates in kidney and liver. Neural damage. Have teratogenic effects – foetal deformities and spontaneous miscarriages.	
Relays and switches, printed circuit boards	Mercury (Hg)	Damage to the brain. Respiratory and skin disorders due to accumulation in food species.	
Corrosion protection of untreated and galvanized steel plates, decorator or hardener for Steel housings	Hexavalent chromium (Cr) VI	Asthmatic bronchitis. DNA damage.	
Cabling and computer housing	Plastics Including PVC	Burning produces dioxin. It Causes: reproductive and developmental problems; immune system damage; interference with regulator hormones	
Plastic housing of electronic equipments and circuit boards.	Brominated flame retardants (BFR)	Disrupts endocrine system functions	
Front panel of CRTs	Barium (Ba)	Short term exposure causes: muscle weakness; damage to heart, liver and spleen.	
Motherboard	Beryllium (Be)	Carcinogenic (lung cancer) Inhalation of fumes and dust causes chronic beryllium Disease or beryllicosis. Skin diseases such as warts.	
housings Cabling and computer housing Plastic housing of electronic equipments and circuit boards. Front panel of CRTs Motherboard	Plastics Including PVC Brominated flame retardants (BFR) Barium (Ba) Beryllium (Be)	Burning produces dioxin. It Causes: reproductive and developmental problems; immune system damage; interference with regulator hormones Disrupts endocrine system functions Short term exposure causes: muscle weakness; damage to heart, liver and spleen. Carcinogenic (lung cancer) Inhalation of fumes and dust causes chronic beryllium Disease or beryllicosis. Skin diseases such as warts	

Source: Report on Workshop titled 'E-waste: Impacts, challenges and the role of government, service providers and the consumers in Kenya'.

These hazardous substances also result in environmental impacts such as air pollution by various toxic gases including those generated from incineration, soil pollution by solid waste materials, ground-water pollution from leaching toxins in landfills and garbage dumps. Lead that accumulates in the environment has highly acute and chronic toxic effects on flora and fauna. Indeed, the physical existence of ICTs through manufacturing, assembly, installation and disposal has been cited in academic research as a contributor to climate change of the first order²³.

Poor conventional methods of disposing e-waste, which are mainly open dumping and open burning results into oxidation of plastics made of Brominated Flame Retardants (BFR). This releases dioxins, furans and toxic Respiratory Suspended Particles (RSP) that cause risks to human health on exposure, and alter environmental systems.

Several studies have documented the hazards of informal backyard recycling. The table below is illustrative of the adverse outcome of investigations carried out between 2003 and 2007 in the town of Guiyu, Guangdong, China which is often referred to as "the e-waste capital of the world."²⁴.

Modern electronics can contain up to 60 different elements; many are valuable, some are hazardous and some are both. Electronic goods generate e-waste which contains valuable materials such as gold and copper. In its entity, electrical and electronic equipment is a consumer of many precious metals and therefore an important contributor to the world's demand for metals. Despite all legislative efforts in the developed countries and the EU to 'mine' these valuable resources from e-waste, the majority of these resources are lost²⁵. One of the main obstacles to efficiently recovering these resources is the almost non-existent infrastructure for collection and recycling as well as the missing assignment of clear responsibilities²⁶. Uninformed disposal leads to a waste of resources when such economically valuable materials are dumped or unhealthy conditions are developed during informal recycling. There is a growing concern about the adverse effects of e-waste as the electronic industry is one of the world's largest and fastest growing industries in the world.

Effective recycling to obtain these metals and other re-usable materials is crucial in order to make them available for the manufacture of new products. It will also ensure that primary metals are conserved for future generations.

The table below illustrates a schedule of hazardous materials that are found in e-waste components.

Outcome of investigations in Guiyu, China

- Elevated concentrations of PBDEs in soil and sediment samples, with substance profiles similar to various technical formulations of flame retardant products;
- Concentration of soils with carcinogenic, mutagenic, teratogenic and bioaccumulating PAHs especially from soils used for open burning of waste;
- High concentration of heavy metals in sediment samples from the Lianjiang river, consistently above the Interim Sediment Quality Guidelines set for Canadian standards;
- Concentration of some heavy metals associated with fine particulates in air samples ranging from 4 to 33 times higher than those recorded in other Asian cities;
- High concentrations of PBDEs in the blood samples of residents of Guiyu, including the highest concentration of of the commonly used brominated flame retardant BDE-209 so far reported in humans;
- High levels of lead in the blood of children from Guiyu and the potential damage to their IQ and developing central nervous systems as a result.

Source:http://gvisionaries.wordpress.com/2011/05/02/digital-dumping-an-inside-look-at-e-waste/

Hazardous Materials		
Components	Constituents	
Circuit boards	Lead,Cadmium, Brominated flame retardants and antimony oxide	
Monitor cathode ray tubes (CRTs)	Lead oxide and Cadmium	
Switches and Flat screen monitors	Mercury	
Computer batteries	Cadmium	
Old capacitators and transformers	Polychlorinated biphenyls (PCBs)	
Plastic casings, cables and polyvinyl chloride (PVC) cable insulation	Brominated flame retardants	
Source: Report on Workshop titled 'E-waste: Impacts, challenges and the role of government, service providers and the consumers in Kenya.		

1.3 Factors causing an increase of e-waste

Technological advances are driving innovations leading to a constant launch of new product ranges that lay a claim to being 'faster', 'smarter', 'lighter' and therefore offering more value to the user than the 'old and out of date' gadgets already in the market. This proliferation of gadgetry is pushed by the consumer oriented nature of the society today at an astonishing rate. The extract below describes the consumer reality in the United States in 2007²⁷.

Electronic equipment has become a mainstay of our American way of life.

In one way or another, it is an integral part of everything we do and own:

TVs in our homes, GPs's in our cars, cell phones and MP3 players in our ears, blackberries and videogames in our hands, and computers in our laps and on our desks. The electronic industry generates nearly \$2 billion a year, and it's no small wonder. Americans own nearly 3 billion electronic products.

For each new product that comes along, one or more becomes outdated or obsolete.

While the degree of gadget proliferation differs, the extract above is very reflective of the emerging scenario of many countries today.

The Environmental Protection Agency²⁸ statistics speak to the levels of e-waste in the US in the same year, as below.

E-Waste in 2007 – Was it Trashed or Recycled				
Products	Total disposed** (million of units)	Trashed	Recycled	Recycling Rate
	(million of units)	(million of units)	(million of units)	(by weight)
Televisions	26.9	20.6	6.3	18%
Computer Products*	205.5	157.3	48.2	18%
Cell Phones	140.3	126.3	14	10%

*Computer products include CPUs, monitors, notebooks, keyboards, mice, and "hard copy peripherals", which are printers, copiers, multi's and faxes.

**These totals don't include products that are no longer used, but stored.

Source: EPA 1

One of the technological advances that is currently causing rapid product obsolescence is the digital switch over in the broadcasting sector²⁹.

The switch to digital broadcasting has led to the ongoing transition from analogue to digital transmission of radio and TV signals by 2015 and in some regions, such as the EU, by the end of 2012. The conversion has led to procurement of Set Top Boxes (STB) to allow owners of analogue sets to receive digitally transmitted signals and acquisition of latest energy efficient broadcast equipment While the transition does not mean a systematic abandonment of analogue TV sets, many consumers are using this switch to overhaul their electronic devices and appliances in developed countries which are implementing the switch. As a result, there is flooding of analogue TV sets from developed nations implementing the switch into those countries that are yet to implement the digital switch over.

With regards to mobile services, the technological migration from second mobile communication networks (2G), which enable voice and limited data communications, to third generation networks (3G), which enable full data communications, and onwards also spurs the acquisition of smartphones and mobile Internet devices that place heavier demands on batteries than previous technologies³⁰. This leads to faster disposal of gadgets in the pursuit of new product releases that are able to harness the emerging functionalities. To enable these trends, it is often necessary to abandon legacy infrastructure and upgrade to accommodate broadband. This is yet another increasing stream of e-waste.

In the computing and information sub sector, there is demand for equipment with faster processing speed, larger memory and Liquid Crystal Display / Thin Film Technology (LCD/TFT) display units which are lighter and occupy less space. There has been a drastic reduction of memory devices like CDs, DVDs, Flash disks, memory cards and hard disks leading to a high turnover of obsolete accessories. All these have resulted in generation of e-waste.

Privatization and liberalization of the sector in many regions of the world has opened up a new platform for delivery of services to citizens. This has been particularly evidenced in developing countries where innovation around the mobile phone, for example has enabled delivery of education, agricultural and even financial services on this non-conventional medium. Governments have responded by enabling further adoption through public policy moves such as tailoring fiscal measures that would enable increased use of ICT equipment.

The Government of Kenya in the budget of 2009/2010 reduced cost of mobile phones and other ICT equipment and related components through elimination of VAT (sales tax) and import duty making ICT gadgets cheaper and enhancing affordability³¹. In the same year, the Government of Mauritius outlined a variety of generous financial incentives to encourage foreign IT/BPO companies into the country. These included corporate tax exemption (either 0% in the first year and 15% thereafter, or 5% in perpetuity); zero customs duty on ICT equipment; 50% tax relief on personal income tax for foreign IT specialists; and refunds of up to 75 % of training costs³². ICT companies continue to seek tax incentives in Singapore indicating that this would foster an environment conducive to internationalization through establishment of overseas markets³³. Without a doubt, these well meant scenarios geared towards growth and expansion of markets eventually lead to increased e-waste downstream. Consideration of fiscal incentives that would promote recycling would help achieve a more balanced outcome in the long run.

At the international level, laxity in enforcement of regulatory requirements on movement of e-waste leads to the export of e-waste from one jurisdiction to another. The exporting jurisdiction does this in order to benefit from cheaper labour and lax standards in the recipient jurisdiction. Often times, the export is a dumping strategy. Whatever the intention of exporting, it leads to an increase of e-waste in the recipient jurisdiction which is often ill prepared to handle it. It therefore gets saddled with dealing with e-waste as a secondary problem.

The United States is one of the largest producers of e-waste in the world. An examination of US data is illustrative of the magnitude of exported e-waste. It indicated that in 2005, approximately 61%, or 107,500 tons of CRT monitors and TVs collected for recycling were exported for remanufacture and refurbishment. The next largest portion (about 14% or 24,000 tons) was CRT glass sold to markets abroad for glass-to-glass processing³⁴. Currently, there is a lack of basic data on shipments of electronics from the U.S. to other countries. Information about where the waste is going, to whom does it go, and in what quantities will help in a better understanding of the extent of the problem, along with ensuring that solutions are targeted appropriately³⁵. E-waste is the dark side of ICT innovation. While countries are encouraged to optimize on the ICT platform to meet socio-economic goals, this is the right time to recognize the 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.

1.4 The e-waste ecosystem

From the foregoing discussion, it is clear that while e-waste presents a significant problem, it also presents opportunities alongside. In most developing countries, the problem of e-waste has continued to fester due to the almost non-existent infrastructure for collection and recycling. Developed countries have been able to harness this situation through formal structures that assign clear responsibilities to the various actors in the e-waste ecosystem.

1.4.1 Features of an effective e-waste ecosystem

At the heart of the design of an effective e-waste recycling ecosystem, the following fundamental objectives should be met:

- Handling hazardous and toxic substances in ewaste in an environmentally sound manner;
- Optimizing the recovery of valuable materials; and
- Creating sustainable businesses through models that address the local context (such as job creation, level of awareness of applicable technologies, etc.)

Typically, in most developing countries and economies in transition³⁶, the recycling of e-waste involves small enterprises that are numerous, widespread and difficult to regulate. They take advantage of low labour costs due to high unemployment rates, internal migration of poor peasants, and the lack of protest or political mobilization by affected villagers who believe that ewastes provide the only viable source of income and entry into modern development pathways. An effective e-waste ecosystem must stand the scrutiny of environment, health and safety standards. This would involve detection and measurement of emissions into air, water and soil as well as safety and protection for workers involved in this industry.

The recovery of useful materials would entail deployment of energy efficient technologies with a good yield of recovered material with respect to economic and environmental value.

The use of business models that address the local context is of utmost importance in determining the success of e-waste recycling. In many cases, the ability to provide jobs that accommodate the existing informal infrastructure in the industry would be key considerations for a developing country context. An assessment of the magnitude of e-waste in a country would provide vital preliminary data that would drive dialogue on how best to position interventions that are appropriate and relevant to the local context, yet cognizant of the need to build up an e-waste recycling ecosystem that complies with best practices.

1.4.2 Elements of the recycling chain

The recycling chain of e-waste consists of three main steps:

- Collection;
- Sorting/dismantling and pre-processing; and
- End-processing which includes refining and disposal.

The effectiveness of the recycling chain is only as strong as its weakest link as the linkages are heavily interdependent. The efficiency of the entire recycling chain depends on the efficiency of each step and on how well the interfaces between these interdependent steps are managed.

The recycling chain is also linked to other steps in the product life cycle such as product design, manufacturing and product use as what is done in dismantling and pre-processing affects the subsequent steps of material recovery. In addition, technological advances in final materials/metals recovery might imply new requirements for the output fractions of preceding steps. New material compositions, combinations or connections in electrical and electronic equipment, like LCD or plasma monitors, can imply adjustments to the set-up of the recycling chain.



1.4.2.1 Collection

This is the backbone upon which the e-waste recycling ecosystem rests. It determines the amount and type of material available for recycling. It requires an accessible, consistent and co-ordinated collection mechanism to enhance the chances of collection success. The lack of a collection system is a significant factor leading to e-waste being stock-piled in homes, offices and repair shops^{37,38.}

Outcomes of consumer surveys have also indicated that social and societal factors also play a role in determining the rate of collection success. Anecdotal evidence regarding mobile handsets has pointed to the reality that operator take back schemes often fail because of consumer behavior of not returning phones or expecting something in return³⁹. A global consumer survey by Nokia in 2008 revealed that majority of old mobile phones are lying in drawers at home and not being recycled as only 3% of people participate in recycling⁴⁰. his points to the need to create awareness and develop incentive mechanisms to make consumers more responsive because a recycling chain cannot be established without the collected items to feed it.

Mobile phone manufacturers could play a critical role in setting up a collection infrastructure to take back their old handsets. For example, Nokia is involved in take back schemes in the European Union, Australia, parts of South America and Asia. In 2006 around 500 Nokia Care points in China started to collect used phones, with China Mobile offering prepaid cards as an incentive to recycle. The scheme collected over 80 tonnes of electrical materials and has now been extended to cover 11 Nokia suppliers in China⁴¹. Samsung Electronics has developed voluntary take back

programs for its products at the end of their working lives in North America, Europe and Asia⁴². This responsibility includes ensuring that all collected products are recycled in the most efficient way to minimize the volume of unrecoverable materials and maximize the usable materials. It would seem that no efficient take back scheme exists as yet in Africa⁴³.

1.4.2.2 Dismantling and pre-processing

The purpose of dismantling and pre-processing is to liberate the materials and direct them to the appropriate final treatment processes. Hazardous substances have to be removed and stored or treated safely, while valuable components need to be taken out for re-use or to be directed to efficient recovery processes. This stage also includes removal of batteries which are sent to specialized plants for further processing.

Circuit boards present in ICT equipment contain most of the precious and special metals. Extraction of metals (such as from circuit boards) sometimes requires state of the art gas treatment equipment to prevent the release of dioxins to the environment. In hydrometallurgical plants, the special handling and disposal requirements necessary for the strongly acidic leaching effluents (such as cyanide, nitric acid, aqua regia) have to be diligently followed to ensure environmentally sound operations and to prevent tertiary emissions of hazardous substances. In implementing this stage, the challenge is to define the right priorities and find a balance in metals recovery that considers economic and environmental impacts instead of maximization of metal recovery rates in isolation. The current global approach is discussed in greater detail in the next sub-section.

Preprocessing of e-waste is not always necessary. Small, highly complex electronic devices such as mobiles and MP3 players can (after the removal of the battery) be treated directly by an end processor to recover the metals. After the removal of both the hazardous as well as the special components, the remainder of the device is further separated in the material output streams by manual dismantling or mechanical shredding and sorting techniques.

1.4.2.3 Mechanical pre-processing

Whereas investments and technology are less challenging in collection and dismantling, mechanical pre-processing and especially metallurgical metal recovery requires considerable investments in advanced technologies to handle the heterogeneous and complex materials. Division of labour at the international level has developed over time in response to this situation⁴⁴. It works with collection, dismantling and partly mechanical processing taking place at a national or regional level, as well as metals recovery from less complex materials such as ferrous, copper and aluminum.

Treatment of complex materials such as circuit boards, batteries, cell phones in integrated metal smelters or specialized battery recycling plants takes place in a global context. For such plants to run, they require a heavy financial investment and employ a highly skilled work force. Currently, integrated metal smelters equipped with appropriate installations for off- gas and effluent treatment are located in Belgium, Canada, Germany, Japan and Sweden. They source their feed materials from all over the world. Their feed mix comprises in addition to circuit boards and copper/precious metals containing e-waste fractions consists mining concentrates, smelter residues and catalysts⁴⁵.

The aspect of considering a regional approach in treatment of complex e-waste material would be a value proposition worth consideration in regions that are yet to formulate an e-waste strategy.

1.4.2.4 Refurbishment

During the classification of the e-waste collected, there are electronic items that can be sorted and

identified as fit for re-use. Such items such as computers can be refurbished and eventually find their way back to the market. Refurbished or recertified computers are those which are checked for any faults, and if any, they are corrected and sold with a warranty. Used computers in the second-hand market, will however not carry a warranty upon re-sale, or will include a limited warranty over a shorter period of time. Through refurbishment, electronic equipment such as laptops, computers, servers and printers get a new lease of life, usually to a new community of persons who would not otherwise have afforded a brand new item.

The interdependence of the e-waste recycling ecosystem indicates the need to clearly identify the key actors/stakeholders in the value chain and develop a healthy dialogue upon which to nurture their mutual relationships. A healthy engagement and adequate communication would enable the achievement of efficiencies and development of proactive strategies for the e-waste recycling ecosystem.

A sample of an e-waste management process flow diagram by Computer for Schools Kenya (CFSK) is illustrated below.

1.4.2.5 Towards a greater awareness

There do exist several initiatives in support for a greater awareness about e-waste in order to inform our response towards its reduction and this section aims to highlight a few of these.

An environmental awareness initiative worth noting is the RSA WEE Man that was launched in 2006 following the enactment of the WEEE Directive⁴⁶. The RSA WEEE Man, is an imposing seven metre high, human figure composed of three tonnes of WEEE. This represents the total amount of electronic waste that an average person in the UK is likely to consume in their lifetime and it was meant to highlight the growing problem of Waste Electrical and Electronic Equipment (WEEE) in the UK and across Europe.



International civil society organizations have also stepped up the e-waste cause through various campaigns. Greenpeace⁴⁷, has developed a Guide to Greener Electronics with the goal of seeking creative solutions to the environmental problem of e-waste. The guide ranks the 18 top manufacturers for PCs, computers, mobile phones, TVs and game consoles according to their policies on toxic chemicals, recycling and climate change. The three goals of the guide are to get the companies to:–

- Clean up their products,
- Take back and recycle their products once they become obsolete, and
- Reduce the climate impacts on their operations and products.

The most recent guide (version 16) was released in October 2010 and is displayed below. A new release is expected in November 2011.

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The entry of e-waste artists is an interesting emerging trend where artists turn e-waste into art. Using discarded hard drives, discs, circuit boards and other components, sculptors are able to create works of art, some of which are quite expensive⁴⁸. Below is 'Jack', an art piece by Brenda Guyton that was on sale for USD 995.



Solid waste management is already a big challenge in many developing countries, and is likely to become worse with the invasion of e-waste, particularly computer waste. Creative forms of utilization of the ewaste would help to raise awareness while creating employment at the same time⁴⁹. An e-waste treatment facility established by Hewlett Packard in Cape Town, South Africa processed approximately 60 tons of electronic equipment, generated about \$14,000, and employed 19 people in 2008. Workers refurbished and resold some products and dismantled others to sell the raw materials to businesses that recycle metals and plastics. They also made jewelry out of some of the processors and boards⁵⁰.

1.5 Barriers to safe E-Waste Management

Despite the growing concern on e-waste management, the problem does not seem to be matched by development of mitigation strategies to handle the situation. One of the immediate strategies would be the development of collection systems, often referred to as the back bone of any successful e-waste management system.

UNEP conducted an assessment to establish the informal and formal processes in the e-waste recycling

chain in selected developing countries and it emerged that the use of informal recycling should not presuppose lack of sustainability. In fact, informal collection systems were found to be rather efficient in countries like India and China because the daily informal collectors were able to penetrate each community and collect e-waste from house to house. The collectors were also able to get a reasonable pay and this in turn promoted a high collection rate, hence a model that was responsive to local needs for job creation⁵¹.

While this model would be preferable for developing countries where labour cost is low and there is an available work force, a further analysis revealed that most sustainable recycling systems tended to be found where recycling schemes were formal⁵². It should therefore be noted that depending on the socio-economic context of a country, a sustainable recycling system could include a blend in an organized informal collection system.

The graphical depiction of the analysis was as below:

Comparative analysis of selected developing countries regarding the dimension of the formal and informal e-waste recycling sector.

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As shown in the illustration above, all developing countries selected featured a formal and informal e-waste recycling sector. The graph is divided into four quadrants representing different shares of the recycling market between the informal and formal sector. It emerged that a sustainable recycling system should grow towards the upper right hand corner of the graph, where most of the established recycling schemes in Europe and North America are currently located.

The report noted that with strong support in capacity building, technology and knowledge exchange, these countries would be able to strengthen their informal sector and move towards establishment of a formal sector with some capability of end-processing technology. Trade related issues also constitute a significant barrier to effective e-waste management.

