

Public Disclosure Authorized

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January 2007

**Summary of recommendations**

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## Introduction

A popular buzzword in the information and communication technology (ICT) world today is 'convergence'. Typically, when press reports or industry analysts talk of convergence, they mean the growing overlap between the traditionally segmented industries of broadcasting and telecommunications. However, this is only part of the story. There are number of different aspects of this phenomenon, and in the most general sense, **convergence is the integration of any traditionally segmented areas of communications systems.**

Convergence is happening today, and is driven by the growth of digital media and packet data communication. We explore these factors below and examine what changes in regulation this entails, taking a view for the Egyptian market. In specific terms, **it is essential that the Government of Egypt should create the environment in which convergence can occur without impediment.** This will allow increased and risk-reduced investment in the ICTs sector, positively influence employment and industry growth, and enable Egypt to establish itself as a hub for content and services for the Arab world.

## Convergence and the state of networks

Before seeking an answer to what is leading to convergence, it is critical to first define what convergence is. In the most general sense, convergence is the process by which multiple devices, services, and access platforms are finding greater overlap in use - **to the point where it will be possible for any communications consumer to use any device to access any service over any network.**

### *Types of convergence*

Simply put, there can be two types of convergence processes. The first is in terms of content and services, i.e. service convergence. The second is how you can access these services, i.e. access network convergence. Figure 1 and Figure 2 show these two types of convergence, along with the current and expected status internationally.

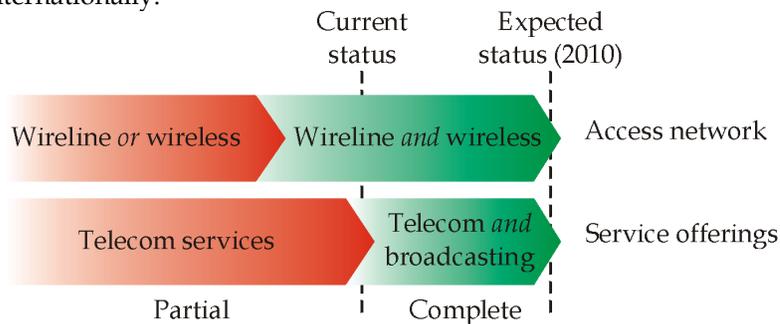


Figure 1: Types and levels of convergence

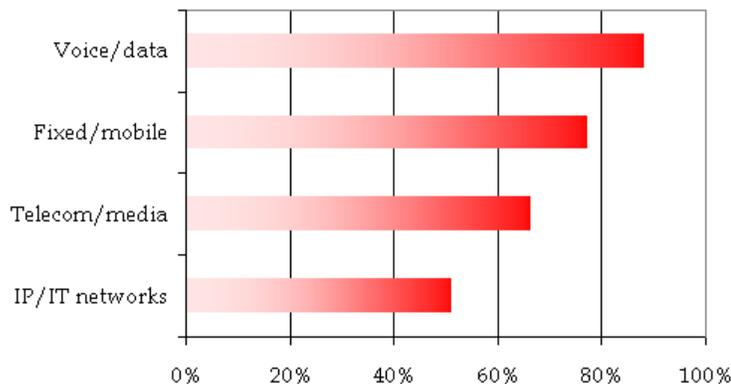


Figure 2: Telecom executives expect voice/data convergence to be most influential up to 2008<sup>1</sup>

### *Access network convergence*

Many regulatory regimes began as technology specific, with individual licenses specifying which technologies could, and could not, be used to provide specific services. Over time, however,

regulators and governments allow different technologies to access the same service. Thus, licenses or regulation became **technology-neutral**. This neutrality is partial, however, because often, licenses restrict operation to wired or wireless media, and are not completely open. There also was little need for full access convergence, because the bulk of telecom service providers were either wireline or wireless providers, not both.

However, of late, there has been significant interest and development in converging wireline and wireless access. Specifically, fixed/mobile convergence has begun,<sup>2</sup> and wireline/wireless convergence is on the anvil. British Telecom, for example, has introduced its BT Fusion offering, where subscribers can carry a voice call over both the cellular network (when outdoors) and their wireless broadband network (when indoors).<sup>3</sup> We expect this to develop into a network where voice or data communications can be carried to one subscriber via a single identifier, and using both wireline and wireless networks depending on subscriber preference and location. Ultimately, this will lead to a situation where, as the OECD explains, it will be possible to use any network for any service.<sup>4</sup>

#### *Service convergence*

Most instances of convergence today involve telecom service convergence. However, this again is partial, and there is an increasing shift towards the provision of both telecommunications and broadcasting services over the same network. For example, cable television operators are offering Internet over their cable systems, and some telephone operators are beginning to offer IPTV, or broadcasting over IP networks.

This convergence of different types of services, specifically, across telecommunications and broadcasting services over the same networks by the same operators is service convergence, and breaks down one of the most fundamental segregations in the communications industry, i.e. the separation between broadcasting and telecommunications.