E-waste from developed countries finds its way into developing countries in the name of free trade and further complicates problems associated with waste management⁵³. It is difficult to estimate the quantum of transboundary e-waste streams, as this trade in ewaste is camouflaged and conducted under the pretext of obtaining 'reusable' equipment or 'donations' from developed nations. Often government trade data does not distinguish between imports of new and old computers and peripheral parts and so it is difficult to track what share of imports are used electronic goods. Some exporters may deliberately leave difficult-to-spot obsolete or non-working equipment mixed within loads of working equipment (through ignorance, or to avoid more costly treatment processes).

The trade related implications of e-waste have led to great co-operation on the international and regional fronts in an attempt to curb rising pollution, the waste of natural resources, and health problems associated with dumped electronics.

Unmarked shipments containing electronic waste make their way to Asia, Africa (Particularly West Africa) and other parts of the world that have little capacity to interdict illegal imports or safely recycle electronics at the end of the useful life⁵⁴. These digital dumping grounds are located primarily in Ghana, Nigeria, Pakistan, India, and China⁵⁵. In Lagos, while there is a legitimate robust market and ability to repair and refurbish old electronic equipment including computers, monitors, TVs and cell phones, local experts complain that of the estimated 500 40-foot containers shipped to Lagos each month, as much as 75% of the imports are "junk" and are not economically repairable or marketable. Consequently, this e-waste, which is a hazardous is being discarded and routinely burned in

what the environmentalists call "a cyber-age nightmare now landing on the shores of developing countries⁵⁶."

It is for these reasons that the development of an effective e-waste management response cannot be complete without appreciating the policy and regulatory governance frameworks that exist at the global, regional and local levels to complement each other in various respects of enforcement and compliance.

The case of Agbogbloshie, a slum that lies on the outskirts of Ghana is illustrative of the trade related implications of e-waste. It is one of Ghana's largest ewaste dumps, with mountains of abandoned motherboards, computer monitors, and hard drives littering the landscape. Living conditions, amid black smoke and the stench of burning plastic are so harsh that locals have nicknamed it 'Sodom and Gomorrah'.

Agbogbloshie is a sad story about best of intentions gone awry. Functional second hand computers began

arriving from the West to help 'bridge the digital divide'. Ghanaians welcomed these donations, because these computers cost 1/10th of a new one⁵⁷. As the turnover rate of electronics increased, the once benevolent act of donating used computers became corrupted. Unsalvageable (outdated, broken, unusable) electronics started to be exported to Ghana in mass quantities. What had been an ad hoc development project quickly devolved into a scheme for companies in the West to send unregulated shipping containers, marked 'donations', as a means to get around national regulations and cheaply dump dangerous garbage into ill-equipped and extraordinarily poor rural villages^{58, 59.}

For Western industries which have strict laws controlling the disposal of e-waste, it is cheaper to ship outdated and damaged computers to developing countries under the 'donation' label than to properly recycle the electronics. As a result, Agbogbloshie's soil and water, have high concentrations of lead, mercury, thallium, hydrogen cyanide, and PVC.

Barriers to safe e-waste management

- Lack of public awareness on the need for an e-waste management system and consumer responsible behavior.
- Inadequate legislation
- Difficulty in inventorization
- Funding/sustainability
- Unhealthy conditions of informal recycling
- No data on quantity of e-waste generated and disposed off each year and the resultant extent of environmental risk
- Reluctance on the part of corporates to address critical issues
- Limited capacity of important government agencies to deal with e-waste
- Lack of co-ordinated approach across service providers and ministries to deal with e-waste.
- Limited support for local initiatives



Source: http://gvisionaries.wordpress.com/2011/05/02/digital-dumping-an-inside-look-at-e-waste/

1.6 Governance of e-waste management

One of the factors that play a significant part in determining the state of the e-waste management sector in a country is the existence of policy and legislative regime articulating the expectation and aspirations pertinent to e-waste management.

The lack of policy and regulatory frameworks, or the existence of disjointed and contradictory frameworks encourages illegal dumping of toxic ewaste and the handling of hazardous waste without safety and protection standards. The use of crude extraction methods exposes the handlers and the environment to unnecessary harms. This is typically the situation in developing countries where the e-waste recycling sector is informal and has no benefit of standards and structures that a regulatory framework would provide.

A governance regime provides the building blocks on which the transfer of skills and technology can be made. It will also determine the involvement of other players such as the private sector who are critical in provision of business and finance in setting up the necessary infrastructure. The role for the ICT regulator is, inevitably drawn to the spotlight as its recognition of e-waste management as a priority determines the commitment in developing a policy and regulatory framework going forward.

The regulatory authority is a custodian to ensure that there is compliance with standards. It is recognized that in different countries, one or more agencies could be called upon to act on the issue of e-waste depending on the structure in place. For example, South Africa, Botswana, Zambia, Zimbabwe among many other African countries have distinct ministries/government departments for ICT and environment, However, the regulator in charge of promotion of use of ICTs would be a critical actor in articulating policies and strategies for dealing with concerns arising after the end of life period of ICT gadgets and devises. It is recognized that there would need to be a good collaboration with related agencies to ensure visibility and scrutiny of all actors towards compliance with e-waste governance requirements.

While the momentum on how to handle e-waste is fairly established in developed countries in Europe, North America and Asia, it remains comparatively unexplored in developing countries. The initiation of this discussion at ITU is an indication that the e-waste dilemma is sitting at the door of the ICT regulator. This is evidence of the law of unintended consequences – markets are regulated to drive competition, giving users access to advanced ICTs; however the resulting proliferation of users and devices has negative effects on us and the environment.

It is timely to have this discussion so that it can prompt a responsible reaction on the role of regulators in enabling and promoting measures that would effectively handle the management of e-waste. Being a new area, this would call for support from ITU in collaboration with other international agencies such as UNEP or the Basel convention, in building capacity necessary to implement an e-waste regulatory framework at all levels – locally, regionally and internationally.

1.6.1 International level

Sector governance through a comprehensive policy and legislative framework lies at the heart of a sustainable e-waste recycling management strategy. This would aid the process of identification of the roles and responsibilities of various players in the sector at the local, regional and international level. The ultimate reflection of commitments made at the supra level would be through development of comprehensive legislation at the domestic level.

1.6.1.1 Basel Convention

The tightening of environmental regulations in industrialized countries sparked the genesis of multilateral environmental agreements (MEAs) as this situation led to a dramatic rise in the cost of hazardous waste disposal. Searching for cheaper ways to get rid of the wastes, "toxic traders" began shipping hazardous waste to developing countries and to Eastern Europe. When this activity was revealed, international outrage led to the drafting and adoption of the Basel Convention. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental agreement on hazardous and other wastes⁶⁰. The Convention had 175 Parties as at April, 2011 and aims to protect human health and the environment against the adverse effects resulting from generation, management, transboundary the movements and disposal of hazardous and other wastes. The Basel Convention came into force in 1992⁶¹.

During its first Decade (1989-1999), the Convention was principally devoted to setting up a framework for controlling the "transboundary" movements of hazardous wastes ⁶², that is, the movement of hazardous wastes across international frontiers. It also developed the criteria for "environmentally sound management". A Control System, based on prior written notification, was also put into place.

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, enforcer?
- How should e-waste policies be designed so that they do not present a bottle neck 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 ewaste management?
- How will 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 ewaste regulatory framework?

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During The Second Decade (2000-2010), the Convention built on this framework by emphasizing full implementation and enforcement of treaty commitments. The other area of focus was the minimization of hazardous waste generation – both in terms of quantity and hazardousness.

The Basel Convention contains specific provisions for the monitoring of implementation and compliance. A number of articles in the Convention oblige Parties (national governments which have acceded to the Convention) to take appropriate measures to implement and enforce its provisions, including measures to prevent and punish conduct in contravention of the Convention. Each party to the Convention is required to report information on the generation and movement of hazardous wastes.

The 2002 Strategic Plan for the Implementation of the Basel Convention has been recognized as a key pillar in giving effect to environmentally sound management of hazardous and other wastes until 2010. There is still much to be done in realizing the full effect of the Basel Convention, particularly for developing countries and economies that are in transition. These challenges stem from the difficulties experienced by developing countries in regulating the import of e-waste among a wide spectrum of actors both domestically and abroad - coupled with high costs of creating an infrastructure capable of enforcing the proper disposal of e-waste⁶³. As a starting point, countries that have not ratified or become signatories to the Convention could examine the possibility of becoming parties to it.

The listing of Parties and Signatories is available at www.basel.int/ratif/ratif.html.

The continued growth of the ICT sector is influencing the movement of issues pertaining to ewaste from the periphery to the center of policies related to ICT and sustainable development. This movement is a reflection of a new awareness particularly in developed countries that have over the years worked on mechanisms to harness the situation. The lack of preparedness for developing countries highlights the plight they are in because e-waste is growing and encroaching uncontrollably every day.

In recognition of this, the Nairobi Ministerial Declaration on the environmentally sound management of electronic and electrical waste was passed during the 8th Meeting of the Conference of the Parties to the Basel Convention held in Nairobi, Kenya from 27 November-1 December, 2006. The declaration, recognizing the lag of enforcement by developing countries sought to re-emphasize the need to cooperate and provide creative innovative solutions to bridge the developmental gap. This subsequently led to the adoption by the 9th Conference of the Parties to the Basel Convention of the Work Plan for the Environmentally Sound Management of E-waste, focusing on the needs of developing countries and countries with economies in transition.

An extract of the Declaration is provided below.

Focus areas of the Basel Convention

- Prevention, minimization, recycling, recovery and disposal of hazardous and other wastes, taking into account social, technological and economic concerns;
- Active promotion and use of cleaner technologies and production methods;
- Further reduction of movement of hazardous and other wastes;
- Prevention and monitoring of illegal traffic;
- Improvement of institutional and technical capabilities -through technology when appropriate especially for developing countries and countries with economies in transition;
- Further development of regional centres for training and technology transfer;
- Enhancement of information exchange, education and awareness-raising in all sectors of society;
- Cooperation and partnership with public authorities, international organizations, industry, nongovernmental organizations and academic institutions;
- Development of mechanisms for compliance with and for the monitoring and effective implementation of the Convention and its amendments.

Nairobi Declaration⁶⁴

Concerned about the risk to the environment and human health arising from international traffic in e-waste to countries, in particular to developing countries that do not possess the capacity for the environmentally sound management for such e-wastes,

1. Declare:

- a) That we shall promote awareness at all levels on the issue of e-waste, challenges and solutions;
- b) That we shall encourage and promote exchange of information and transfer of best available technologies for the environmentally sound management of e-waste from developed countries to developed countries and countries with economies in transition;
- c) That we shall encourage national, regional and global comprehensive actions for the environmentally sound management of e-waste, and end-of-life equipment, through shared responsibilities and commitments from all concerned stakeholders;
- d) That we shall improve waste management controls through the establishment of robust national policies, legislation and diligent enforcement, including producers' and traders' responsibilities as well as take-back and recycling schemes and their targets;
- e) That we shall prevent and combat illegal traffic of e-waste, taking into account the benefits accrued through harmonization of national laws at the regional level;
- f) That we shall develop and consolidate national, regional and international cooperation and programmes or initiatives to support the implementation of activities aimed at the environmentally sound management of e-waste utilizing, as appropriate, the Basel Convention region centers;

1.6.2 Regional level

With the creation of political federations, economic trade areas and common markets, the need to articulate regional issues on a common platform has gained currency over the years. The European Union (EU) is probably the most distinguished in this regard, requiring member stated to pass on regional directives into their national laws for compliance and enforcement.

1.6.2.1 Directives on Waste Electrical and Electronic Equipment (WEEE)

While most MEAs focus on the proper disposal and transportation of e-waste, WEEE and Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations (RoHS) are partner Directives focusing on minimizing the source and creation of e-waste by banning certain hazardous chemicals and shifting the costs and responsibility of e-waste disposal to industry through the concept of Extended Producer Responsibility (EPR)⁶⁵.

Through EPR, industry is expected to establish an infrastructure for collecting WEEE, in such a way that "Users of electrical and electronic equipment from

private households should have the possibility of returning WEEE at least free of charge". Also, industry is compelled to use the collected waste in an ecologicallyfriendly manner, either by ecological disposal or by reuse/refurbishment of the collected WEEE.

RoHS restricts the use of mercury, lead, hexavalent chromium, cadmium and a range of flame retardants notably polybrominated biphenyls and ploybrominated diphenyl ethers in electrical and electronic equipment. The only exemptions for use of these hazardous substances are where alternatives do not presently exist. There are also permissible maximum concentration values which allow for any trace presence. Given the scope of RoHS, it assigns responsibility to manufacturers, assemblers and importers of electrical and electronic equipment⁶⁶.

These Directives apply to products placed on the European market and each member state was required to transpose their provisions into national law by 13th August, 2004.

1.6.2.2 The North American Agreement on Environmental Cooperation

The Commission for Environmental Cooperation (CEC), is an international organization established by the United States, Canada, and Mexico under the North American Agreement on Environmental Cooperation (NAAEC) to complement the North American Free Trade Agreement (NAFTA).

Since its creation in 1994, the CEC has advanced dialogue and understanding of trade-environment linkages; increased government accountability regarding enforcement; achieved substantial results on key North American issues such as chemicals management and the conservation of North American biodiversity; and built substantial environmental capacities. The North American cooperation addresses issues of illegal movement of e-waste and also contributes to more effective enforcement at the domestic level in the region.

Currently, projects specific to e-waste relate to: Recycling metals and plastics within Small and Medium Enterprises (SMEs), E-Waste Intelligence Sharing to enhance enforcement and Studying trade flows of Used Electronics in the region. The latter project goal is to improve the understanding of the trends of e-waste and used electronics coming into North America and those being exported to the rest of the world. Thereafter an electronic system for exchanging information on the transport of hazardous wastes and hazardous recyclable materials in North America will be completed⁶⁷.

Worth noting in this example is the pooling of synergies at a regional level to tackle issues of commonality. This would be a critical learning item for regions yet to implement e-waste management mechanisms as some aspects of e-waste management are easier to achieve through regional cooperation due to huge financing requirements, extensive compliance and enforcement requirements etc.

1.6.2.3 Durban Declaration on e-waste management in Africa

The Durban Declaration was the outcome of an ewaste workshop held during WasteCon 2008 in Durban South Africa. Based on the sharing of experiences from Kenya, Morocco, Senegal, South Africa and Uganda, it recognized the need to escalate awareness among stakeholders about environmental and health issues related to recycling and disposal practices of e-waste⁶⁸. It also recognized the need for every country in Africa to initiate its own internal process that would define a road map related to specific e-waste management objectives. While this Declaration does not qualify as a multilateral agreement, it does demonstrate the beginning of a 'meeting of minds' on an issue which is a great catalyst to drive a regional dialogue towards implementation of e-waste management best practices.

1.6.3 Domestic level

As a carry forward of commitments made at the international and regional level, there is need for an e-waste policy and regulatory environment at the domestic level that encourages investment right through the ICT value chain to ensure minimization of the waste and environmentally safe disposal.

Many jurisdictions do not have any dedicated legislation dealing with e-waste such as India, Brazil, Mexico, Colombia, Kenya and South Africa. At best, the issue of e-waste management is covered in disparate legislation on issues of environment, water, air, health and safety, municipal waste and hazardous waste⁶⁹ The lack of a focal custodian means that there is no one agency dedicated to this issue, resulting in inertia, inordinate delays in formulation of the much required regulatory frameworks and lack of uniformity in enforcement. Government, however, is ultimately responsible for enforcement through mandatory regulations that serve the purpose of controlling and setting of goals, and establishing monitoring, enforcement rules⁷⁰.

Earlier studies have indicated a significant correlation between legislative activity and constraints in landfill capacity, such as in Western Europe⁷¹ and Asia⁷² and in Australia⁷³. Japan and Taiwan, China face similar problems with Japan's landfill capacity having been estimated to be zero by 2008^{74,75,76}. Could the existence of open spaces in many developing countries be the source of comfort?



The limited capacity in government agencies coupled with lack of a coordinated approach means that visibility of the actors to the legal requirements is low, and at worst lost. The issue of e-waste management continues to be absent from the political agenda in many countries due to this dispersion of effort, at a time when it should be in the fore front. The knowledge and expertise resident with ICT regulators would play a key role in shaping and driving the dialogue on e-waste. The regulator would also be able to ensure a responsible balance between the push for ICT access and disposal of ICT components and gadgets.

1.7 Role of legal reform

In the last two decades, significant technological developments and correspondingly rapid social and economic changes have been experienced in the ICT sector. Largely, the changes have been positive and are to be celebrated. There are however new challenges that have come with this new prosperity that have exacerbated tensions in government institutions ill prepared to cope and put increased pressure on the regulatory frameworks that did not quite anticipate the emerging challenges. This unfolding scenario presents the ICT Regulator with a frontier for legal reform in the area of e-waste management in order to ensure that its

regulatory framework remains responsive to emerging needs in society.

All regulation is ultimately about encouraging and reinforcing good behavior or penalizing and deterring bad behavior. This can be achieved through various means, formal and informal with varying degrees of informality and enforceability. Interventions can be supported with a range of incentives, penalties and sanctions designed to steer behavior towards the desired direction.

1.7.1 Formal and informal regulation

In the absence of strong legislative practices, voluntary actions appear to guide waste management – both at global and national levels⁷⁷. Statutory law is very formal and mandatory in nature. It is normally enacted by a legislature or other governing body before it becomes operational. The mandatory nature allows for achievement of certain defined public policy goals and backs up non-compliance with penalties⁷⁸. It is often the means used where informal voluntary efforts are not enough in achieving the desired regulatory goals. Informal measures come in many forms and can be supported with varying levels of formal interventions.

	Formal regulation Statutory law			
Ad • •	vantages Mandatory, non-negotiable Has access to immediate adverse consequences in the event of non-compliance Allows a government to communicate a clear and consistent signal to its target	Disad • (•)	<i>dvantages</i> Could stifle innovation if construed too strictly Vulnerable to being overtaken by events as sometimes law reform can take a long time.	

Informal regulation		
Code of practice, code of conduct Key performance indicators Targets Voluntary agreements Guidelines Industry labels Best practice information Public consultation, publication, information and education		
 Advantages Less formal, can be changed from time to time to accommodate changing circumstances Can influence introduction of corporate social responsibility programmes to deal with e-waste 	 Disadvantages If the parameters keep changing, it can lead to confusion in the targeted audience Due to informality, it relies on good will or peer pressure to achieve desired outcomes. It is therefore prone to free riders who can seriously hamper the achievement of the desired objectives Because of the impact on human health and the environment, e-waste cannot be left to voluntarism. It is a national priority and should be regarded as a key consumer awareness issue. Sometimes can be implemented to pre-empt legislation or avert a regulatory threat without the intention to really achieve goals Voluntary business practices tend to be the exception rather than the rule The success of informal regulation is very dependent on the existence of industry associations, commitment by members, ability to generate industry solutions which factors may not be present or consistent Self regulation on its own hardly provides sufficient credibility to the system 	
From the tables above the scales seem to tip in	growth and innovation in the castor in a systematic	

From the tables above, the scales seem to tip in favour of formal regulation. The existence of e-waste is a symptom of deviant behaviour in a market economy – whether it be illegal importing, polluting recycling or poor product design and it needs to be corrected at any rate.

A study on dissemination of DfE in Europe shows that "regulations are the main driver for eco-design activities" ⁷⁹. Further research indicated that the conclusion and implementation of the most successful covenants, a flagship of the voluntary approach, would not be possible without a so-called 'regulatory threat' and observes that the anticipation of upcoming legislation can be just as powerful as actual mandatory requirements in stimulating improvements.'⁸⁰.

While each form of regulation can be supportive of the other, the growing concern on e-waste and the need to allocate obligation on users and manufacturers, would call for statutory interventions for enforcement to be successful. Statutory intervention is able to leverage itself in achievement of strategic transformation by enabling the ICT regulator steer growth and innovation in the sector in a sustainable direction. Unless there is statutory direction on e-waste management, there is a high likelihood that the ICT sector will adopt a 'wait-and-see' strategy, hence compounding the problem.

It is however worth noting that even in countries where legislation had been developed, the success has been mixed. For instance, despite all legislative efforts to establish sustainable e-waste recycling in many developed countries such as the UK and the US, there is evidence of weaknesses in implementation. That explains why investigative reports by UK media houses tracked electronic devices belonging to the UK's leading public institutions including local councils, the police department and health services in dumping sites in Ghana and Nigeria⁸¹. In August 2008, a scathing report was issued against the EPA, indicating that large amounts of e-waste collected in the United States were still ending up in China and India⁸². A study by UNEP analyzing policy and legislation mechanisms to assess barriers for sustainable e-waste management in eleven countries (South Africa, Kenya , Uganda, Morocco, Senegal, Peru, Columbia, Mexico, Brazil, India and China) showed that no country – with the exception of China, which has a low record of implementation – has dedicated policy and legislative mechanisms to deal with e-waste⁸³.

In addition, it is also noted that most developing countries do not have strong industry associations that are capable of implementing informal regulation with the commitment and adherence of all their members. It therefore demonstrates that informal activity will be ridden with loopholes and therefore be incapable of credibly administering an e-waste management strategy. It is with this in mind that the next section will discuss the concept of extended producer responsibility and propose that countries consider its adoption into their e-waste regulatory frameworks.

1.7.2 Extended Product Responsibility (EPR)

Increased environmental awareness is contributing to new government regulatory measures that address disposal of electronic waste. EPR is a concept that is increasingly being adopted into legislation. It is a strategy designed to promote the integration of environmental costs associated with goods throughout their life cycle into the market price of the products⁸⁴. EPR may take the form of a reuse, buy-back (take-back), recycling or disposal program, or in energy production from waste materials.

Also known as product stewardship, EPR uses financial incentives to encourage manufacturers to design environmentally-friendly products by holding producers liable for the cost of managing their products at end of life. This strategy attempts to relieve local governments of the costs of managing certain products by forcing manufacturers to internalize the cost of recycling within the product price. EPR promotes that producers (usually brand owners) have the greatest control over product design and marketing and therefore have the greatest ability and responsibility to reduce toxicity and waste⁸⁵ One of EPR's main objectives is not only to mitigate harmful environmental impacts at the end-of-life of a product, but to do so by influencing the product design process. In response to legislated producer responsibility, methodologies have been developed which incorporate a form of environmental consciousness at product design stage^{86,87,88}.

The most direct form of EPR implementation is take-back legislation, where the producer may be required financially and sometimes physically to reduce the environmental impact (i.e. handling and disposal of waste)⁸⁹. The producer may also choose to delegate this responsibility to a third party called a producer responsibility organization (PRO), which is paid by the producer, for spent-product management. In this way, EPR shifts responsibility for waste from government to private industry, obliging producers, importers and/or sellers to internalize waste management costs in their product prices and ensuring the sustainable and safe handling of the remains of their products^{90,91}. The producer responsibility arrangement can vary from fully private models to publicly funded ones, sharing operational and controlling aspects at different levels⁹².

Mobile Cashmate, UK is registered as an Approved Authorised Treatment Facility (AATF) to facilitate re-use or recycle of electronic equipment in compliance with the EU Directive



Source: news.mobilecashmate.co.uk/

The goals of take-back laws are to:

- 1. encourage companies to design products for reuse, recyclability, and materials reduction;
- correct market signals to the consumer by incorporating waste management costs into the product's price;
- 3. promote innovation in recycling technology⁹³.

The greatest take-back activity has been in Europe, where government-sponsored take-back initiatives arose from concerns about scarce landfill space and potentially hazardous substances in component parts. Although the United States does not currently have a national law or policy requiring producer responsibility, 25 states have already passed laws requiring producer responsibility and many others are currently working towards passing producer responsibility laws⁹⁴.

Advantages of EPR

When producers are held directly accountable for their products end of life impact or recycling under EPR through a financial or physical burden, they become more responsive to design more sustainable, less toxic, and easily recyclable electronics^{95,96,97,98}. They tend to use fewer materials and design their product to last longer in order to cut costs^{99,100}. EPR has the potential to alter the industry standard of planned obsolescence by encouraging a longer life to reduce overall cost of production and recycling¹⁰¹. EPR's can also extend from product design to research and development for better ways to recycle and reuse^{102,103}. An immediate direct benefit of enactment of take-back legislation would be reduction of waste in landfills¹⁰⁴.

Disadvantages of EPR

Due to the complexity of electronics, the problems of disassembly of parts to be re-used and their quality

Challenges to implementation of EPR

- Trade problems
- Producer definition
- Collection logistics
- Assignment of financial responsibilities
- Free riders
- Identification of responsible producer for some items
- Retroactive legislation

and durability for re-use are a concern¹⁰⁵. The need to an elaborate collection develop mechanism, particularly for large items such as computers, coupled with more sophisticated methods of recycling due to heavy metals used, could increase the cost of electronics for consumers because producers would be adding recycling costs into the initial price tag of items. It has also been argued that the obligations imposed by EPR would slow technical innovation and impede technological process. In countries where take-back is ran on a voluntary platform, it can encourage free riders, which places companies that act most responsibly at a disadvantage¹⁰⁶.

The greatest challenge of implementing EPR is the requirement for sustainable financing for a collection mechanism. Where responsibility of a product is shared between many producers, the assignment of EPR along the value chain gets complicated¹⁰⁷. In developing countries, the EPR requirement would extend to importers since most of the electronic goods sold are imported. International companies would therefore have to factor the implications of EPR within their distribution channels.

1.7.3 Financing

Significant resources would be required to implement an e-waste regulatory framework due to the extensive compliance and enforcement requirements to be met. The need to establish formal collection systems locally and facilities for treatment of complex e-waste material within regions would demand considerable investments in advanced technologies and the requirement for a highly skilled work force. The financing mechanism of e-waste is not clear particularly for developing countries where ICT goods are imported through third parties, making it difficult to implement EPR. Due to this unstructured method of supply, how best should a sustainable funding mechanism be designed?

The lack of e-waste policies in developing countries could be an early indication on the lack of clarity as regards who should bear the cost of responsibility in ewaste management – is it the consumer, producer, service provider, municipal authority or the government?

There is however a need to balance the push for access to ICTs with the practicality of harnessing the resultant e-waste which is the dark side of this innovation, in a manner that is sustainable. Yet the implementation mechanism must be robust enough to support formalization of collection systems, establishment of treatment facilities and enable cooperation at regional and international level where transboundary enforcement issues are handled.

From a general perspective, three main stakeholders have been identified as potential bearers of responsibilities for managing e-waste and could be used to inform the financing model going forward¹⁰⁸. These are producers, consumers and the government.

A 'front-end' mechanism as a basis for a financing model would be informed by the producer responsibility principle. This would entail increasing sales prices and reducing sales margins in order to absorb the cost of managing e-waste. It must however be recognized that the current producer responsibility principle across Europe has not always been an incentive to collect more, simply because stakeholders responsible for financing have no economic benefits.

The 'polluter pays' principle can be extended to consumers with the justification that they are the cause of e-waste through consumption and should therefore pay for its management. This mechanism is workable through the designing-in of additional funding through advance recycling fees on all ICT products. This 'back-end' financial mechanism has been found to be a prudent source of finance from actors at the point of retail sale for final consumption where there is both the ability and the willingness to pay¹⁰⁹.

However, while this would generate a proportionate revenue stream dedicated to recycling, it

would raise the cost of products (whose price has probably already been subsidized through tax waivers and rebates in developing countries) thus making them inaccessible. This in turn could fuel a grey or black market for used EEE from elsewhere. In addition, the enforcement requirement in markets with unstructured importation might be difficult to achieve due to nondocumentation of points of sale which renders them 'invisible' as a back-end fund collection mechanism, leading to weak fund collection potential.

Both these 'front' and 'back-end' models are constrained in terms of bearing the cost of handling historical cases consisting of existing e-waste and electronic products in the market with no recycling obligations attached. As long as illegal imported ewaste continues to arrive into developing/transition countries, allocation of financial responsibility would be a complicated issue and may force government to step into the gap. The problem of historical and orphan products cannot be resolved in an ex ante fashion as the products had already been placed on the market and their producers have subsequently disappeared before the establishment of any financial mechanisms¹¹⁰. Where it is not possible to identify producers for free rider products, should the identifiable producers bear the cost of the free riders proportionately, based on the present market share? It would therefore appear that, these mechanisms utilized in isolation, would fall short in addressing the ewaste realities on the ground.

As e-waste is a societal problem and it has longterm environmental impact, its management could be effectively regulated by public policy mechanisms. Government would therefore come in as a veritable stakeholder to oversee e-waste management financed by tax. This funding model would be a complementary mechanism to either one of the two models discussed earlier. It would also bear the costs of free- riders such as e-waste from no-name products, historical and orphan products, illegally dumped e-waste and branded products that "escaped" at the point of sale. As no-name products tend to be cheaper, they might easily comprise a significant market niche and hence a considerable proportion of e-waste in developing countries.

Certain questions become pertinent in addressing the issue of financing in a developing country context:

Questions in relation to e-waste financing mechanisms

- What is the proportion of products in the market whose producer is identifiable/not identifiable?
- Is the market being supplied with branded products, no-name products or refurbished products from elsewhere?
- Are the supplies being put on the market by their manufacturers or by third parties?
- Is it possible to identify the front-end point of sale eg. Sales over the internet and harness it for enforcement purposes?
- Is illegal WEEE imported into the country?
- Which design of e-waste management best suits the local situation: producer led or centralized, with the ICT regulator?

In general, most studies find that a combination of a front-end tax and a subsidy for recycling is an effective way to provide economic incentives for design improvements while guaranteeing high utilization of product and material quality which are cornerstones of effective e-waste management.¹¹¹.

With e-waste considerations moving to the center of design of ICT policy, it will ensure that there is an attempt to balance ICT access with interventions to handle e-waste in a sustainable manner. This shift will lead to the ICT regulators, particularly in developing countries, acting on the issues of e-waste to meet boarder public policy goals. In this regard, could universal service funds that are dedicated towards development of the ICT sector also be used to provide complimentary financing to implement e-waste management strategies?

1.8 Critical aspects in the development of a roadmap for management of e-waste

The adoption of a carefully thought through roadmap as a guide in the achievement of the various policy objectives, can be a resourceful reference point in terms of progression in the short, medium and long term.

1.8.1 Identification of Stakeholders

In executing its mandate through implementation of its regulatory framework, the ICT regulator ought to know its stakeholders. This would enable identification and create visibility for all actors on the e-waste value chain to state scrutiny for regulation of standards and monitoring for quality assurance of processes.

The ICT sector however presents a stakeholder profile that is not clear cut, calling for a careful analysis.

The sector has been described as "a fluid and ever changing ecosystem, (which includes) individuals, fixed and mobile network operators, internet service providers, chipset design firms, device manufacturers, application developers, content owners and infrastructure providers."¹¹² To this category, it would be justified to add broadcasters and satellite providers. In addition, importers of ICT equipment running SMEs, recipients of donations of ICT products, government agencies, informal recyclers, service providers, scrap metal dealers and customers using ICT products and services would rightly find their place in this category.

This fluid mix of stakeholders creates a dynamic challenge for the ICT regulator. For example, SMEs import a lot of computer hardware and software into developing countries. Many lack distributor linkages with the manufacturers of the ICT products, making it difficult to allocate responsibilities like EPR. Such SMEs are subject to general corporate laws such as company and tax law. How would the ICT specific obligations be extended to such an SME and be monitored for compliance as they are also part of the e-waste value chain?

A close interaction and communication among stakeholders will foster partnership which is necessary to achieve overall efficiency. In this respect, it is envisaged that the regulator would be identifying stakeholders at three levels:

- a) Those directly involved in the e-waste value chain and come under the scrutiny of the ICT regulatory framework. These are mostly licensees.
- b) Those who are directly involved in the e-waste value chain but fall outside the regulatory scrutiny of the ICT regulatory framework. These include actors like importers and recipients of donated ICT goods.

c) Those who while not directly in the value chain, have ability to significantly influence the e-waste agenda such as government agencies (handling environment, air, health and safety, importation, taxation, education), informal recyclers and scrap metal dealers.

A deliberate attempt by the regulator to carry along its stakeholders through information, engagement and feedback allows for dialogue that is proactive and supportive of each other, a desirable situation when tackling an issue that calls for multiple solutions by multiple players such as this one. This also allows for a sharing of experiences and models that have worked elsewhere, as the ICT sector enjoys a fair share of stakeholders with international operations.

A typical selection of actors would include state actors (government agencies handling policy, regulation, standard setting, municipal authorities), Private sector (manufacturers, suppliers and importers), civil society such as donation recipients and consumers.

1.8.2 Compliance

The ICT regulator is mandated to guard adherence to standards and responsibilities in order to uphold the governance standards set out. This can be particularly challenging where different compliance parameters are monitored or measured by different agencies. While partnership and collaboration is encouraged at all times, the reality on the ground can sometimes point to agencies having varied levels of technical resource capacities, activity schedules and outright territorial rivalry which make it difficult to conduct joint or coordinated exercises. With the continued growth of the ICT sector, e-waste recycling will have to take center stage for sustainability to be achieved. Can this be achieved in the present circumstances?

In implementing compliance standards, it may be necessary to phase the approach into three categories:

- 1. e-waste that is already in-country;
- 2. e-waste that is anticipated in form of legal expected imports of ICT equipment and
- 3. e-waste arising from illegal dumping.

Each category, while complementing the other calls for engagement of different strategies, actors and resources. Should developing countries adopt a piece meal approach opting for one strategy at a time or should they adopt a gradually progressive approach tackling all categories at the same time?. The ICT regulator could effectively re-define the e-waste landscape in a country that adopts the broad scope of office, information and communication equipment set out in the EU Directive. By requiring that equipment in this category be submitted for type approval, this move alone would signal to manufacturers and importers on raised standards on a much wider array of EEE, rather than the handsets and mobile phones that have been traditionally presented for type approval.

One emerging issue is that a pool of skills on handling and inspection of EEE is urgently required within the ICT regulator in order to boost compliance and enforcement and facilitate collaboration with other agencies e.g. Customs, where required. Facilitation of such skills at regional level by lead agencies such as ITU would enable adoption and effective implementation of e-waste management strategies.

The emerging situation prompts the need for conducting an urgent situational analysis of ICT regulators in developing countries with a view to assessing their capacity to handle e-waste. The outcome would generate different solutions for different countries, with some strengthening skills within the regulator and others pursuing collaboration with other agencies in a more concerted manner. There is no one size solution for all and countries would be encouraged to conduct individualized case by case assessments.

Compliance success can happen if stakeholders are made aware of the critical issues and encouraged towards self-assessment. For example, agencies concerned and manufacturers would need certainty about the actual performance of recycling operations in achieving resource efficiency and environmental compliance, so that producer responsibility obligations are fulfilled by respective parties. It would however be the role of the ICT regulator to exercise leadership in ensuring that information awareness and sensitization on pertinent issues is maintained at all times.

1.8.3 Enforcement

The efforts to improve any situation through regulations, though an important step, are usually only modestly effective if there is lack of enforcement. Provisions for fines and penalties are only half the story as they only specify the penalty for non-compliance but not the probability of being caught. In the event of noncompliance with the legal requirements, it is the role of the regulator to take firm action in ensuring that necessary mechanisms are put in place to oblige compliance or remove the discordant actor from the sector. Enforcement can present a challenge if the regulator lacks specialized measuring and investigative (monitoring) tools. Reporting obligations should also be in place to reinforce enforcement.

Inadequate staffing capacity or unethical practices and corruption can also hamper successful enforcement. Due to the long delay in amending laws, the penalties provided for breaches can sometimes be so low that they do not act as a deterrent to the commission of the offence. It is therefore the role of the regulator to ensure that it pursues legal reform continually and upholds legal requirements in order to avoid being labeled a 'toothless bulldog'.

Given the significant harms that inappropriate handling of e-waste can pose, there should be political recognition and support at the country level of the need to equip the regulator with all resources that are required (financial, technical, capacity) to enable it respond to the emerging issue of e-waste.

The prominence of the role that trade related issues play in barring effective e-waste management needs to be emphasized as an enforcement concern. Countries that allow the import of e-waste for recycling should close their borders to this trade as e-waste should be treated as close as possible to the place where it is generated. Enforcement success would require that countries that export collected e-waste halt this practice too. The ICT regulator would need to partner with customs to halt this illegal traffic by having clear guidelines which distinguish the various categories of EEE. A more severe measure would be to ban all imports of used EEE into the country, irrespective of use.

1.8.4 Awareness and capacity building

The discussion so far recognizes that the e-waste management issue calls for multiple solutions by multiple players. Activities aimed at sensitization and awareness creation therefore take center stage in not only providing information, but also providing opportunities to transfer knowledge. They provide opportunities to exchange information on best practices and lessons learnt with a view to enabling articulation of practical solutions to the problems caused by e-waste in a particular local context. Incorporation of information from different actors would help with development of an integrated vision and enable implementation of a sustainable e-waste management strategy that takes all major interests into account.

Consumers of electronic products are the dynamo that drives ICT markets and innovation. At an individual level, they have a responsibility to buy smart, use right, and at the end of the equipment's useful life, to dispose well. Collectively, they have a responsibility for critical awareness, action, solidarity, empathy and maintaining a healthy and sustainable environment. Awareness on their part would be critical in driving the development of responsive policy and regulatory frameworks at the domestic level. Concerted consumer action would ensure implementation and follow-up, which often lack, leading to good laws but no actual results.

With awareness and appropriately directed capacity building initiatives to the spectrum of actors at state level, private sector and civil society, the necessary critical mass will have been developed to drive the e-waste management roadmap forward.

1.9 Policy and regulatory recommendations

"If we develop and apply ICT badly, it could add to the world's problems. It could devour energy and accelerate climate change, worsen inequality for those who do not have access and increase pollution and resource use by encouraging ever more frenetic consumerism. If we apply ICT well, the rewards could be enormous. It could help to enhance creativity and innovation to solve our problems, build communities, give more people access to goods and services and use precious resources much more efficiently. We have the capacity – through our decisions on how we produce, buy, use and apply ICT – to secure enormous social and economic benefits."

Forum for the Future¹¹³

Despite being parties in MEAs like the Basel Convention, many developing countries have not been very successful in translating these commitments made at the international level into their domestic legislative frameworks. Because of these regulatory gaps, they continue to experience challenges in regulating the import of e-waste from a wide spectrum of actors – both domestically and abroad. They are also faced with high costs of creating an infrastructure capable of enforcing the proper collection and disposal of e-waste.

Checklist for development of a roadmap for management of e-waste

- 1. Are you a signatory to the Basel Convention?
- 2. Has an assessment of the e-waste generated in your country been undertaken?
- 3. Have stakeholders been identified?
- 4. Has a strategy/roadmap for e-waste management been formulated?
- 5. Do you have an e-waste policy?
- 6. Do you have a domestic regulatory framework on sound management of electronic waste?
- 7. Has a vulnerability assessment of the e-waste regulatory framework been undertaken?
- 8. Is there a specific agency mandated to handle the management of e-waste? OR If there are a number of regulatory agencies with responsibility of various aspects of e-waste, is there a defined framework for co-operation?
- 9. Have you identified some aspects of e-waste management in-country which can be handled through cooperation with other countries at a regional level?

An effective proposal on response to the e-waste problem calls for a clear allocation of roles and responsibilities between several actors as well as identification and implementation of a policy mix of interventions, which must be adapted to the local context as much as possible. Unless a policy is tuned to match the social, technological, economic and political contexts, it is likely to result in inappropriate implementation with synergies being lost and counterproductive outcomes being observed. As such, the exact allocation of roles and responsibilities and policy choices are very dependent on particular local circumstances.

1.9.1 Harmonization

Even where attempts have been made to benchmark with exemplary regional best practice, the level of adoption and implementation varies. For example, the manner in which EPR for WEEE is transposed into legislation and its subsequent implementation differ from country to country, particularly in its scope (the entire WEEE categorization or part thereof), range and type (collective vs individual responsibility) and funding mechanisms (financial responsibility and its point of imposition)¹¹⁴. This scenario will present some operationalization anomalies within regions when for example, broader cooperative efforts towards enforcement of import of hazardous substances would net the wrong type of equipment due to differing classification, or worst still be hampered in regions that have no provision for financing mechanisms.

This section proposes that there are aspects of ewaste management that can be handled at the regional level, particularly in regions that have nascent or nonexistent governance frameworks for e-waste. Evidence has already been provided of regional efforts in Europe and North America that have realized significant gains. The following aspects are proposed for consideration and implementation on a regional level.

1) Establishment of regional e-waste cooperation mechanisms

The success that has been realized through cooperation in regions that have established e-waste management systems has been recognized. Borrowing a leaf from the examples given of the EU and North American cooperation, the establishment of a dedicated regional e-waste cooperation mechanism would enable the advancement of dialogue and understanding on e-waste concerns per region.

Regional co-operation mechanisms would provide a focused platform to deal with issues such as illegal movement of e-waste and trade-environment linkages. It would also contribute to more effective enforcement at the domestic level in the region. Introducing a system of type approval and type acceptance of ICT EEE within a region would ease the individual burden of approval per country and also hasten the scrutiny of equipment in this category for compliance with agreed guidelines. This would be a critical stepping stone for regions yet to implement e-waste management mechanisms as these might be easier to achieve through regional cooperation due to availability of
technical support, huge financing requirements, extensive compliance and enforcement requirements etc.

The need for co-ordination by ICT regulators over the management of e-waste at the regional level would add to the urgent and growing list of issues to be handled through regional regulatory associations.

2) Harmonization of policies and legal frameworks within regions

Harmonization would allow for an approximation of principles and still afford the ability to address local situations in domestic laws for implementation. Development of regional guidelines led by ICT regional regulatory associations would greatly assist in overcoming technical capacity challenges at country level and in this way hasten the emergence of regulatory frameworks at the domestic level.

Countries within the same region will tend to have similar experiences which will allow for a platform on which to develop an approximation of guidelines addressing solutions to the challenge of e-waste. At this level, it will be possible to provide indicative direction on establishment of a collection infrastructure, ownership models and financing mechanisms.

Approximation will allow a country when establishing its collection infrastructure, for example, to address issues of employment in determining how to integrate the informal collection mechanisms at various levels. It also allows the country to structure the ownership of collection facilities at various levels, ranging from public ownership, such as in Taiwan, China where the government owns and operates collection facilities, to models where government only provides subsidies such as in California, USA or loans to induce the establishment of private facilities such as in China¹¹⁵.On the other hand, the country could opt for the design of a legal framework and leave it to producers to develop the necessary facilities. This is the model used in the EU, Japan and the Republic of Korea.

The beauty of harmonization at regional level is recognized due its capacity to fast track development of regulatory frameworks and implementation mechanisms. It also brings the expert role of the ICT regulator and ITU to the fore in interpretation of local subtleties against best practices – necessary considerations – as countries tailor their policy mix to address their local contexts.

3) Consideration for establishment of mechanical pre-processing within regions

A regional approach in treatment of complex ewaste material would be a worthwhile value proposition due to the considerable investments in financing, advanced technologies and the requirement for a highly skilled work force.

Regional efforts would contribute significantly in helping design a regulatory framework that is holistic in dealing with e-waste management. This would entail multi-pronged strategies that seek to handle both proper disposal and transportation of e-waste and the reduction of creation of e-waste by banning certain hazardous chemicals. The challenge can be met considering that in developing countries, the share of historical products is still low and the share of non-branded products is often overestimated¹¹⁶. Formalization of part of the informal sector is a must; however low-risk operations like collection can be left in part to the informal sector¹¹⁷.

1.9.2 Standards and certification

International agreed standards can provide a unique framework to control, limit and ultimately reduce e-waste at the global level. At the supply side, the inclusion of the e-waste problem in the process for the elaboration of new standards can limit the volume of e-waste generated annually. The recently adopted ITU-T Recommendation L.1000¹¹⁸, which defines a global standard for a universal power adapter and charger solution for mobile terminals, can reduce significantly the volume of e-waste by limiting the amount of chargers produced annually for mobile devices. This same approach can be taken by introducing similar standards in other ICT equipment and devices. On the regulatory side, ICT regulators can introduce new measures to encourage manufactures and service provides to comply with such standards, either on a voluntary basis or through new regulation.

On the recycling part, and going forward, e-waste management requires to be anchored in a comprehensive regulatory framework with shared responsibility for collection and recycling amongst manufacturers/assemblers, importers, recyclers, scrap metal dealers, regulatory bodies, consumers and other key actors. This engagement of actors would provide a platform on which to develop efficient take-back schemes and other formal recycling infrastructure that would be supported by informal collection mechanisms. Stringent regulations on standards and procedures to be followed in handling and disposal would need to be in place as well as strict requirements for operator training and certification. Due to the dearth of laws that regulate the electronics recycling industry, high-bar voluntary standards for the recyclers can be established as a bridging mechanism. These can be backed up by a certification program, where accredited third-party auditors certify that recyclers are meeting the standards. A certification standard, such as Estewards¹¹⁹, would be necessary in introducing formal structures and best practices into the e-waste management arena.

1.9.3 Matrix of obligations and incentives

Compliance with the various roles and responsibilities assigned to the actors can be achieved regulatory scrutiny through an effective by enforcement mechanism. It has been recognized that e-waste management is an emerging problem which is turning out to be a business opportunity, given the volumes of waste being generated.

This reality should be buttressed by a regulatory framework that contains an adequate matrix of incentives and obligations.

With the expansion and upgrading of ICT services over huge expanses geographically, it is expected that the infrastructure will produce considerable amounts of e-waste in time. Encouragement for operators to share infrastructure, where possible, will contribute to minimization of e-waste and its adverse impacts on the environment¹²⁰.

The success of some of the proposed obligations e.g. Take back schemes, would only be possible where informal and haphazard recycling is prohibited. This would ensure availability of adequate amounts of EEE required to sustain safer methods of e-waste disposal such as recycling. Introduction of standards for scrap metal dealing would ensure a minimum threshold for protection of workers and handling of EEE.

e-Stewards Initiative

The e-Stewards Initiative is a project of the Basel Action Network (BAN), which is a 501(c)3 non-profit, charitable organization of the United States, based in Seattle, Washington. It is against the backdrop of the growing e-waste crisis that the e-Stewards Initiative was born.

Without appropriate national and international legislation or enforcement in place in many regions, it is unfortunately left up to individual citizens, corporations, universities, cities – all of us – to figure out how to prevent the toxic materials in electronics from continuing to cause long term harm to human health and the environment, particularly in countries with developing economies.

e-Stewards Certification is rapidly emerging as the leading global program designed to enable individuals and organizations who dispose of their old electronic equipment to easily identifiable recyclers that adhere to the highest standard of environmental responsibility and worker protection.

e-Stewards Certification is open to electronics recyclers, refurbishers and processors in all developed countries

Proposed matrix		
Examples of Lic	ense Obligation	
Implement a take back scheme Implement a trade-in scheme eco-labeling recycling Develop environmentally superior products		
Incentive Discount on fees Tax benefit Expenditure grant Recognition Reward scheme	Penalty Fine Enforcement action Social pressure	

1.9.4 Extended Producer Responsibility (EPR).

Recognition of EPR by developing countries in domestic policies would ensure that manufacturers have the responsibility to collect and recycle their old products after consumers are done with them. It would also ensure that emerging manufacturers and assemblers are motivated to take the lessons learnt in disassembly and recycling of their products and feeding them back into design. This would also induce importing producers into compliance at the risk of being shut out from these markets. These policies would also impact the rest of the electronics supply chain including small-parts producers, end-use manufacturers and distributors¹²¹.

1.9.5 Partnerships

No one stakeholder in the e-waste space holds a turn-key solution for effective e-waste management. Any measure of success can only be achieved through partnerships at all levels – internationally and regionally to address aspects that cross boundaries such as illegal dumping. At the local level, robust partnerships between state actors (regulatory agencies for ICT, environment, water, land, solid waste management, customs, trade etc), the private sector, civil society and consumers would need to work together in identifying practical solutions that are responsive to their local contexts.

1.10 Conclusion

That the volumes of e-waste will continue to increase due to emerging technologies and consumer sophistication is not in doubt. The absence of e-waste management frameworks or a relaxed approach in enforcement will lead to unwarranted threat to the environment and human health. This is a good time for countries to reflect on where they are in the path of implementation to enable a decision on whether there is need to realign the e-waste agenda towards more comprehensive implementation.

A default approach would be irresponsible and would amount to endorsing environmental devastation and danger to human health arising out of the 'developments' we have created for ourselves. But then, the choice is ours to make.

There is an urgent need to recognize the challenge of e-waste as a priority in the political agenda of countries that have not yet done so. This will enable allocation of resources to strengthen the supervision of regulatory standards for e-waste management. With required support in capacity building, technology and knowledge exchange, countries that have no e-waste governance policy in place will be able to streamline their informal sector and move towards establishment of a formal sector with some capability of endprocessing technology.

In many developing countries, recognition of informal activities that turn e-wastes into resources would strengthen them and enable them to enjoy tax and other business incentives. This would enable the ewaste management sector to exercise its potential in job creation and poverty alleviation. Awareness creation on the adverse implications of e-waste will raise the environmental consciousness that is critical to drive forward a policy framework advocating for application of the 3Rs-Reduction, Re-use, Recycle of ewaste.

By acting now, we can turn an e-challenge into an e-opportunity.



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- ³⁸ Final Report, E-Waste assessment Tanzania: UNIDO e-waste initiative for Tanzania (January 20, 2011).

According to this Report, the current practice of end-of-life management for ICT equipment is storage.

- ³⁹ A pilot study by the Kenya ICT Network in 2007 indicated this as a challenge that was also identified by ICT stakeholders and interest groups in Kenya. Presentation made at Workshop titled 'E-waste: Impacts, challenges and the role of government, service providers and the consumers'. Organized by the Communications Commission of Kenya. Held on 9-10 June, 2010, Nairobi Kenya.
- ⁴⁰ http://press.nokia.com/2008/07/08/global-consumer-survey-reveals-that-majority-of-old-mobile-phones-are-lying-in-drawersat-home-and-not-being-recycled/ (Accessed on August 1, 2011).

The study revealed that only 3% of people recycle their mobile and that three out of every four people don't even think about recycling their devices. Nearly half were unaware that it is even possible to do so.

The survey was based on interviews with 6,500 people in 13 countries including Finland, Germany, Italy, Russia, Sweden, UK, United Arab Emirates, USA, Nigeria, India, China, Indonesia and Brazil. It was conducted to help Nokia find out more about consumers' attitudes and behaviors towards recycling, and inform the company's take-back programs and efforts to increase recycling rates of unused mobile devices.

- ⁴¹ www.nokia.com/environment/recycling/why-recycle/take-back-achievements (accessed May 15, 2011).
- ⁴² www.samsung.com/us/aboutsamsung/sustainability/environment/takebackrecycling/takebackrecyclingprograms.html (accessed May 15, 2011).
- ⁴³ http://ewasteguide.info/node/4184 (accessed May 15, 2011).
- ⁴⁴ Recycling From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009 at page 15.
- ⁴⁵ Recycling From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009 at page 15.
- ⁴⁶ http://weeeman.org/ (accessed on 2 August, 2011).

- ⁴⁷ www.greenpeace.org/international/en/ (Accessed on August 8, 2011).
- ⁴⁸ www.treehugger.com/files/2010/06/adorable-sculptures-created-from-e-waste.php (accessed on August 2, 2011).
- ⁴⁹ See demonstrations of e-waste sculptures at <u>http://bartvargas.com/e-waste-sculptures</u> (accessed on @ August, 2011).
- ⁵⁰ www.icologie.com/news/leading-africans-to-responsible-recycling/, 'Leading Africans to responsible recycling' by Grace Stead. (Accessed on August 1, 2011).
- ⁵¹ Recycling From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009 pages 59-66.
- ⁵² OECD, Extended Producer Responsibility: A Guidance Manual for Governments, 2001: Paris at page 58.
- ⁵³ Sinha, S (2010), Sustainable E-waste Management. Available at <u>www.toxicslink.org/art-view.php?id=134</u> (Accessed on July 29, 2011).
- ⁵⁴ www.epa.gov/international/toxics/ewaste.html#building (accessed June 2, 2011).
- ⁵⁵ <u>http://gvisionaries.wordpress.com/2011/05/02/digital-dumping-an-inside-look-at-e-waste/, 'Digital dumping- an inside look at e-waste'</u> by Christina Lorella (Accessed on August 8, 2011).
- ⁵⁶ <u>http://ban.org/BANreports/10-24-05/index.htm</u>, 'The Digital Dump: Exporting Re-Use and Abuse to Africa'', Basel Action Network (BAN) Report October, 2005 (Accessed on August 8, 2011).
- ⁵⁷ Darko, Richmond. "Electronic Waste Dumping on Ghana Still Continues." GhanaWeb. 25 Aug. 2010. (Accessed on August 8, 2011)
- ⁵⁸ Newsweek magazine. Article titled '*Digital Dump*' dated July 25, 2011.
- ⁵⁹ www.greenpeace.org/international/en/news/features/poisoning-the-poor-electroni/, 'Poisoning the poor Electronic Waste in Ghana' Feature dated August 5, 2008 (Accessed on August 8, 2011).
- 60 www.basel.int
- 61 www.basel.int/
- ⁶² The wastes controlled by the Basel Convention in Annex I are characterized as explosive, flammable, oxidizing, toxic and corrosive. "Other Wastes" are found in Annex II of the Convention. These include any waste notified to the secretariat by a Party (country) and listed as hazardous.
- ⁶³ www.inece.org/newsletter/15/europe/ewaste.html
- ⁶⁴ Full text available at <u>www.basel.int/industry/compartnership/NairobiDeclarationCRP24.pdf</u> (accessed on August 8, 2011).
- ⁶⁵ www.inece.org/newsletter/15/europe/ewaste.html
- ⁶⁶ www.bis.gov.uk/nmo/enforcement/rohs-home (accessed on May 15, 2011).
- ⁶⁷ www.epa.gov/international/regions/na/nacec/cecewaste.html (accessed on May 15, 2011).
- ⁶⁸ http://ewasteguide.info/files/Durban_declaration_FINAL.pdf (accessed June 13, 2011).
- ⁶⁹ Recycling From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009 pages 59-66.
- ⁷⁰ Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 2.
- ⁷¹ While the concept of incorporating environmental costs into product costs was by no means new, the application of EPR in Germany found a driving force in Klaus Töpfer, then the nation's powerful environment minister and now head of the United Nations Environment Program (UNEP). The catalyst was a looming shortage of landfill capacity, which created a critical need to decrease the amount of materials sent to landfills by reducing the amount of waste generated and increasing recycling.

Fishbein, EPR, What does it mean? Where is it headed?

Available at: www.mindfully.org/Sustainability/EPR-Extended-Producer-Responsibility.htm

- ⁷² Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 2.
- ⁷³ Public Review Landfill Capacity and Demand Report issued in 2009 reported that all landfill sites in Sydney will be full by 2016 and the city's annual 2 million tonnes of rubbish will have to be transported by rail 250 kilometres south to the Woodlawn dump at Tarago.

Reported in an article dated March 21, 2010 available at www.smh.com.au/environment/waste-solution-left-to-rot-as-landfill-capacity-runs-out-20100320-gn6z.html

- ⁷⁴ Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 2.
- ⁷⁵ OECD 2002, Environment Performance Reviews Japan. At page 26.

Japan was reported as making major policy and societal effort to promote a recycling-based society, fully utilizing materials by reducing waste generation and increasing waste recovery.

- ⁷⁶ Hotta (Ed.), *Extended Producer Responsibility Policy in East Asia*, Institute of Global Environmental Strategies, Japan, 2009.
- ⁷⁷ Murali Shanmugavelan, 'Tackiling e-waste' Panos London. Available at <u>www.giswatch.org/thematic-report/sustainability-e-</u> waste/tackling-e-waste (Accessed on 6, 2011).
- ⁷⁸ See <u>www.ictregulationtoolkit.org/en/Section.1650.html</u> (accessed on July 24, 2011) Part 3.1.3 on Implementation of regulatory design for a more extensive discussion on this issue.
- ⁷⁹ Mont and Lindhqvist 2003, 906.
- ⁸⁰ Tojo N,Extended producer responsibility as a driver for design change Utopia or reality? IIIEE Lund, Dissertation, 2004 at pg. 2.
- ⁸¹ Murali Shanmugavelan, 'Tackiling e-waste' Panos London. At page 23 Available at <u>www.giswatch.org/thematic-report/sustainability-e-waste/tackling-e-waste</u> (Accessed on August 6, 2011).
- ⁸² 'Drowning in Electronic Where the law stands on e-waste' by Jackie Bennion Available at www.pbs.org/frontlineworld/stories/ghana804/resources/ewaste.html (Accessed on August 6, 2011).
- ⁸³ Recycling From E-waste to Resources: Sustainable Innovation and Technology Transfer Industrial Sector Studies, UNEP, 2009.
- ⁸⁴ OECD (2001). Extended Producer Responsibility: A Guidance Manual for Governments. Paris, France.
- ⁸⁵ Sierra Club. "Producer Responsibility Recycling." <u>www.sierraclub.org/committees/zerowaste/producerresponsibility/index.asp</u>. May 2009.
- ⁸⁶ There are now several names for environmentally conscious design methodologies such as Environmentally Conscious Design and manufacturing (ECDM), Design for the Environment (DFE), Green Engineering, Life Cycle Analysis (LCA) and Sustainable Technology.
- ⁸⁷ Siemens stopped painting computer housings to facilitate recycling, and is using clips instead of permanent rivets to facilitate disassembly.
- ⁸⁸ The electronics industry is interested in incorporating such strategies as standardizing fasteners, avoiding permanent fasteners, identifying materials and using materials with recycling properties to facilitate end of life processing (Electronics Industry Environmental Roadmap Disposition, No date).
- ⁸⁹ Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 1.
- ⁹⁰ www.computertakeback.com/index.htm
- ⁹¹ Fishbein, EPR, What does it mean? Where is it headed?

Available at: www.mindfully.org/Sustainability/EPR-Extended-Producer-Responsibility.htm

- ⁹² Heinz et. Al, *E-waste Recycling in Latin America: Overview, Challenging and Potential* (No Date).
- ⁹³ James Sallzman, Sustainable Consumption and the Law, 27ENVTL. L. 1274 (1997).
- 94 www.electronicstakeback.com/promote-good-laws/state-legislation/
- 95 www.computertakeback.com/legislation/state_legislation.htm
- ⁹⁶ www.sierraclub.org/committees/zerowaste/producerresponsibility/index.asp
- ⁹⁷ www.epa.gov/epawaste/partnerships/stewardship/basic.htm
- 98 http://72.10.40.168/commentaries/scarlett_20001004.shtml
- 99 www.eprworkinggroup.org/
- 100 www.eprworkinggroup.org/
- ¹⁰¹ www.computertakeback.com/legislation/state_legislation.htm
- ¹⁰² www.epa.gov/epawaste/partnerships/stewardship/basic.htm
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- ¹⁰⁴ Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 4.
- ¹⁰⁵ Williams et. Al. Current status of Extended Producer Liability Legislation and Effects on Product Design, Proceedings of 2000 ASME Japan-USA Symposium on Flexible Automation, 2000. At page 5.
- ¹⁰⁶ Fishbein, EPR, What does it mean? Where is it headed? Available at: <u>www.mindfully.org/Sustainability/EPR-Extended-Producer-Responsibility.htm</u>
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- ¹⁰⁸ Murali Shanmugavelan, 'Tackiling e-waste' Panos London at page 25. Available at <u>www.giswatch.org/thematic-report/sustainability-e-waste/tackling-e-waste</u> (Accessed on 6, 2011).
- ¹⁰⁹ Panate N et al, Extended Producer Responsibility in a non-OECD context: The management of waste and electronic equipment in India at page 4.
- ¹¹⁰ Panate N et al, Extended Producer Responsibility in a non-OECD context: The management of waste and electronic equipment in India at page 5.
- ¹¹¹ Panate N et al, Extended Producer Responsibility in a non-OECD context: The management of waste and electronic equipment in India at page 7.
- ¹¹² World Economic Forum, ICT for Economic Growth: A dynamic ecosystem driving the global recovery (WEF: Davos, 2009) at 2, online: <u>www.weforum.org/pdf</u>
- ¹¹³ Madden and Weibrod, Connected: ICT and sustainable development (2008).
- ¹¹⁴ Panate N et al, Extended Producer Responsibility in a non-OECD context: The management of waste and electronic equipment in India at page 15.
- ¹¹⁵ Panate N et al, Extended Producer Responsibility in a non-OECD context: The management of waste and electronic equipment in India at page 15.
- ¹¹⁶ Heinz et. Al, *E-waste Recycling in Latin America: Overview, Challenging and Potential* (No Date) at page 4.
- ¹¹⁷ Heinz et. Al, *E-waste Recycling in Latin America: Overview, Challenging and Potential* (No Date) at page 19.
- ¹¹⁸ www.itu.int/newsroom/press releases/2009/49.html and www.itu.int/ITU-T/workprog/wp item.aspx?isn=7301

- ¹¹⁹ <u>http://e-stewards.org/about/</u> (Accessed June 15, 2011).
- ¹²⁰ www.ictregulationtoolkit.org/en/Section.3448.html (accessed on July 24, 2011) See detailed discussion on 7.2.

GSR 2011 Discussion Paper

Intellectual property rights in today's digital economy



Work in progress, for discussion purposes

Comments are welcome! Please send your comments on this paper at: <u>gsr@itu.int</u> by 7 October 2011.

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1 INTELLECTUAL PROPERTY RIGHTS IN TODAY'S DIGITAL ECONOMY

Author: Adam Denton, Senior Telecom Expert

1.1 Intellectual property rights in today's digital economy

Intellectual property rights (IPR) play a critical role in the digital economy. They provide the foundation upon which innovation is shared, creativity encouraged and consumer trust reinforced. This is not a new paradigm; IPR has been playing an important role in providing an incentive for creativity and innovation since first introduced in the Statute of Anne in 1709¹ and by 1776 was already significant enough to be included in the US Constitution. Today, IPR remains critical to foster creativity, innovation and growth. Heads of States and Governments participating in the G8 Summit of Deauville held in May 2011 further recognized that "broadband Internet access is an essential infrastructure for participation in today's economy. In order for our countries to benefit fully from the digital economy, we need to seize emerging opportunities, such as cloud computing, social networking and citizen publications, which are driving innovation and enabling growth in our societies. As we adopt more innovative Internet-based services, we face challenges in promoting interoperability and convergence among our public policies on issues such as the protection of personal data, net neutrality, transborder data flow, ICT security, and intellectual property."²

IPR plays an increasingly important role in today's economies. The global trade in IPR-related goods is estimated to be more than \$600 billion annually, with this trade having doubled between 2002 and 2008³. This IPR based knowledge economy is seen as a key enabler of future growth; President Obama recently stated "[Intellectual Property] is essential to our prosperity and it will only become more so in this century."⁴ Having clear frameworks for intellectual property rights and enforcing these rights remains critical to provide the incentives and economic reward for creators and innovators. The opportunity for growth

through the knowledge economy is not only a developed market phenomena; developing economies also have the opportunity to create economic value by encouraging the creation and exploitation of intellectual property. Indian Prime Minister Dr. Singh commented that to secure further international "We have strengthen investor investment, to confidence and have done so by putting in place a new Intellectual Property Rights regime..." ⁵ sentiments echoed by President Hu Jintao of China when noting "To protect intellectual property rights serves the interest of all countries and complies with China's efforts of opening wider to the outside world, improving investment environment and enhancing innovation ability." ⁶ The wider economic benefits are also recognised with OECD estimates showing that a 1% increase in the strength of IPR protection results in between a 0.7% and 3.3% increase in domestic R&D, depending on the type of IPR'.

The rapid growth of the digital economy, enabled by broadband penetration, coupled with increases in computing power and storage, presents huge opportunities for economic and social development, creating global markets for content and rights holders. The growth of broadband networks will accelerate this trend, especially in the developing markets, opening up new markets and providing consumers the opportunity to participate in the digital economy for the first time. The levels of creativity and innovation and content production are astounding. There are now 750 million Facebook users⁸, there are one billion tweets sent per week⁹, over 48 hours of video are uploaded every minute on Youtube¹⁰, Flikr hosts over five billion images¹¹, in July 2011 the Apple I-store announced 15 billion applications had been downloaded from the 425,000 applications available since the introduction of the store in 2008.¹²

Access to broadband infrastructure is however also creating a hugely disruptive challenge to the creative

industries, especially in the area of digital copyright, pressuring business models, market structures, regulatory approaches, law enforcement and the legal system. Estimates of the total value of counterfeit and copyright goods by Frontier Economics¹³ for the International Chambers of Commerce suggest a global value in 2008 of up to \$650bn, of which digital piracy is estimated to be about 12% or \$75bn. Frontier Economics "conservatively' estimates that digital piracy will have trebled by 2015, reaching up to \$215bn. Music piracy is at the forefront of this activity ("the canary in the coal mine") but peer-to-peer networks, coupled with higher broadband speeds, are increasingly being used to share TV programmes and films with piracy of live rights for sports is also on the increase. 'Lost' Series 5 was the most pirated show in 2010 with over 2 million downloads in the first week and reports of over 100,000 people sharing a single 'torrent'¹⁴. It is reported that within 20 minutes of the broadcast of the final series of 'Lost' it appeared, subtitled in Portuguese¹⁵, on a pirate website.

Endemic copyright infringement facilitated by broadband infrastructures is increasingly drawing the telecommunications and internet eco-systems into the IPR debate, especially in the area of enforcing copyright protection. There is increasing pressure from the copyright industries, including film, music, publishing and TV for internet carriers and service providers to play a more active role in addressing both commercial copyright infringement and infringement by consumers. Telecoms policy makers and regulators are playing an increasingly important role in establishing the roles, responsibilities and procedures to both enforce copyright and ensure free and open access to the digital eco-system.

For Telecom/ICT regulators and policy makers there are a number of questions to address in relation to copyright as a consequence of the growth of the digital economy:

- What is the role of regulation and industry selfregulatory approaches in protecting IPR?
- In a global village, how do national and international rights work together?
- Can changes to existing market structures help to enable innovative content services?
- How should rights be enforced and who is responsible for this enforcement?

- What institutional framework needs to be in place to protect, manage and facilitate IPR?
- What procedures and processes need to be implemented for notice, takedown, filtering and blocking of illegal content?
- Where the boundary between legal and illegal content lays?
- Where should the balance be between protecting rights holders and protecting consumer interests?

IPR has always faced the challenge of creating the proper balance between the rights holders and those that wish to exploit those rights. This is no different today. The challenge today however is to manage the balance where the consumer is the creator, where the marginal cost of copying is zero, where enforcement of existing law is extremely difficult and where 'free' access to information and content is considered by many to be a right.

1.1.1 The growth of the digital economy

The ITU-UNESCO Broadband Commission outlined a vision of broadband for all "that embodies effective and sustainable solutions to the great global challenges of the 21st Century in poverty, health, education, gender equality, climate change and the seismic demographic shifts in youth and ageing populations."¹⁶ The digital economy, enabled through internet access, broadband networks and affordable subscriber equipment, is transforming the way we work, shop, educate, entertain ourselves and communicate. As the Broadband Commission declaration states, "broadband will be the basis for digital invention and innovation and the foundation for digital and other investments that lie at the very heart of our shared knowledge economy society..... governments have today and an unprecedented opportunity to unleash the creativity and inventiveness of their citizens and industries to innovate and invest in health and education."17

ITU figures show that global internet users have surpassed 2 billion, with over 872 million of these accessing the internet through active mobile broadband subscriptions.¹⁸ In the developed markets internet user penetration reached 69% of the population; in developing markets this is only just over 20%. Growth in internet access in the developing markets is however dramatic, driven by improved network availability, lower subscriber costs and access to local services and information.

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Growth of data on networks has also been dramatic and is expected to continue to increase, with Cisco forecasting that IP traffic will reach the zettabyte threshold in 2015¹⁹. Much of the growth of traffic is driven by video, with 50% of all consumer internet traffic forecasted to be video traffic by 2012. Global growth of global internet traffic is being driven by both the increase in high capacity services, in the developed markets and the growth of broadband and internet access in developing markets.

The social and economic benefits of the digital economy are widely reported. Most studies on the topic

conclude that broadband penetration has an impact on GDP growth. However, such a contribution appears to vary widely, from 0.25 to 1.38 percent for every increase in 10 per cent of penetration.²⁰ Similar impacts have been shown in a range of economic studies for different markets across the world²¹.

The social impact is also significant, improving access to education and knowledge, access to services, improving communication and improving government

accountability. It is also enabling a change in the way consumers create and consume content. Usergenerated content (UGC) is a new phenomenon; however, the digital economy has also changed the way consumers access TV, music, film, news and other media services.

The growth of the digital economy provides significant opportunities and access to new global markets but it also creates a risk. Illegal copying and distribution of copyright materials has had a hugely disruptive effect on a range of copyright industries including music, film, software, games and TV. As broadband coverage, capability and capacity increase there is a threat that without adequate controls the disruption will cause permanent, long-term damage to the creative industries. This issue alone is not enough to outweigh the value of providing access to the digital economy but it also can't be ignored. Providing adequate copyright protection will ensure the longterm supply of quality commercial content and will provide protection to incentivise local creative sectors to develop and take advantage of access to the global economy.

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1.1.2 IPR in the digital economy

Although technology and digital technology create new challenges for IPR, the underlying IPR frameworks remain the same. There are four main IPR areas:

- Patents covering inventions of technical features or processes. They give exclusive rights, for a limited time (under the WTO a minimum of 20 years) for the owner to use or sell their invention.
- Trade Marks cover distinctive or unique signs that are used to distinguish goods and services. They can be a word, logo, symbol, design, image, sound, colour or a combination of these. Trademark rights are typically maintained by use and maintenance of the registration.
- Design covers the visual and physical appearance of products. Design rights extend beyond the purely utilitarian to cover the aesthetics. Like trademarks, they are maintained by use and registration.
- Copyright and related rights which give automatic and exclusive rights to the author, or creator, of original work. Original work can cover writing,

music, art, films, broadcasts, sound recordings and databases.

These frameworks cover the range of IPR protection, from pharmaceutical to fashion goods, technology to the arts and everything in between. The frameworks also have a strong international element to them to ensure the protection of rights internationally with the World Intellectual Property Organization (WIPO), World Trade Organization (WTO), the World Customs Organization (WCO), the World Health Organization (WHO), the International Telecommunications Union (ITU), the Group of Twenty Finance Ministers and Central Bank Governors (G-20), International Criminal Police Organization the (INTERPOL), the Asia-Pacific Economic Cooperation (APEC) Forum, and the Organisation for Economic Cooperation and Development (OECD) all active in the area of IPR policy and/or enforcement.

For the digital economy the main IPR issues relate to copyright and copyright protection. However, patents and some elements of trademark protection also raise some interesting challenges for policy makers.

1.1.2.1 Patents

Patents and patent protection are areas of significant focus within the ICT sector. Although patent law applies across all industries, it is particularly important within the technology sector where, not only is significant competitive advantage gained through research and development, but innovation and further market development are gained by leveraging these developments under licence. The latest OECD patent statistics for 2007 show that nearly 40% of all patents globally are technology-related, with 80% of these being specifically ICT-related²². A functioning and effective patent environment is therefore critical to ensure a vibrant, innovative, economy by encouraging invention, exploitation and sharing.

In the technology sector some companies have evolved business models that are entirely based on inventing new technologies, patenting the invention and then licensing the rights without ever manufacturing goods. Qualcomm, which has a market capitalisation of \$96 billion, has a business model founded on creating and licensing IPR. As their corporate profile states, "The goal of their [Qualcomm's] resulting business model is to rapidly develop innovations and license them as broadly as possible"²³. The company's valuation is the result of an estimated \$12 billion investment in research and development since its foundation in 1985. The value of patents was also recently demonstrated when Google agreed to place a 'stalking horse' bid for Nortel's portfolio of patents of \$900m only for them to lose to a \$4.5bn bid the 6000 patents by a consortium including Apple, RIM, Ericsson, Sony and Microsoft. However, this deal also raised one issue of increasing concern in the area of technology patents, that of patent 'trolls' ²⁴. In commenting on the stalking horse bid Google stated, "The patent system should reward those who create the most useful innovations for society, not those who stake bogus claims or file dubious lawsuits". It went on to state, "we hope this [Nortel's] portfolio will not only create a disincentive for others to sue Google, but also help us, our partners and the open source community". The Coalition for Patent Fairness²⁵ when commenting on the US 2009 Patent Reform Act stated reform is needed to protect "inventors and innovators from unjustified lawsuits and to allow them to continue to make products and services that will help the US

economy grow"²⁶. In May 2011, it was announced Microsoft had become a member of a crowdsourcing service designed to challenge and invalidate specious software patents and to avoid litigation costs.

The nature of the technology sector, which displays rapid innovation and incremental development, is driving a number of challenges. Administratively, the rapid growth in the volume of patent applications is placing administrative pressure on patent offices; more important though, it is resulting in patent 'thickets'. These occur where interrelated and overlapping patents result in a lack of clarity of who owns the patent and, as a consequence where to go for the licence, which – in turn – potentially inhibits further innovation. A representation of the smartphone 'thicket' is shown below.

Patent thickets are not new. In the 1850s a patent thicket prevented Singer from launching his innovative new sewing machine²⁷. After a period of claim and counterclaim the patent owners agreed to settle through a patent pool. Today, patent pools, technology standards and cross-licencing agreements are all attempts to navigate through the complexity of the patent jungle. This is not always successful and the technology sector has become increasing litigious. Although litigation is not in itself an issue, it becomes a problem if this stifles innovation or acts as a barrier to new market entrants. ITU-T, in conjunction with the International Standards Organisation (ISO) and the International Electrotechnical Commission (IEC) have been active in developing common patent policies. These policies have been designed to ensure that patents used in technology standards encourage patent holders to share their intellectual property in the knowledge that their interests are protected by mitigating against some of the potential issues related to technology patents.

Patents are critical to support new innovation and growth. Most stakeholders see the international patent registration, licensing and enforcement systems as effective. There are concerns that the exploitation of the system by a few patent trolls for financial gain (unrelated to creating and exploiting innovation) is adding unnecessary cost, and risk, to innovators.

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1.1.2.2 Trademarks

Trademark protection is not significantly impacted by the digital economy. Naturally new channels of distribution and marketing are opened up and there is a wider geographic scope for trademark use. This is true for legitimate and counterfeit use of trademarks but the fundamental issues and challenges of trademark protection remain the same.

Closely related to trademark protection is the effective management of a domain name registry. Having an effective dispute resolution mechanism in place to recover domain names is an area of increasing concern. The .com domain is globally the most popular with over 80 million registrations, while the Chinese .cn is second with 13 million names. However, the volume of national domain names is growing as a consequence of congestion in the .com domain.

In 2010, trademark holders filed 2,696 cybersquatting cases covering 4,370 domain names from 57 countries with the WIPO Arbitration and Mediation Centre, an increase of 28% over the 2009 level and 16% over the previous record year, 2008. Since 1999, 20,000 cases covering 35,000 domain names have been raised with 91% demonstrating evidence of cybersquatting. As the domain is the critical access point for brands to market and to sell their services globally, the ability to protect domain names and, where appropriate, recover them is an increasingly important aspect of IPR in the digital economy.

1.1.2.3 Copyright

The nature of the digital economy and the nature of digital content create new challenges for the creative industries, law enforcement and regulators. The OECD 2009 report on digital piracy²⁸ highlighted the differences between digital and physical goods:

- The marginal cost of reproduction: Digital goods have an almost zero cost of reproduction. This, along with the fact that the quality of the copy is almost identical to the original and that copying is easy, are key features of digital products. Barriers to entry for digital piracy are low.
- Digital Delivery: Digital delivery is easy. There is limited storage cost, limited transport cost (if any) and little risk of the goods being intercepted like traditional counterfeit goods. Delivery via the internet or through local networks is easy and provides significant flexibility in the way the goods are delivered.

- Market Scope: Goods can be delivered instantaneously almost anywhere in the world. Traditional barriers do not constrain the distribution of digital goods, they are solely constrained by the network availability and the capacity of the user's hardware to store the material.
- Hardware Dependence: The availability of hardware is a key difference from most physical goods. There is no hardware necessary to use a counterfeit handbag! With much greater prevalence of broadband devices and network capacity increasing globally, hardware availability will become less of a barrier for legitimate and illegitimate distribution of digital content.
- Life Span: The OECD highlights that consumer tastes for digital products appear to be shorter than for physical goods. However, once created digitisation extends the lifespan of digital products and extends their durability.

Digital markets offer significant potential to the creative industries. The very nature of digital products that makes them targets for piracy also creates opportunities for rights holders to exploit the value of their rights more widely, at lower cost and at greater scale. It is unquestionable that digital markets have been hugely disruptive to existing business models, but it remains open to question as to whether, in the long run, legal business models will be able to compete with illegal ones, ultimately to the benefit of the creative industry.

1.1.3 Who is impacted by copyright and copyright infringement?

Copyright industries are defined by WIPO²⁹ as those industries in which copyright plays an identifiable role in creating tradable private economic (property) rights, and income from use of these economic rights. This classification defines copyright industries in four groups:

- Core industries, which exist to create copyright materials,
- Dependent industries, which manufacture equipment that facilitate copyright activity,
- Partial industries, which don't create copyright but are dependent on copyright and
- Support industries, which distribute copyright materials.

The original intention of copyright was to encourage the development of new creative work. It was a system put in place to stimulate incentives for artistic production. Copyright is still a critical foundation for the core copyright, creative industries, and it is these industries that are most impacted by copyright infringement, in particular commercial scale piracy, with counterfeiting having a greater impact on the partial copyright industries. Frontier Economics ³⁰ estimated the total value of all counterfeiting and piracy globally was between \$455bn and \$650bn in 2008, with digitally pirated goods estimated to be about ten per cent of the total value.

In the digital economy, copyright continues to perform the critical function of encouraging new works but also has a wider impact, playing a significant role in fostering innovation; the impact of copyright is therefore now much wider than the creative industry alone. Digital technologies, the companies that exploit them, and the business models they facilitate are all potentially impacted by copyright.

Finally, the Internet, coupled with access to broadband networks, has facilitated an explosion of creativity and content production by consumers. This tsunami of content, and the involvement of everyday consumers in the generation and publication of content, places new and different stresses on the existing copyright frameworks.

Classification	Example Industries
Core copyright industries	Literature, music, theatre, film, video, radio, photography
Copyright dependent industries	TV sets, CD players, Games equipment, Photocopiers
Partial copyright industries	Household goods, footwear, apparel, museums, libraries
Non dedicated support industries	Retailing, Transportation, Telecommunications

1.1.3.1 Core Copyright Industries

The biggest impact of the development of the digital economy has been on the core copyright industries. The nature of digital goods means that copyright infringement, both by individuals and through commercial piracy is easy and widespread. Copyright infringement and the need to protect and enforce copyright are critical concerns of all of the creative industries. Without adequate protection, the industries argue that they will not be in a position to invest and develop talent or products.

The prevailing view is summarised by a recent Business Alliance Against Software Counterfeit and Piracy (BASCAP) report on the global impact of piracy and counterfeiting; "The massive infiltration of counterfeit and pirated products, or IP theft, creates an enormous drain on the global economy - crowding out billions in legitimate economic activity and facilitating an "underground economy" that deprives governments of revenues for vital public services, forces higher burdens on tax payers, dislocates hundreds of thousands of legitimate jobs and exposes consumers to dangerous and ineffective products."³¹ The view that there is a significant social and economic impact also is prevalent for copyright as well as for wider IPR infringements. In a joint submission to the United States Intellectual Property Enforcement Coordinator, the US creative industries stated "The Internet in general, and broadband services in particular, offer many new and exciting opportunities to consumers; prime among them are new ways to create, distribute, and enjoy copyrighted works. But, when these networks are abused to provide widespread unauthorized access to these works, that seriously undermines the incentive to invest in the creation of content for this new medium, or for more traditional distribution channels."32

Outlined below is an indication of the level of infringement reported for the different industry sectors and their assessment of the potential industry impact.

Music

Without doubt, there is a significant amount of copyright infringement, both through commercial music piracy (where the organisation generates income through the unlicensed sale) and private copying and distribution of music. The International Federation of the Phonographic Industry (IFPI) estimated the number of files illegally shared on a global basis at more than 40 billion in 2008³³, a piracy rate of about 95%. Frontier Economics, drawing on industry figures for retail pricing and the volume of illegal downloads, has estimated the commercial value of all recorded music digital piracy was between \$17 billion and \$40 billion in 2008. They believe the figure was likely to be closer to \$40 billion with an estimated commercial loss to the industry globally of between \$3.5 and \$8bn annually.

The digital music market, and particularly online music, has been a significant disrupter to the existing business models and markets. Despite a growth between 2004 and 2010 of over 1000% for legal digital music downloads and an increase to 29% of all music sales, the overall revenue from recorded music still fell by 31%.³⁴ There are now over 400 licenced music services, which support over 13 million licenced music tracks³⁵. Subscription services, facilitated by better device compatibility have also started to grow. Napster, the original pirate site, now operates legally as a subscriptions service; Spotify, Deezer and Slacker are also proving new advertising and premium content business models. Business models with the ISPs and the mobile operators are seen to offer further potential to integrate payment services and billing arrangements to further grow the legal market for music.

Further new music services are anticipated. Apple has announced I-Cloud³⁶ music services, which allow users to store and access their entire music collection in the cloud for an annual subscription fee regardless of the original source of the music. Facebook and Spotify have also been rumoured to be partnering on a new music service³⁷ demonstrating further innovation and development in legal music services.

Film

Greater broadband penetration is increasing the potential of film piracy as networks have the capacity to handle the volume of the data required to copy video images. As with any illegal activity, estimating the impact and the loss of earnings for the film industry is difficult. Film revenue growth has slowed; however, it is hard to assess whether piracy is directly responsible for this decline or how much it contributes to the loss. The Motion Picture Association (MPA) and L.E.K³⁸ estimated the economic impact of substitution on the film industry to be \$7bn in 2006, with Frontier assessing the commercial value of pirated films to be between \$10 and \$16bn in 2005. Given the rapid growth of internet penetration, they believe, by now, this is likely to be a conservative estimate.

There is an increasing development in legal online film propositions including Netflix, LOVEFiLM and IMDB (The Internet Movie Database), iTunes, Blinkbox and others, that reflect not only the commercial viability of delivering film over the internet but also the opportunity for commercial piracy. In July 2010 the US government shut down nine websites offering free access to films. The sites, some providing access to films just hours after their official cinema release, had nearly 7 million subscribers each month and, like many illegal music sites, made their money from advertising revenue and donations. Studies and economic analysis by IPSOS and Oxford economics in the UK, Australia and Canada all show high and growing, levels of piracy. The Korean Film Council estimate 50% of households in Korea have illegally downloaded films at an estimated cost of the industry of \$1 billion with the DVD market being most significantly impacted. In May 2011 it was reported that Voltage Pictures was suing 24,583 BitTorrent users, mainly in the US, for illegally downloading 'The Hurt Locker', making this the largest BitTorrent lawsuit and giving an indication of the scale of consumer sharing and copying.

TV and Broadcast Industries

Recently Viacom stated "The growth in broadband connection speeds and internet-connected TV such as Apple TV and Google TV, combined with the proliferation of illegal file-sharing, streaming and downloading sites presents a mortal threat to the economic and creative processes which underpin our business"³⁹

A study by Screen Digest for WIPO⁴⁰ highlighted four forms of 'unauthorised access to broadcast signals', physical piracy, hardware-based unauthorised access, unauthorised re-broadcasting and extra territorial TV access or grey markets. The scale and the nature of the copyright issues vary by region, but hardware-based access and unauthorised retransmission have the biggest commercial impact on the industry. In Europe AEPOC (the European anti Piracy Association) estimates €1bn is spent on pirated cards and set top boxes. In Asia and the Middle East unauthorised rebroadcasting is a greater issue. Globally, it is extremely difficult to accurately estimate the cost of physical piracy on the broadcast sector.

Sports rights face a unique challenge as there is a significant premium for 'live' content and a correspondingly high value associated with the rights to live broadcast. Commercial streaming of 'live' sports events by pirated sites is an area of increasing concern for the

industry and it is technically becoming more feasible for the pirates. As the pirates can now effectively transmit in real time, the live content using unicast (one to one) or via a peer-to-peer (P2P), they have the ability to compete directly with the rights holder. As noted by the OECD⁴¹, many of the sites offering these services, particularly unicast services, are doing so on a commercial basis, P2P sites being supported by advertising and the Unicast sites supported through subscriptions or pay-by-view. For consumers it can be difficult to differentiate between legitimate and illegal services.

Publishing

The digital economy offers significant opportunities for the publishing industry but, as with music and film also presents some threats. In the US e-book revenues grew 146% in March 2011 compared with the same month in 2010, with Amazon announcing e-book sales now outstrip hardback and paperback sales in the US. The increasing availability of e-book readers and tablet PCs suggest this trend is likely to continue, as does the attempt by Google and the American publishers to broker a licensing deal for e-books. This development of e-readers increases the accessibility and offers a new distribution channel for books and other published materials but opens up the possibility of widespread sharing of copyright material.

In book publishing there is a view that the impact of piracy may be less severe than in music and potentially film and TV. Nigel Newton, founder and chief executive of publisher Bloomsbury recently stated: "We should reflect on how lucky we are that we are winning this war and that the public accept they should pay something for e-books."⁴² The publishers Association Infringement portal noted 31,000 titles reported copyright infringement on-line from January to June this year, on over 80,000 web pages. Although there is optimism that illegal copying of books and other published materials can be controlled, there still remains a risk that illegal copying and distribution of copyright material could have a significant commercial impact on the industry.

Games

Games and entertainment software has been reasonably resilient to piracy. This is mainly due to the technical capability needed to 'hack' games consoles. For PC-based games, without the constraint of needing to modify hardware, there have been reports of ratios of ten to one for pirated games software. Interestingly the games industry has developed business models that are resistant to piracy in other ways too. Monthly subscriptions and value added services for games such as 'World of Warcraft' limit the potential impact of piracy. Online communities also have active debates on the ethics of online piracy, which appears to be a debate missing from other copyright industries.⁴³

Software

The software industry suffers from piracy, both physical and digital. In some markets the vast majority of software used is sourced illegally; however, global estimates by the Business Software Alliance suggest total piracy is approximately 40% of the market. Underlicensing, where companies buy a limited user licence and then install the product on many more PCs or servers, as well as counterfeit and increasingly digital piracy, are all challenges for the industry. Frontier Economics estimate the economic value of digital piracy infringements alone could be as high as \$19 billion. The Business Software Alliance issued 7.5 million take down notices to Peer to Peer and BitTorrent sites in 2009, which gives an indication of the scale of the distribution of illegal software online.

The focus of efforts by the industry has been to encourage governments to ensure that they use legal software across all of their departments and to maintain a focus on business software and targeting commercial, criminal, software distribution rather than consumer copying.

1.1.3.2 Distributors and Carriers of copyright materials

This range of stakeholders covers a number of different commercial users of copyrighted content, including; broadcasters (that create their own programming using copyrighted materials), libraries, educational establishments, new digital businesses, internet service providers, web hosting services and other internet businesses. Given the diverse nature of this range of stakeholders there is naturally a significant divergence in individual company positions.

There is consensus on the value of and need for copyright to stimulate and reward creativity. There is also consensus that piracy levels are endemic and that action is needed to enforce copyright protection. There are however questions as to where the balance in the debate should lie, summarised recently by Google; "Just as inadequate copyright protection can reduce incentives to create, excessive copyright protection can stifle creativity, harm competition, halt innovation, block free speech, and gridlock economic growth."⁴⁴ Maintaining an effective balance that encourages innovation whilst protecting copyright is a key area of the IPR debate. The main concern with regard to innovation being summarised in 2004 by Edward W. Felten, a computer scientist at Princeton University, "The legal tools that are being used to rein in bad behavior are so blunt that they block a lot of perfectly benign behavior."⁴⁵

As well as this concern distributors and carriers generally have two other main issues with copyright. The complexity of licensing rights is one major area of concern, especially the international rights needed to support regional and/or global businesses. Related to the licensing issue is the problem of orphan rights (copyright material where the rights owner can't be found), which not only add cost and uncertainty into the use of copyright materials but also result in valuable cultural work being unusable.

The role of intermediaries in enforcement is the other area of current debate and discussion, especially with regard to the liability of intermediaries and the balance of consumer rights. These issues are discussed in detail in Section 4.

For telecoms regulators this group of stakeholders is interesting as it includes the telecom carriers. Whilst many of the IPR discussions and debates are somewhat tangential to telecoms policies some of the discussions, particularly on enforcement approaches, are potentially central to telecoms policy issues. As the digital economy becomes an increasingly important part of the economy and society, it is highly likely that telecoms regulators will increasingly be drawn into defining the regulations, rules, procedures and remedies relating to the internet eco-system in general and copyright in particular.

1.1.3.3 Consumers and Consumer Advocates

A number of consumer advocacy groups and academics are increasingly looking at copyright and patent issues. Whilst the consumer advocate groups are not supportive of illegal commercial abuse of copyright they have concerns that enforcement efforts against these pirate operations and efforts against individual consumers can start to rip the fabric of the internet and undermine individuals' rights to privacy

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and, in some cases, freedom of expression. Most noteworthy of the advocacy groups is the Pirate Party. The Party advocates for reform of copyright and patent laws and for consumer privacy. The Pirate Party are also strong supporters of net neutrality regulation and have been active on this issue in the European Parliament.

The nature of digital products has changed the way consumers interact with them and has altered consumers' views on copyright. There is a body of research that indicates that consumers are unclear on exactly what their rights are and where the legal boundaries are within the existing copyright regimes. Even where consumers are clear on the law, there is widespread disregard for the existing boundaries, which, in itself, is an issue for policy makers. Also of note is that in certain situations industry and the rights holders no longer 'police' the legal boundary and have openly expressed their view that although existing practices remain technically illegal (in some markets) they are not enforceable and it is unlikely to be in the interests of rights holders to pursue actions against infringers.⁴⁶ Finding the appropriate enforcement balance is a challenge for policy makers and for regulators implementing appropriate enforcement procedures with internet service providers.

The biggest transformation for consumers, however, is that they are now the content creators. Facebook is reported to have 750 million users worldwide; YouTube announced 3 billion views of content per day⁴⁷, and MySpace has over 8 million Bands and Artists hosting 1.5 billion images and uploading 60,000 new videos per day₄₈. As noted by Consumer International, "The explosion of creativity from ordinary consumers commenting and building upon works from pop culture, and freely sharing their creations with the world, has been one of the defining cultural phenomena of this century." ⁴⁹ The huge increase in user-generated content (UGC), much incorporating copyright material, and the growing ability to share copyright material is placing pressure on existing copyright frameworks.

UGC is an integral part of the today's Internet. The OECD⁵⁰ identified three main characteristics of UGC including a publication requirement (the work needs to be published), a creative effort (some effort to create or adapt is required, not just posting other people's content), and 'outside of professional routines' (it is typically produced by amateurs on a non-commercial basis). The volumes are astounding. Google's Executive Chairman Eric Schmidt recently observed, "Every two days now we create as much information as we did

from the dawn of civilization up until 2003."⁵¹ More than 48 hours of video are uploaded to the YouTube site every minute⁵², users contribute to reviews and news stories, post pictures and videos whilst mashing up content in ways unimaginable when copyright laws were created three hundred years ago.

This explosion of content creation and content reuse has created a challenge for copyright frameworks. The volume of users downloading, editing, mixing, creating and posting content, primarily on a noncommercial basis, is a new aspect in the copyright debate. Techniques and technologies that were only available to professional studios and production houses are now available to anyone with an interest and a \$1500 computer. The volume of UGC, much using copyright material, makes enforcement impractical, in part because of negative reputational damage and in part because it is simply uneconomic to take action against all of the infringements.

UGC is a positive development. The challenge facing policy makers is to find a way of adapting existing copyright frameworks to encourage creativity whilst protecting the rights holders or, as Gowers stated in relation to IPR generally, *"It must strike the right balance in a rapidly changing world so that innovators can see further by standing on the shoulders of giants"*.⁵³

1.1.4 Summary

The Internet, broadband and the growth of the digital economy is one of the great transformational catalysts society has seen. The wider social and economic benefits and the potential to further enable change have been widely reported. Although for many the transformational change has been good, for the creative industries it has created significant disruption.

The debate on future copyright is a delicate balance between the protection of the copyright owner and the development of 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 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 use copyright material with a variety of technologies and for a variety of purposes is a significant challenge for policy makers and regulators.

Within the overall IPR debate copyright is the issue of most relevance to telecoms regulators and policy makers. Telecoms regulators are increasingly being looked to as the authority to implement rules that protects copyright, provide protection for consumers and encourage investment and service innovation within the digital economy. The focus of this paper is therefore on copyright and the implications of the growth and development of the digital economy on copyright issues.

1.2 Institutional Overview

The goal of a robust framework for international copyright is not only to protect the international rights of the creator but also to allow the global community to benefit from intellectual property.

U.S. Copyright laws exist "to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries" (United States Constitution, Article 1, Section 8, Clause 8)

As earlier mentioned, there are a number of global and regional organisations that support this goal.The World Intellectual Property Organisation (WIPO) administers international treaties, with the World Intellectual Property Organization (WIPO), World Trade Organization (WTO), the World Customs Organization (WCO), the World Health Organization (WHO), the International Telecommunications Union (ITU), the Group of Twenty Finance Ministers and Central Bank Governors (G-20), the International Criminal Police Organization (INTERPOL), the Asia-Pacific Economic Cooperation (APEC) Forum, and the Organisation for Economic Co-operation and Development (OECD) all active in the area of policy and enforcement.

Regionally there is significant cooperation. For example the European Union provides a common framework for the 27 member states through the Copyright Directive⁵⁴ and the IPR Enforcement Directive⁵⁵. In Asia, the 1995 Framework Agreement on Intellectual Property Cooperation agreement between ASEAN markets provides a formal cooperation agreement on intellectual property and collectively coordinates on intellectual property issues. Common frameworks and agreements also exist in Africa through ARIPO (African Regional Industrial Property Organisation) and OAPI (African Intellectual Property

Organisation) and in Latin America through the Andean Pact Countries.

Each national market also, typically, has a number of institutions involved in the management of intellectual property and in the enforcement of intellectual property rights.

1.2.1 Intellectual Property Rights Institutions and Treaties

The World Intellectual Property Organisation (WIPO) is part of the United Nations. Established in 1970, it administers the majority of the global intellectual property treaties and has a mandate to promote intellectual property rights protection globally through cooperation between member states and in collaboration with other international organisations.

The World Trade Organisation also has a significant role in international intellectual property through the TRIPS agreement. The TRIPs agreement ⁵⁶ was introduced as a way to provide more "order and predictability" into trade rules for intellectual property and as a way for more systematic dispute resolution. TRIPS establishes the minimum level of protection governments need to provide for the intellectual property of other WTO members. Later treaties also extend these protections for rights holders.

The main international agreements for copyright include:

The Berne Convention (1886) – This was the original international convention for copyright and and required minimum rights for a copyright owner to reproduce, translate, perform and broadcast the work as well as national treatment of works from other treaty members..

The Rome Convention (1961) – Extended international protection to the rights of performers, record producers and broadcasters, this was mainly as a reaction to the introduction of new recording technologies.

The TRIPs Agreement (1994) – includes requirements that national laws must meet with regard to copyright rights, patents, industrial designs, trademarks and other confidential information. It extends some the protection in a number of areas including rental rights. TRIPs also specifies enforcement

requirements, remedies and dispute resolution procedures.

The WIPO Copyright Treaty (1996) – updates the Berne Convention provides further extensions to distribution and rental rights as well as including rights for interactive downloading and for the distribution of copies and protection against the circumvention of technology measures.

The WIPO Performances and Phonograms Treaty (1996) – refines the Rome convention and has the objective of providing an updated set of international rights for performers and record producers. The Treaty effectively updates the Rome Convention to accommodate interactive downloading and distribution as well as protection against the circumvention of technical protection measures..

The anti-counterfeiting trade agreement – ACTA (2010) – In October 2010, the Anti-Counterfeiting and Trade Agreement, was signed by a number of countries including the EU (on behalf of member states), US, Japan, Korea, Singapore and others. This agreement, yet to come into force, adds more detail the current TRIPs obligations in the area of IPR enforcement.

1.2.2 IPR Enforcement

The rules for enforcement of IPR at a national level are outlined in the TRIPs agreements. The agreement outlines what protection should be given to rights holders, what enforcement should be available nationally and outlines how international disputes should be handled. In general TRIPs compliance requires governments to be able to ensure that IPR can be adequately enforced under national law, have sufficient penalties available to deter abuse of IPR and should be fair equitable and not too costly. Minimum enforcement standards for members under TRIPs include civil proceedings for rights holders, criminal proceedings against commercial scale trademark and copyright infringement and border measures to prevent commercialisation of imports.

Implementation of enforcement measures is a national responsibility. A number of international organisations are active in promoting and sharing best practice on International IPR enforcement. WIPO and WTO provide technical enforcement advice as well as overseeing international treaties. Interpol is active through the Interpol International Intellectual Property Action Group (IIPAG), providing advice and assistance on enforcement approaches. The World Customs Organisation (WCO) also provides advice and guidance for border controls.

A number of countries also produce ranking lists on international performance on IPR protection and enforcement. The Special 301 report⁵⁷ produced by the Office of the United States Trade Representative is the US publication ranking their views of IPR protection globally. The EU also produces an enforcement report ranking IPR protection globally⁵⁸. The reports reflect concerns raised by domestic industry on international IPR protection. Although there is some consistency in the reports and the focus is typically on developing markets, concerns are also raised, on developed markets. The Canadian copyright laws being specifically highlighted in both reports recently and the US appearing in the EU report.

The long history of IPR legislation and individual approaches to implementation do result in market specific differences. This makes it complex to converge into a single global IPR approach. Although the broad objectives for IPR protection and enforcement nationally are consistent, the differences in implementation can cause confusion and uncertainty for rights holders. This adds to the transaction costs for legitimate businesses, and weakens the ability for legitimate businesses to compete against illegitimate ones who disregard copyright.

1.3 How to protect copyright and consumers in the digital environment?

What legal instruments, business practices and technical measures are there to protect copyright materials and to protect user-generated content?

1.3.1 Types of digital infringement

It is a function of digital products that they are easy to copy and easy to distribute. There are a number of different ways copyright material is made available commercially through illegal 'pirate' services or privately between individuals. The different techniques are outlined in summary below:

1.3.1.1 Physical copying

There are a wide variety of methods available to copy and transfer files between computers. These are frequently used to transfer copyrighted materials where there is limited internet access and between associates, friends and family. Techniques include burning disks, transfer using memory sticks, use of storage drives and direct transfer between two PCs.

Physical copying using CDs for music or DVDs for film content is still the primary method for distributing pirated material in many developing markets. Enforcement techniques are similar to those for other counterfeit and pirated goods and tend to focus on disrupting the supply chain and seizing the assets of the organisations copying and distributing the material.

Copying and transferring files between associates and friends, defined by the OECD as local sources, is increasingly handled by memory sticks, and for larger amounts of data, storage drives. Many consumers don't consider this type of transfer to an illegitimate activity, but a legitimate use of an asset they have bought, the digital equivalent of lending a book or a CD.

Naturally these techniques are also used to back up files legally purchased or to transfer files between old PCs and new PCs. In markets with fair use provisions or specific exceptions that allow format shifting this application is fine; in markets without these provisions even back-up is defined as a copyright infringement.

Transfer of files through email and as attachments through social networking sites is possible for 'small' volumes of data. These methods substitute for physical copying where physical presence isn't possible but remain reasonably limited and tightly linked to an individual's social network.

1.3.1.2 Internet Piracy

A variety of different approaches exist, and are widely used, on the internet to distribute copyrighted materials illegally, both for commercially gain and for free distribution. The techniques used are not illegal and have many legitimate and legal applications. However, as they are also effective for handling large file transfers, they are widely used to transfer copyright material, much of it illegally.

1.3.1.2.2 Peer-to-Peer (P2P)

P2P networks are a "communication structure in which individuals interact directly, without necessarily going through a centralised system or hierarchy. Users can share information, make files available, contribute to shared projects or transfer files"⁵⁹. In technical terms

P2P networks are computer systems that can share information with each other without the need for a central server, each computer acting as a file server as well as a client on the network. For P2P the only requirements are internet access and P2P software which allows the client PC to search other PCs on the network, typically a single P2P file. Examples of P2P sharing networks include gnutella, G2, eDonkey and BitTorrent.

Although there are legitimate services and purposes for P2P technology, it is also widely used to share copyright material across the P2P community on a reciprocal basis. The volumes are significant, with Bit Torrent, one of the bigger P2P providers, announcing 100m users worldwide and over 20 million active users daily⁶⁰. A 2011 report by Envisional⁶¹ suggests two-thirds of P2P BitTorrent traffic involved sharing copyright infringed material – estimated as close to 15% of all internet traffic. New P2P techniques also support streaming of live broadcasts which makes it a significant enabler of piracy for live sports rights and other time-sensitive content, although the volumes of this activity are still relatively small.

P2P networks have a legitimate purpose: as they distribute processing across a large number of computers they are efficient and resilient. Research on the potential impact for P2P technology on handling user-generated content showed server workload could be reduced by as much as 98% by using P2P technology rather than traditional server technology. ⁶² The technology is used by legitimate, legal, services. Spotify uses P2P technology to relieve pressure on streaming servers and, in their words, using a model "where central servers and peers work in unison to provide you the best, fastest experience in an economically viable fashion"⁶³

1.3.1.2.2 Warez Sites

Warez sites are sites that host and distribute pirated software on the internet. Often the material is pre-release and is distributed by 'release groups' who break the software security or other content protection and then post it onto Warez sites for download. Originally Warez sites focused on software but they are now a source of films, music and computer games. Although much of the content is delivered free, it isn't uncommon for Warez sites to charge for some content. Distribution and delivery of the content is now often through P2P technology.

1.3.1.2.3 Cyber Lockers

Cyber lockers are internet storage sites, many of which provide free storage for registered users. The sites have a legitimate purpose in that they provide consumers and small businesses with a cloud-based back-up service. However, the way they operate makes them easy to use to distribute copyright material over the internet. Users simply upload a file onto the cyber locker and the cyber locker returns a URL to the user, who, if they wish, can then post the URL onto internet forums. Although used for many legal purposes, cyber lockers are known to transfer and store large quantities of copyright material. Following the introduction of the Hadopi legislation in France there is evidence that users have simply started to share material through cyber lockers, which aren't covered by the legislation. Envisional⁶⁴ suggest that, as with P2P, about 75% of all content in cyber lockers is being illegally downloaded and shared.

With the increasing commercialisation of cloud services and the increasingly global nature of these services there is an increasing risk that both commercial pirates and individuals will exploit these services to transfer and store pirated materials. Wherever there is an ability to move digital content easily there is a probability people will look to exploit this for sharing copyright material.

1.3.1.2.4 Streaming sites

Internet streaming is a challenge and especially a problem for the protection of live rights. Live rights carry a significant premium, with the value of the right declining rapidly for delayed or repeat viewings. Sports rights, from the Olympics through to football, cricket, basketball and motorsport are commercially the most valuable.

Technology has allowed pirates to intercept and retransmit the live video streams in real time, allowing them to compete directly with the original rights holder. Broadband connectivity, computers with TV card and freely available media player software make it technically simple for people to retransmit content onto the Internet.

Originally, streaming solutions were dependent on unicast solutions, which create a small buffer and then retransmit the content in near real time on a one-toone basis. For unicast there is a dependence on significant server capacity and, as such, these solutions are nearly always commercial, subscription-based services. For end users it is often hard even to determine that the content is sourced illegally.

Increasingly however, P2P technology is being used to stream content. As with all P2P technology the more users actively downloading the content, the better the quality of the transmission, so P2P is ideally suited to the most popular sports rights. Sites like MyP2P have a professional schedule of live sports covering all major sports events.

1.3.1.2.5 Proxy services (to avoid international restrictions)

For international rights one challenge is preventing the use of proxy services to bypass international rights restrictions. The proxy service allows users to mask their home location to the content server and access material that would otherwise be restricted. Where governments have implemented blacklists, like the recent Malaysian proposal to block P2P sites⁶⁵, use of proxy DNS services is seen as a simple way of getting round the block. Although the proxy services don't host or distribute copyright material, they do help to provide users with anonymity, allowing them to access services and content from which they would otherwise be barred.

1.3.2 Protecting Copyright

Copyright infringement is a civil offence in most jurisdictions. However, where the offence is for commercial gain it is possible for criminal action to be taken against the offenders. Having an effective and proportionate remedy to copyright infringement is one of the key elements of TRIPs and is a focus of many of the discussions on international enforcement of copyright. There are a number of other areas that can either help to redefine copyright, potentially reducing the level of infringement, or can address copyright problems without legal action being taken.

1.3.2.1 Digital Rights Management

Digital Rights Management (DRM) is a set of technologies designed to protect and enforce licence holders rights for digital content. Typically there are two parts to the technology: encryption, which protects the content, and authentication, that only allows authorised users to access the content. DRM technologies are used across the copyright industries to protect films, music, books, games, software and broadcast content. A variety of different techniques and technical protection measures exist in both the online environment and using encryption related to hardware.

Circumvention of digital rights management, specifically technical protection measures, was a commitment agreed to in the WIPO 1996 Copyright treaty and has subsequently been incorporated into national laws. The agreement requires signatories to "...provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures" and to "...provide adequate and effective legal remedies against any person knowingly performing any of the following acts: (i) to remove or alter any electronic rights management information without authority; (ii) to distribute, import for distribution, broadcast or communicate to the public, without authority, works or copies of works knowing that electronic rights management information has been removed or altered without authority."

For the majority of legal users DRM is relatively (if not completely) transparent. The existence of Warez sites and the known activities of hackers and crackers in breaking encryption is evidence of illegitimate activity in this area. It would seem unlikely that DRM will be able to prevent all illegitimate copying; however, it does create a barrier which many consumers are unwilling to cross and does also prevent inadvertent copyright infringement. Many services on the market today, including the BBC I-Player, Spotify and Napster, all use forms of DRM.

1.3.2.2 Exceptions and Fair Use

Whilst having an effective and appropriate fair use policy does not protect copyright, it does define what activities constitute an infringement and therefore have a bearing on any impact assessment assessing the value of illegitimate activity. Clear policies, which are aligned with the views and actions of the majority of people can help to clarify where the boundary between legitimate and illegitimate and will help to focus copyright enforcement efforts on commercial activities and on individuals who are flagrant abusers of rights, rather than those who unintentionally infringe copyright in minor ways.

In the UK (which has reasonably limited exceptions) the Hargreaves review stated "IPRs cannot succeed in their core economic function of incentivising innovation if rights are disregarded or are too expensive to enforce. Ineffective rights regimes are worse that no rights at all: they appear to offer certainty and support for reliable business models, but in practice send misleading signals."⁶⁶ Hargreaves, in conclusion, supported the introduction of new exceptions to clarify user rights whilst also supporting strong enforcement of clear infringements.

Exemptions and Fair Use

In most cases, if someone wants to make a copy of the original work, permission from the rights holder is required. There are however typically a number of exceptions where copies can be made without first gaining permission from the rights holder. The main exception areas typically provided for in national law include, on a non-commercial basis, exemptions for education, museums, libraries and research, for the press and for a variety of other specific cases. The EU Directive contains over twenty exceptions, which are optional for implementation into national law. Many markets globally use the same approach; copying material without permission is not allowed unless it is specifically included on the list.

The US approach differs in that it contains a 'fair use' principle. This is a more flexible approach to copyright exceptions and in many ways could be more appropriate for the digital economy and the rapid pace of innovation. The US fair use provision allows for parody, caricature, news reporting, education and research. These are similar to the EU exceptions in the Copyright Directive. However, under the fair use there is provision for a wider use of copyrighted materials if the use advances knowledge and is transformative in its nature.

Source: Author, based on national sources.

1.3.2.3 New Licensing approaches

New flexible content licensing models are a potential solution to making content more freely available for shared use under clear and simple licences that reserve some rights, but not all rights, all without needing to contact the licensor. Creative Commons licences⁶⁷, are one of the new 'open' licence models being increasingly used⁶⁸. Facebook, Flickr, The White House, The President of the Russian Federation, Wikipedia, Al Jazeera and a host of other sites and content creators make available, or use, Creative Commons. The original licenses were designed for the US legal system however, these have been ported into over 50 other markets and Creative Commons have affiliates working in over 100 markets.

Creative Commons are not an alternative to copyright; they are founded on copyright law and use copyright to protect rights holders if the Creative Commons licence is misused. Their intent is however to make content much more freely available, to allow people to incorporate, transform and share copyright in a simple and easy way without individually needing to seek permission. The intent, and application of the licences, granting limited rights for the use of copyright materials, seems more closely aligned for usergenerated licences than existing copyright frameworks. Recently, reports from Russia suggested changes to existing legislation "aimed at allowing authors to let an unlimited number of people use their content on the basis of free licensing"69 are an attempt to introduce 'commons' type licensing into Russian copyright law.

1.3.2.4 Industry action to protect copyright

Whilst legal definitions and approaches define permissible activities, there still needs to be a range of enforcement activities to protect rights holders. Intermediaries play an important role in this enforcement either within statutory duties or through voluntary industry action or codes of practice.

1.3.2.4.1 ISP activity and enforcement

ISPs and other members of the internet value chain have been involved in enforcing copyright, either through voluntary codes of practice or through legislative requirement, for some time.

Recently, there is an increasing trend towards ISPs being required to undertake graduated response against copyright infringers using their networks. The French Hadopi law introduced in 2009, named after the 'High Authority' (Haute autorité pour la diffusion des œuvres et la protection des droits sur Internet) will send notices to infringers in France, similar enforcement approaches are being implemented in the UK, Japan, Korea and New Zealand. This approach is not however without controversy and legal uncertainty. In a May 2011 report, a United Nations Rapporteur was highly critical of the proportionality of the enforcement measures: "The Special Rapporteur considers cutting off users from internet access, regardless of the justification provided, including on the grounds of violating intellectual property rights law, to be disproportionate and thus a violation of article 19, paragraph 3, of the International Covenant on Civil and Political Rights."70

Voluntary action and industry codes of practice are also increasingly common, as ISPs and the content industries work together to try to inform customers and, where appropriate, enforce copyright. There is however a balance the ISP community has to achieve when taking action. Taking direct action, restricting access to services or using other enforcement mechanisms (e.g. blocking or throttling) needs to have gone through due legal process before being implemented. In most jurisdictions the telecoms providers have legal obligations to protect consumer privacy and have obligations concerning intercept - both requirements to undertake intercept where required and obligations to protect users from intercept. The role of ISPs in enforcement is an area of on-going legal debate. General for the European Court of Justice, which, when considering a Belgian case that required an ISP to implement filtering on its network to block copyright infringing traffic, found that the broad filtering obligation was inconsistent with EU Law. "The installation of the filtering and blocking system is a restriction on the right to respect for the privacy of communications and the right to protection of personal data, both of which are rights protected under the Charter of Fundamental Rights." 71 In the UK, a recent case between the major film studios and BT ruled that BT should use existing filtering technology (used to filter illegal child abuse images) to block Newzbin272, an illegal pirate site. The ruling was limited to this specific case and not to a general obligation to block illegal content.

Whist there is pressure to increase the role of ISPs in enforcement and even the liability of intermediaries in handling copyright content, there is also an increasing trend for governments to recognise internet access as a right; Estonia, Costa Rica and Finland have all provided this for their citizens. Chile has also introduced legislation that requires a court order before an ISP can be obligated to remove content or access and similar proposals are being discussed in Brazil.

1.3.2.4.2 Search engine activity and enforcement

Whilst the ISPs have been the focus of much of the attention in enforcement, there is also concern that search engine algorithms don't differentiate between legal sites and those that are known to provide illegal copyrighted material. Search engines are the main access points into the internet, and are the most visited sites. Google, MSN and Yahoo account for nearly 20% of all site visits⁷³. They are also the primary way that users source content and find sites. As a consequence of this, search engines provide an obvious 'choke point' for sourcing illegal content.

In December 2010 Google, under pressure from the creative industries, implemented a number of policies to help inconvenience people searching for illegal copyright material and also took action against sites hosting illegal content advertising through their AdSense service. The actions included faster take-down requests, stopping auto-complete filling in common piracy terms such as 'torrent' and looking at ways to index legal content to make it 'easier to find' than illegal content. Google's AdSense policy is to ban sites involved in illegal file sharing from their AdSense network.⁷⁴

The role of search engines in the digital eco-system, and their role in helping to manage illegal content downloading, is an area currently being discussed. The Preventing Real Online Threats to Economic Creativity and Theft of Intellectual Property (PROTECT IP) Act currently being discussed in the US contains provisions to mandate, with a court order, that search engines remove links to offending sites. The intent of the Act is clear: that by removing offending sites from search engines, the majority of sites will lose access to their customer base and the distribution of illegal content will be reduced. There are concerns, currently being debated, as to whether the Act could diminish existing safe harbour protections and whether it is necessary to extend provisions beyond the existing notice and takedown provisions.

1.3.2.5 Social Networking

Social networking sites are widely used for publishing and sharing both user-generated content and by content owners sharing their materials. The opportunity for users to inadvertently, or intentionally, post copyrighted material is significant. As such the social networking eco-system has been active in developing guidelines and taking action to manage copyright content.

MySpace introduced a Take Down Stay Down (TDSD) service that not only removes content improperly posted by users it also places a digital "fingerprint' on the video content which is added to the MySpace copyright filter and prevents the user simply reposting the content under a different user name. The tool works for video and audio content. YouTube has a similar content identification system (CIS)⁷⁵ in operation, which can not only filter content but can also provide the opportunity for rights holders to monetise their content. The bulk of the 1000 content owners who have registered content in the CIS choose to monetise the content.

The content industries and the user-generated content (UGC) service providers have developed a number of principles⁷⁶ for UGC sites with the objective of eliminating infringing content, encouraging uploads of original audio and video content, accommodating fair use of copyrighted content and protecting legitimate interests of user privacy. The fifteen agreed principles include a principle that UGC services should include content identification systems, users should clearly be notified of their obligations to copyright holders, and fair use provisions should be respected, as should a user's right to privacy.

1.3.3 Summary

Digital copyright infringement is ubiquitous. There are a number of technical approaches used by pirates to copy and share content. These techniques are increasingly sophisticated and have increasing scale and scope. Industry is making efforts to work cooperatively to mitigate the risks and to help to enforce copyright. These efforts alone have clearly not managed to limit copyright abuse and there is an on-going debate on the role of different players in the ecosystem in enforcement.

1.4 Challenges, Risks and Regulatory Responses

For telecoms policy makers and regulators the copyright debate is an increasingly important issue within their portfolio. The debate is interwoven with parallel 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.

This section outlines the main risks for telecoms regulators and policy makers to consider in the copyright debate and considers some of the potential policy implications current challenges and issue with copyright raise.

1.4.1 Risks in the Digital Economy

Managing the balance between the IPR creator and the individual user, between innovation and status quo, and between enforcement and liberalisation is a significant challenge for policy makers. If insufficient protection is given to rights holders then the incentive to create new works is lost, if too much protection is given there is a risk innovation and investment in networks will be chilled. Whilst across businesses the digital economy fight a high stakes commercial battle there is also a risk that consumers become the collateral damage. For regulators implementing processes and proportionate rules that protect the rights of all stakeholders whilst encouraging investment, innovation and consumption is a new challenge.

To achieve the optimum balance policy makers and regulators have to encourage creativity, encourage innovation and encourage consumption and use by consumers. The risks relating to these areas are outlined below.

1.4.1.1 Protecting the creativity incentive

The original intention of copyright was to encourage and reward the creation of new works. Copyright still fulfils this intent, not just by incentivising the creator but also by providing an environment that offers some certainty to support investment by the creative industries. Despite the enormous growth of UGC, professional content is still the catalyst that drives much of the digital ecosystem and makes up a significant proportion of consumption, either legally or illegally. Failure to protect copyright, and by implication the industries that invest in the development of new material, is a significant risk to the future of the creative sector. Analysis by the OECD⁷⁷ found evidence of a correlation between foreign direct investment in developing markets and the effectiveness of the IPR regime. The lack of effective copyright enforcement was seen as one of the disincentives for private sector investment in the creative industries in Africa, with many artists choosing to record or publish works in markets with stronger copyright protection⁷⁸.

Copyright protection has, over time, been extended in scope to widen the protection across different technologies and to extend duration. Legal definitions have been tightened and the law made more specific in many jurisdictions, yet copyright abuse remains ubiquitous. An arms race of stronger enforcement and increasing penalties to protect rights holders is an option but may, as discussed below, have unintended consequences. However, failure to protect the rights of the creative industries threatens to remove the incentive to create new works and the incentive to market and distribute copyright material, with the subsequent social and economic benefits this brings. In discussing the impact of digital piracy on the film industry, producer Jeremy Thomas⁷⁹ commented; "Independent film makers are dying on the vine..... Ultimately, if nothing is done, we just won't be here."80 For the publishing industry Victoria Barnsley, chief executive of Harper Collins, echoed this sentiment; "If illegal use of creative work is allowed or tolerated, how will authors earn a living in future?"81

1.4.1.2 Protecting the innovation incentive

In the digital ecosystem copying is a function of the technology and is in many markets a breach of copyright unless specifically noted as an exception or considered fair use. When computers cache memory for streaming services, technically this is a copy, and in the IP Watch list analysis this was exempted in less than half of the markets studied.⁸² The Hargreaves review, which was specific to the UK, asked whether laws developed over 300 years ago are obstructing innovation today the review concludes, "IP law must adapt and change. Digital communications technology involves routine copying of text, images and data, meaning that copyright law has started to act as a regulatory barrier to certain kinds of new, internet based businesses."83 New innovators, particularly SMEs, are negatively impacted by copyright where it creates a barrier to new services and innovation, either because of the complexity of sourcing rights or because of the potential legal risk and liabilities of interpretations of fair use or exemptions.

Tensions between copyright holders, copyright users, dependent industries and support industries are not new. Sceptics look back in history and note that in the 1900s the end of all artistic development was forecast on the introduction of the gramophone⁸⁴. In the 1920s the radio industry was predicted to herald the end of record buying, in the 1960s cable industry was described as a "huge parasite" by the film industry and in the 1980s RIAA described home taping as the industry's nemesis. Today the position of the industry is summarised by Viacom which has stated: "streaming and down-loading sites presents a mortal threat to the economic and creative processes which underpin our business"⁸⁵. Consumer groups are sceptical as are many others. Francis Gurry recently stated: "... we should constantly remind ourselves that the history of the confrontation of our classical copyright world with the digital environment has been more a sorry tale of Luddite resistance than an example of intelligent engagement"86.

New technology innovations and new services have been resisted and challenged on the basis of copyright protection and today a number of industrial processes, critical to digital technologies and exploiting the value of the internet, could potentially be stifled because of copyright concerns⁸⁷. In voicing concerns on proposed legislation extending copyright protection in the US, a group of forty venture capitalists that funded many of the top internet companies stated; "As investors in technology companies, we agree with the goal of fostering a thriving digital content market online. Unfortunately, the current bill will not only fail to achieve that goal, it will stifle investment in Internet services, throttle innovation, and hurt American competitiveness."88 There is a concern that in the arms race to increase enforcement efforts, tighten the rules copyright and increase the penalties for on infringement, innovation will be 'chilled' and the potential benefits of these technologies lost. To address this it is advocated that copyright law should provide "flexible laws that can adapt as technology advances provides the best way to ensure our legal framework does not provide a barrier to innovation."89

1.4.1.3 Consumer attitudes to digital piracy

In 2006 the International Federation for the Phonographic Industry (IFPI) suggested 95% of all music

copying fell outside the boundaries of copyright law⁹⁰. A Pew Internet & American Life Project survey in 2000 found that 78% of internet users did not think they were stealing when downloading music. Reports by the OECD, SSRC and others highlight that consumer attitudes to copying and piracy are at odds with current laws. Copyright cannot act as an incentive for creativity if it is widely disregarded and isn't enforced. The challenge is enforcing copyright when the vast majority of users are infringing copyright routinely and often inadvertently.

The demographic of copyright abuse is also informative; it is predominantly a youth activity. This is a significant risk for rights holders and more widely in society. Attitudes amongst this demographic are already reasonably well formed and attempting to 'put the genie back in the bottle' is a major challenge. When discussing P2P technology in Sweden, Marianne Levin, professor of private law and intellectual property at the University of Stockholm, stated "It's very difficult to make people act legal when they've been doing something for some time,..... In Sweden the debate (on file sharing) came very late."91 This suggests that early, pre-emptive action to shape consumer attitudes is required as the digital economy reaches new markets. Whether this will be effective is open to question. SSRC analysis suggests consumer attitudes to piracy are already well formed from the CD and DVD markets⁹².

The wider societal implications were summed up by Hargreaves: "Widespread disregard for the law erodes the certainty that underpins consumer and investor confidence. In the most serious cases, it destroys the social solidarity which enables the law abiding majority to unite against a criminal minority."⁹³ In the case of digital piracy and youth, the social solidarity may not be restricted to copyright infringement but to other activities enabled by the Internet.

1.4.2 Policy Implications

There are a number of areas for policy makers to consider when addressing the opportunities, risks and challenges the development of the digital economy brings. There are a range of issues currently being debated in different markets across the world as regulators and policy makers look to find an appropriate copyright framework to support the digital economy. The highlighted areas below are not intended to be recommendations but are intended to highlight the main areas of policy discussion across the copyright debate.

1.4.2.1 The scope of copyright and User Generated Content

The growth of the digital economy, development of new applications and services and the dramatic increase in UGC have all placed significant pressure on existing copyright frameworks which have struggled to adapt with the speed of change. As a consequence, in many markets there are areas of existing copyright exceptions that do not comfortably align with the general activity and practices of the majority of citizens. Lawrence Lessig commented that, "We need to recognize you can't kill the instant the technology produces, we can only criminalise it. We can't stop our kids from using it, we can only drive them underground. We can't make our kids passive again, we can only make them "pirates" and that's not good....."⁹⁴ Revising and refreshing copyright to better align with market practices and accepted norms is worthwhile.

Simply copying and posting copyright content on UGC sites is a breach of copyright; the commercial harm may be small in each individual case, but the cumulative effect can be significant for the rights holders. UGC site principles, and the technical measures the site owners have put in place, address this kind of infringement. The grey area however, is where the material is being used as "the raw materials for other kinds or creative or transformative works."⁹⁵ One question facing policy makers is therefore how to amend and adjust the copyright exceptions (or fair use provisions) to allow for copyrighted material to be used for private use that has no commercial impact.

Proponents of a UGC exception have proposed an exemption that would apply to 'transformative works' (not simply reposting copyright material unchanged) if the UGC "adds something new, with a further purpose or different character, altering the first with new expression, meaning, or message."⁹⁶ It has also been suggested that this could be extended to provide a limited right to create new works (using copyright material) for non-commercial activity where there is no demonstrable impact on the existing work and where the licensing transaction costs are disproportionately high. This needs to be achieved within existing legal frameworks and international commitments.

Adapting existing exemptions, or clarifying fair use, for UGC would potentially help legitimise much activity

that today is a copyright infringement. It is argued the commercial harm would be limited and the societal benefit significant as it addresses the 'corrosive and corruptive' aspects of copyright on many of today's amateur creators. Rights holders argue that any use of copyrighted material should be compensated. However, the pragmatic reality is that in most cases the cost of pursuing action against minor private infringement is not economic and the rights holders either turn a blind eye or more likely, openly accept that private use of the material is being made.

Aligning the copyright frameworks to actual behviour (where this is for private non-commercial use) will help to clarify copyright law for users and to educate, communicate and enforce where there are more serious infringements. The balance is a complex and sensitive one but an important one for policy makers to consider as the status quo doesn't appear to benefit any of the stakeholders. The internet has enabled creative participation of millions of citizens which should be encouraged, not demonised.

When considering the scope and implementation of copyright, orphan rights are often raised as a significant policy issues. Orphan rights occur where the copyright owner cannot be found. As a consequence the original work cannot be used or copied. Finding a resolution for orphan rights is a challenge and has been the focus of both commercial activity and legal debate recently. Given that copyright extends for at least fifty years after the death of the creator, this can be a significant issue for archive material. There is a general view that not only do orphan rights increase the costs and uncertainty in using the content, they also inhibit innovation and stifle economic exploitation of a valuable asset. "Opening up orphan works is a move to which there is no national economic downside"⁹⁷; most users of content agree with this view. The European commission is working on a Directive to address orphan works as part of the Digital Agenda and there have been commercial initiatives to help address the issue. The Google Books deal with Authors Guild and Association of American publishers was in part an attempt to make orphan works electronically available on a commercial basis.⁹⁸ Addressing orphan rights will help to free up cultural assets, unlocking economic and social value 'at no costs'.

1.4.2.2 Measurement & Reporting

A significant issue for policy makers is to undertake an evidence-based impact assessment before

implementing policy recommendations or changes. Whilst there are a significant number of reports and many figures have been produced highlighting the economic impact of copyright infringement, there is also a concern that these figures lack transparency and can be potentially misleading. If private sector figures can't be relied on as a basis for policy making then reporting and assessing the impact of infringements on all stakeholders is a role for government. This is a notoriously difficult task. However, where policy decisions will have implications for investment in new enforcement measures, innovation and growth and even human rights, it is important for policy makers to undertake these decisions based on the best available evidence.

That piracy, particularly in music and CD sales, has had a significant impact on some aspects of the business is not generally disputed. There is also a general assumption that where music has led, film DVDs and potentially other electronic goods such as books will probably follow. For these businesses and product lines the impact is significant. Consumer groups question whether the overall impact of piracy on the industries is as great as claimed and whether piracy is fundamentally impacting the incentive to create and stifling the emergence of new talent. The US copyright industries, likely to be the industries most impacted by copyright infringement, grew 5.8% between 2003 and 2007 against an average overall economic growth of 3%. Reported industry figures show that the music industry as a whole has continued to grow in the US and UK, the number of book titles released has grown, as have the number of films and the value of the film industry, the software has grown as has the video games sector.⁹⁹ Consumer groups acknowledge that there would be a commercial impact on the creative industries, but argue that weaker copyright, closer to original copyright laws, is sufficient and may even provide greater social welfare gains.¹⁰⁰

Whilst the difficulty of measuring any illicit activity is acknowledged, concerns have been raised with some of the methodologies and the transparency of these methodologies used in private sector impact assessments.¹⁰¹ A number of government reports have raised concerns. The US Government Accountability Office stated; "....it is difficult, if not impossible, to quantify the net effect of counterfeiting and piracy on the economy as a whole"¹⁰². The Hargreaves review in the UK, whilst looking for an 'evidence based' assessment of the impact of copyright on innovation stated; "we have not found either a figure for the prevalence and impact of piracy worldwide or for the UK in which we can place our confidence"¹⁰³, the review concludes, "the cost of IPR infringement is neither negligible or overwhelming in economic scale."

Establishing a transparent basis for measuring and reporting the impact of piracy across different stakeholders both nationally and internationally would help to provide a more robust framework within which the debate on future policy decisions can be considered. It is in the interests of all stakeholders that decisions are based on the best possible evidence rather than anecdotes and supposition. This holds not only for industry, but also for consumer advocates and other stakeholders in the debate.

1.4.2.3 Market Structure

Legal alternatives to pirate services reduce the incentive for people to break copyright. The internet and 'free' models of delivery have been very disruptive to existing business models in music, film and other creative industries. There is however a view that the levels of piracy are, in part, a consequence of existing industries trying to protect out dated business models. The SSCR research council quote in an 2009 interview, the Motion Picture Association of America (MPAA) Director of Special Projects, Robert Bauer, outlined a new direction on beating piracy: "to isolate the forms of piracy that compete with legitimate sales, treat those as a proxy for unmet demand, and then find a way to meet that demand." This view reflects the sentiments of the advocacy groups too. Whether the creative industries are doing enough to react to the threat posed to them is a difficult question. Outside the industry there is a perception that they are not. Forrester Research recently commented on the music industry stating, "The record labels are at the start of a very long journey, but they have only taken a couple of steps and they are not walking quickly enough."104 Where the music industry goes today, it is likely that facilitated by developments in the digital economy other industry sectors will follow.

Many stakeholders believe there are inefficiencies in licensing, concerns have been raised on the role and transparency of collecting societies, over overlapping rights, delays in licensing and challenges in efficiently obtaining international rights. All of which inevitably increase uncertainty and costs, which potentially undermine the business case for new services. This also suggests there are structural issues in rights management that increase costs and inhibit innovation
in new services. Even where rights are available, the commercial terms on offer don't always support an economically viable model, a problem exacerbated when competing with 'free'. There is a perception that inflexibility from some rights holders and their collecting societies are stifling legal, innovative, online businesses and as a consequence encouraging and facilitating illegal ones. Pirate services show 'the art of the possible' when unconstrained by licensing and other considerations. The challenge is to see how legal services can be developed to move at the same speed, with as much flexibility but whilst supporting a viable, if evolved, business model.

The content industries are reacting; 'On Air On Sale' policies for music are designed to limit the pre-release window for music.¹⁰⁵ Film studios are increasingly premiering films internationally following the example of the Indian film industry that has had to manage simultaneous regional release strategies to limit piracy and to protect revenues.¹⁰⁶ The creative industry have also been addressing the technical solutions that will allow for a more efficient, transparent licence procedure for rights. The Global Repertoire Database (GRD)¹⁰⁷, International Music Registry (IMR)¹⁰⁸ and the PPL repertoire database (PPL)¹⁰⁹ are examples of these initiatives in the music industry, all of which have the objective of reducing transaction costs and administrative costs. As the industry looks for a market based solution, it would seem appropriate that policy makers allow the market to develop and adapt rather than specify a single regulated solution which may lack the flexibility to adapt to future challenges.

The challenge for policy makers, in what is still a nascent market, is not to intervene but to develop a copyright framework that is simple, cost-effective, transparent, flexible and technology-neutral and will allow the flexibility to adapt to future changes without the need to legislate for specific issues and problems. It should not be the role of policy makers to protect particular business models or business interests, but to ensure there is an effective, competitive, market, which allows all participants to create value and gain a reasonable return on their investment. Encouraging an effective legal market for copyright works is as important, if not more important, than pursuing a pure enforcement agenda and is a critical area for policy makers to consider.

1.4.2.4 Enforcement

The debate on enforcement is the most sensitive and potentially the most challenging for policy makers, it is also the debate telecoms regulators are most closely engaged with. The significant divergence in views between different stakeholders is a major challenge for policy makers and regulators to bridge. On one side the creative industries see greater enforcement activity as the main weapon in the battle against piracy. On the other side, many consumer groups believe that the on-going escalation of industry and government efforts to enforce copyright is at best ineffective and at worst leading to an erosion of consumer rights and civil liberties for the majority of law-abiding citizens. In the middle, carriers and other internet players are concerned that there is no erosion of their safe harbour protection and that they are not obligated to 'police' the activities of users. The enforcement issue is further complicated given that the enforcement debate happens both internationally and nationally as elements of enforcement policy within existing copyright regulation, telecoms regulations, privacy regulations and human rights obligations.

As the effect of the digital economy becomes more pronounced, telecoms policy makers and regulators will become increasingly critical actors in the copyright debate and have a valuable contribution to add, especially to the enforcement discussions. They have a long history of implementing policies that balance the needs of different stakeholders. For intercept regulation they understand the need to protect individual rights, support the needs of the state, protect carriers from whist ensuring carriers protect liability the communications carried across their networks. Telecoms regulators have a greater understanding of potential unintended consequences the of implementing technical obligations on network operators or other players in the eco-system. Current debates in telecoms policy on privacy, traffic management, child protection and 'internet openness' or net neutrality can all influence, and be influenced by, discussions on copyright enforcement.

The enforcement debate is still evolving and the balance of appropriate obligations for the different stakeholders is still being defined in various markets across the world. It seems increasingly likely, with the growth of the digital economy, that the various stakeholders across the value chain will be involved in enforcement efforts. In the Global Intellectual Property Index Report¹¹⁰ one respondent summarised the crea-

tive industry's view in stating "The health of [the online] environment for doing business will depend on the cooperation of internet service providers – as any other stakeholder seeking to "monetise" consumer access to content – in helping to protect copyrights." A joint IPEC submission¹¹¹ by the creative industries highlighted the following stakeholders who should collectively be acting against piracy.

- Hosting Service Providers hosting illegal sites, or sites that facilitate illegal sharing of copyright material
- Search Engines who provide a simple and easy mechanism to source the illegal sites
- Ad Networks who provide a critical funding source to the illegal sites
- Payment processors who provide a means to secure revenues where charging models are applied
- Domain Name Registrars noting ICANN provides resolution for trademark but not on issues of providing illegal content
- Social Networking Sites used as a channel for promotion of illegal sites

Many of the stakeholders are already involved in enforcement today either through voluntary industry action or through existing enforcement frameworks. Pressure to extend the nature and level of intervention by internet intermediaries is already increasing and is likely to continue to grow. In the US, the IPEC white paper¹¹² released in March 2011 recommended increased enforcement powers, including the right to wiretap as part of enforcement efforts against copyright. In many markets pressure for enforcement measures to include 'graduated response' is the next step in the debate. In France the government passed the 'Hadopi' 3 strikes law that requires ISPs to warn and ultimately block internet services to persistent copyright infringers. In the UK the DEA implements a similar graduated response mechanism and similar policy are implemented in New Zealand and the Republic of Korea.

As with other areas of telecoms regulation and enforcement activity, there are safeguards that need to be in place to protect consumers, businesses, ISPs, hosting service providers and carriers to ensure they are not placed under an obligation to monitor or make value judgments on the nature of content or services. Legal oversight, as with intercept regulation, is critical to ensure the carriers can operate without fear of litigation by either the copyright owners or the alleged infringers. Procedures for notice and takedown and other protection measures need to be designed to ensure that the carriers, hosts or internet service providers are not placed in a position of making judgments as to rights, or wrongs, of a particular case. In a recent report the UN Rapporteur stated: "Holding intermediaries liable for the content disseminated or created by their users severely undermines the enjoyment of the right to freedom of opinion and expression, because it leads to self-protective and overbroad private censorship, often without transparency and the due process of the law."

Carrier independence, protected by safe harbour, is an important principle, not only for copyright protection issues but also more widely. In any long term-solution to the enforcement challenges of copyright, protecting this principle is an important consideration for regulators implementing enforcement processes. Many legal frameworks provide safe harbour for a range of specific activities undertaken by internet service providers, subject to a number of conditions. This includes the US Digital Millennium Copyright Act¹¹³ (DMCA) in the US and of the European E-Commerce directive¹¹⁴. These provisions are provided to ensure that networks are not held financially responsible for the content that they are merely transmitting or hosting which, in turn, helps to ensure the free unfettered transfer of information.

In considering IP enforcement the US Institute of Intellectual Property and Social Justice stated "Developing and implementing policies that address only current, parochial enforcement concerns based on past actions and traditional business models would be myopic and counterproductive."¹¹⁵ Proportionality, costeffectiveness and the potential impact of any unintended consequences all need to be balanced against any perceived benefits that new enforcement approaches will deliver. Enforcement mechanisms should be part of a wide range of commercial and educational efforts to address piracy issues. Telecoms regulators have an important role in assessing the proportionality of proposed enforcement measures, understanding the potential unintended consequences of proposed actions and providing expert guidance on the technical challenges and costs involved in implementing any proposed solutions. Extending powers too far to protect the rights of the creative industries could threaten the rights of the majority and even damage the fabric of the internet. However, allowing widespread illegal copying and distribution of copyrighted materials undermines efforts to establish new services, which in turn prevents access to these services for the law-abiding majority.

1.4.2.5 Industry self regulatory initiatives

All stakeholders in the digital economy have a role to play in protecting copyright and, where appropriate, in enforcing copyright. Different industry stakeholders already undertake, on a voluntary basis, a number of measures to protect copyright whilst also ensuring they meet other obligations. Industry codes of practice potentially play a valuable role in self-regulation by providing a level playing field and consistent 'rules' which set a benchmark and consistency for the players in the eco-system. Industry codes of practice also typically balance a range of interests and factors, providing a consensus view of the appropriate collective action that should be taken.

There are already many Codes of Practice that have been implemented in different markets to address copyright issues. The sites supporting UGC have their principles¹¹⁶ that outline how they address copyright concerns and more recently the ISPs in the US have implemented a Code of Practice, in part to educate consumers on copyright infringement and in part to strengthen enforcement effort.¹¹⁷ In the UK discussions have also started on a code to address concerns over how to block international sites that are hosting copyright material.¹¹⁸

Policy makers can facilitate and encourage industry stakeholders to develop Codes of Practice to protect copyright and to encourage dialogue between the different industry stakeholders. Although it is unlikely there will be unanimity across all the stakeholders on the content and obligations agreed in the Codes, they can provide an effective alternative to regulatory intervention and potentially can be introduced faster and at lower cost to the industry. Industry codes can also be more adaptable and flexible than regulation, allowing for easier evolution in response to market circumstances. This flexibility is helpful in the internet environment. A final advantage of industry Codes is that they can be implemented internationally far more easily than regulation or legal frameworks. This allows the industry to potentially address some of the international issues and challenges faster and more effectively than policy alone.

Naturally, as these Codes are generally selfregulatory in nature, they typically need to go further than existing obligations, taking into account the views of various stakeholders. They also need to be implemented in a transparent manner. However, assuming these conditions are met, industry Codes of Practice are an effective way of providing a balanced and pragmatic response to policy challenges.

1.4.2.6 Consumer education

An important element of the graduated response systems being introduced is consumer education. Evidence quoted in the press release accompanying the voluntary code of practice in the US highlighted the positive impact ISP letters have had in the Republic of Korea and in France¹¹⁹. Combining education with the potential threat of enforcement action does appear to be more effective than addressing these actions in isolation.

The SSCR study found consumers were typically ambivalent towards copyright, saw price as more important than moral considerations and are typically very aware of whether they are buying legal goods or not. A study commission by the ICC and undertaken by StrategyOne in 2009¹²⁰ also showed high acceptance of physical and digital piracy by consumers. This ambivalence is compounded as consumers don't understand many of the subtleties of copyright laws and how they apply in the digital world. Education of consumers on the impact and implications of piracy is an important aspect of the copyright debate.

Education alone will not address the challenges of copyright infringement, but, as the evidence of research into consumer attitudes show, there is an important role to raise awareness, in which all stakeholders need to participate. Globally there have been a number of efforts to increase consumer education, the StrategyOne study identified and reviewed messaging from over 350 campaigns¹²¹. Whilst it is clear that education alone will not be enough to prevent copyright infringement it is one element of the campaign to address the issues. The SSRC study assessed that approximately 25% of these education campaigns were focused on children and students, the key target demographic for downloading and using illegal copyright material.

Educating consumers on the importance of copyright and on the impact and harm of copyright infringement is not only an industry responsibility. There is also a role for government to play in increasing awareness of impact of copyright infringement. Education alone will not prevent copyright infringement but combined with an effective market structure and proportionate enforcement approaches it forms an integral part of the potential solution. Policy makers should look, in conjunction with industry, to see how they can most effectively educate consumers on copyright issues.

1.4.2.7 Protection of rights

Providing protection for the creative industries is important and protecting rights holders been an important part of stimulating creativity over the last centuries and is likely to remain so. However, in an effort to stem the tide of illegal copying and distribution of copyright material, there is a risk that policies may have unintended consequences. These unintended consequences could have wider societal impacts and this needs to be considered as part of the wider debate on enforcement. The balance, at a policy level and at a legal level, is far from clear today and will continue to be an area of passionate debate for some time to come.

As discussed in the previous section, an increasing role for ISPs and hosting services in enforcing copyright has raised questions over the balance and proportionality of enforcement measures. There is a potential contention between potential obligations to protect copyright and net neutrality concerns as well as concerns over consumer privacy. Recently a Communiqué on Principles for Internet Policy-Making¹²² was not endorsed by the Civil Society representatives. Civil Society Information Society Advisory Council (CSISAC) stated "that certain aspects of the Communiqué could be used to undermine online freedom of expression, freedom of information, the right to privacy and innovation on the Internet. Reportedly, the main point of contention was intellectual property and the role of the ISP in enforcing these rights.¹²³

The main rights concerns include the possibility that enforcement measures can be used to block and filter complete domains on the basis of copyright protection even where the bulk of the domain serves legitimate purposes and may, in the case of social networking sites, be a legitimate channel for free expression. Abuse of notice and takedown procedures is another concern; in general the commercial balance of power is in favour of the accuser and the accused often lacks the resources or the ability to challenge the takedown notice. The potential to abuse notice and takedown procedures to block political comment has been noted. As intermediaries could be liable if they fail to act on a notice they tend to act on the side of caution, increasing the risk that the procedures can be abused. Certainly, as described above, intermediaries should not be put in a position where they need to make judgment on the legitimacy of content or have liability for their actions.

Achieving a balance in this area is difficult for policy makers and is a key area for regulators promoting industry initiatives or implementing any new rules and procedures.

1.4.2.8 International cooperation

increasing global digital In an economy international cooperation is essential. Opening up markets that allow service providers to access markets delivering innovative services is one of the great advantages of the internet. In this borderless world there is an increasing need to be able to coordinate enforcement efforts at the international level as recognized by Heads of States and Governments participating in the G8 Summit of Deauville held in May 2011¹²⁴ (See Box 2). This requires common approaches to enforcement, consistent legal structures and the enforcement capacity in all markets to tackle infringements. Whilst international coordination is well established in tackling physical counterfeit goods, this is still a developing area for digital copyright enforcement.

Coordinating these efforts is far from easy, even in Europe that has a single Copyright Directive; there is significant difference in the approach different Member States have taken in implementing this directive. This creates uncertainty and makes enforcement efforts more difficult. Whilst a single global approach and legal framework for copyright is not a realistic goal, it is important for policy makers to continue to coordinate and align policies where possible to provide appropriate protection for rights holders globally.

Box 2: Summit of Deauville Declaration, May 2011

II. Internet

15. With regard to the protection of intellectual property, in particular copyright, trademarks, trade secrets and patents, we recognize the need to have national laws and frameworks for improved enforcement. We are thus renewing our commitment to ensuring effective action against violations of intellectual property rights in the digital arena, including action that addresses present and future infringements. We recognize that the effective implementation of intellectual property rules requires suitable international cooperation of relevant stakeholders, including with the private sector. We are committed to identifying ways of facilitating greater access and openness to knowledge, education and culture, including by encouraging continued innovation in legal on line trade in goods and content, that are respectful of intellectual property rights.

Source: www.g20-g8.com/g8-g20/g8/english/live/news/renewed-commitment-for-freedom-and-democracy.1314.html

The challenge associated with international coordination is significant. The digital economy is global, the services provided are global and information flows freely across this environment. Historic, geographic, boundaries are easily usurped by consumers and by illegal services. Moving hosting services is relatively straightforward, as has already been demonstrated by some of the peer-to-peer services that have simply moved country when prosecuted in one market to countries in which have no legal means of recourse against them¹²⁵. Pirate Bay is reported to host services in at least three markets and has already demonstrated, after their servers and back-up files were confiscated in 2006, that they have the ability to re-launch a service with minimal disruption to their users. Their approach has been described as 'international copyright whack-amole', moving from one jurisdiction to the next as lawyers and authorities move in to shut them down. International coordination will be required if copyright enforcement efforts against commercial criminal activity is to be effective. Attempting to address issues unilaterally makes it relatively easy for infringers, both at a consumer and commercial level, to circumvent controls. Coordinating an international response to address the issues is extremely challenging and the existing international enforcement organisations currently addressing counterfeiting and physical piracy are not yet set up to coordinate action for digital piracy.

International cooperation is not only needed for enforcement. The illegal commercial sites demonstrate the art of the possible where there are no transaction costs and no national barriers. For legitimate, legal, services to compete, international rights management needs to become nearly as streamlined and nearly as flexible. Legitimate businesses need to be able to get to market as fast, supply an equivalent portfolio and do this cost effectively¹²⁶. Policy makers have a role in enabling markets to respond and actively encouraging them if they don't respond fast enough.

There is a significant history of international legal agreements within which any international action will need to be taken but to date these typically apply national obligations on countries to address international issues. There is a role for policy makers to see how they can enable international solutions that can address both market failures and enforcement concerns.

1.5 Implications for Telecoms Regulators

Commissioner Kroes in November 2010 summarised the current copyright challenges in the European environment stating; "Today our fragmented copyright system is ill-adapted to the real essence of art, which has no frontiers. Instead, that system has ended up giving a more prominent role to intermediaries than to artists. It irritates the public who often cannot access what artists want to offer and leaves a vacuum which is served by illegal content, depriving the artists of their well deserved remuneration. And copyright enforcement is often entangled in sensitive questions about privacy, data protection or even net neutrality."127 Given the global nature of the digital economy many of these challenge increasingly face policy makers and regulators in markets around the world.

Copyright is not a new area of policy or regulation, there is 300 years of case law and precedent that makes the subject complex and nuanced. For telecoms regulators however, it is a new area. Increasing penetration of broadband, low-cost storage and high processing power coupled with the endemic levels of piracy on the internet are placing significant pressures on existing business models, legal frameworks and regulatory environments. The growth of the digital economy has raised new challenges and has moved regulators into the middle of the copyright debate, particularly in the area of enforcement and internet intermediary liability.

Many of the aspects of the copyright debate align closely to the wider internet policy debate. Industry codes of practice, reliable publicly available data, transparency and accountability, privacy protection, promotion of creativity and innovation, limits to internet intermediary liability, and appropriate enforcement efforts having all been raised as part of the internet policy debate.¹²⁸ Telcoms regulators are increasingly being looked to as the authority to develop the rules, processes and institutions needed to innovation and investment encourage whilst implementing proportionate enforcement approaches against copyright infringement in the digital environment.

There is no simple answer to the questions and challenges raised by the growth of the digital economy. The ambition is significant. It is beyond the scope of telecoms regulators to resolve all of the copyright challenges however there are a number of areas they can, and should, influence:

- Actively encouraging and promoting industry self regulatory approaches developed in collaboration with all industry stakeholders
- Ensuring there is a balanced, proportionate and robust mechanism for content owners to address copyright infringement
- Supporting the implementation of independent institutional structures to arbitrate on copyright disputes and to provide clear guidance to internet intermediaries
- Encouraging the consistent and transparent measurement and the impact assessment of copyright infringement on the creative industries and the digital economy
- Ensuring that internet intermediaries have sufficient protection from liability to continue to protect a free and open internet

- Designing rules and procedures for copyright enforcement that ensure the protection of consumer privacy
- Maintaining a balanced allocation of costs in relation to enforcement activities ensuring no one stakeholder carries a disproportionate cost
- Encouraging the removal of market barriers and inefficiencies in the copyright industries to facilitate legal services as part of an overall solution to managing copyright.
- Actively promoting and encouraging innovation and new service development by assessing the unintended consequence to changes in the scope of copyright protection.
- Collaborating internationally to provide to address international aspects of copyright in relation to the digital economy

Although the pervasiveness of internet broadband networks presents significant opportunities for growth and will deliver wide social benefits, this accessibility also poses a number of risks and raises a number of challenges. Copyright is a critical element of this new environment providing the incentive and remuneration for the creative industries, without this professional creative content the internet would be a duller and less compelling place. Overly draconian protection policies designed to protect existing business models may however have the effect of 'chilling' innovation and alienating citizens and stifling mass creativity. Creating an environment that stimulates creativity, enables competition, protects free speech and fully exploits the transformative potential of digital technology may require the 'Wisdom of Solomon' to find a balance that both stimulates and protects for all of the different stakeholders.

Telecoms regulators have an increasingly critical role in developing the environment that allows all aspects of the digital economy to flourish and for the societal benefits to be realised. On balance, for now, light touch nurturing of the digital economy still seems a safer regulatory option than strong intervention.

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- ¹⁰² US Government Accountability Office (Apr 2010), GAO-10-423 Intellectual Property: Observations on the Efforts to Quantity the economic Effects of Piracy and Counterfeit Goods.
- ¹⁰³ Hargreaves (2011).
- ¹⁰⁴ Guardian (May. 2011), Record labels not dinosaurs of the music industry, <u>www.guardian.co.uk/business/2011/may/13/record-labels-not-dinosaurs-music-industry</u>
- ¹⁰⁵ Sky (Jan. 2011), Music Labels to Launch On Air, On Sale Policy, See <u>http://news.sky.com/skynews/Article/201101115897368</u> for a UK example.
- ¹⁰⁶ ibid SSRC 2011.
- ¹⁰⁷ Global Repertoire Database, <u>www.globalrepertoiredatabase.com/</u>
- ¹⁰⁸ International Music Registry, <u>www.wipo.int/imr/en/</u>
- ¹⁰⁹ PPL Repertoire, www.ppluk.com/en/Record-Companies/repertoire2/Data-Policy-Summary/
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- ¹¹¹ The American Federation of Television and Radio Artists (AFTRA), the Directors Guild of America (DGA), the International Alliance of Theatrical and Stage Employees (IATSE), the Motion Picture Association of America (MPAA), the National Music Publishers' Association (NMPA), the Recording Industry Association of America (RIAA), and the Screen Actor's Guild (SAG).
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- ¹¹³ House of Representatives, (Oct.1998), Digital Millennium Copyright Act, <u>www.copyright.gov/legislation/hr2281.pdf</u>
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- ¹¹⁵ Institute of Social Justice (2010), Comments on IP Enforcement, www.whitehouse.gov/sites/default/files/omb/IPEC/frn_comments/InstituteofIntellectualPropertyandSocialJustice.pdf
- ¹¹⁶ www.ugcprinciples.com/
- ¹¹⁷ www.copyrightinformation.org/
- ¹¹⁸ www.bbc.co.uk/news/technology-13890935 and www.bbc.co.uk/news/technology-14035502
- ¹¹⁹ Hadopi (2011), L'Hadopi reçoit M. Frédéric Mitterrand, Ministre de la Culture et de la Communication, www.hadopi.fr/actualites/agenda/l-hadopi-recoit-frederic-mitterrand.html
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- ¹²¹ Ibid BASCAP / StrategyOne (Jan. 2009).
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