Full service convergence will allow both telecom and broadcasting service providers to offer both services without restriction, ushering in an era of **service-neutrality**. Such a process is underway, and according to a survey done in 30 OECD countries, 87 operators have converged service offerings, with differing levels of convergence.

	Video	Fixed voice	Internet	Mobile voice	Providers	Countries
Dual play	✓		✓		10	9
		✓	✓		29	21
Triple play	✓	✓	✓		48	23
Quadruple play	✓	✓	✓	✓	10 <sup>a</sup>	10

*Sample: 87 providers in 30 OECD countries<sup>5</sup>*

## Convergence trends

### *Causes and effects*

There are a number of causes and effects of convergence. At a high level of abstraction, like any thing to do with communication, convergence has some technical causes, and market forces at play are capitalizing or driving these changes, finally there are specific regulatory catalysts that allow or support convergence.

### *Technological trends*

**Three main technological factors** are driving convergence. First is **digitization**, which begun in the 1980s as a move away from analog to digital systems of data recording, processing, and transmission. Digitization allows us to represent any data in the same form, most commonly binary. The second is the reducing cost and size alongside the increases in **computing power**. This allows powerful processing in small devices at costs that are reducing over time, allowing digital devices to proliferate at a rapid rate. Third, and more recent, is the growth in the use and universality of **Internet Protocol (IP) based packet switching** data transmission. Using IP, it is possible for different devices and

<sup>a</sup> Estimated number of quad-play operators.

applications to use the same networks, sharply reducing costs, and significantly easing the process of designing and deploying access devices.

### *Market trends*

Over the past two decades, there has been a significant shift towards digital media and the rise and spread of the Internet has driven significant investment and market involvement in the development of applications and services that use text, video, audio, and now increasingly, voice. The interest in convergence depends on these markets developments, but has found significant traction in the past few years because of **five main market trends**.

One of the major market drivers is the interest of service providers to **reduce costs**. IP-based converged networks save costs because of three reasons. IP is an **open platform**, and this allows for strong competition in the development of network technology. The possibility of having one unified network for multiple types of content **reduces redundancy**. Uniformity in the design of the network and simplicity by employing end-user device oriented networks reduces the **costs of deploying and managing networks**.

Network operators also see convergence as a way to **shore up falling revenues**. As the OECD notes in a recent report on multi-media networks, "One of the driving forces behind the introduction of multiple-play services is the desire of telecommunication and cable operators to offset revenue losses from increased competition to their core services."<sup>6</sup> Further, as ARPUs are falling in voice provision, service providers have realized that their service offerings have to diversify. Further, converged services consolidate billing, allow bundling, and increases possibilities for leveraging tariff. In 2005, IBM and the Economist Intelligence Unit (EIU) found in a survey that "more than 80 percent of the telecom executives polled agreed that it will be essential to embrace convergence within the next three years as a source of long term revenue growth."<sup>7</sup> It should be noted that there is a risk of falling ARPUs given the possible bundling of services and offers to make such converged bundles attractive to customers.<sup>b</sup>

Another market factor is the availability of **significant broadband penetration**, and the availability of significant fiber capacity. The massive rollouts of the late 1990s and early in this decade resulted in a glut of capacity that remained unused because services had not matured or applications were not developed. Convergence offers a set of services that can utilize this capacity, which due to excess capacity and the competitive bankruptcies early in this decade have driven down prices.

The fourth driver for convergence is the consolidation in the development and provision of **content and services**. Due to investments, mergers, and cross-holdings in the media and telecom industries, and there is an increase in instances of both content creators and network operators that have access to both the content and the delivery mechanisms.

The final market factor driving service and technology convergence is the industry's search for the ultimate '**pipe to the consumer**'. Earlier, there were a number of different connections entering the home, or reaching the consumer – there was the telephone, cable television, electrical connection, and more recently the broadband connection. The communications industry has been at the cusp of a tension between having one pipe reaching each consumer, and the realization that there is no 'one size fits all' pipe. Service convergence allows multiple services to reach the consumer via one network, while access convergence will allow a consumer to use the access network of their choice, or in the worst, allows service providers to deploy any number of appropriate access networks to serve to specific set of consumers.

### *Regulatory trends*

The combination of services over the same platform is challenging common perceptions about the best means to license and regulate providers in the information and communications technology (ICT) sector. Traditionally, regulatory frameworks were designed for an era when clear functional differences existed between services and infrastructure, but these regulations are increasingly inadequate for dealing with today's world. Policy-makers and regulators are responding to the challenges presented by the ICT sector in a variety of ways.

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<sup>b</sup> We expect such losses in revenues in the short-term, and given the reduced costs of converged network offerings, not damaging to long-term profit earning potential of any converged service provider

First, there has been a shift towards an equal or technology-neutral regulatory treatment of different information and communications infrastructure. For example, the European Union (EU), India, and Kenya have introduced, or are in the process of introducing, legal frameworks and regulations to regulate aspects of convergence through a flexible and a technology neutrality approach.

Second, governments such as Malaysia, Singapore, and the United Kingdom, are modifying the structure of regulatory authorities by providing them with the authority to regulate the telecommunications, broadcasting, and information technology sectors. Finally, governments are drafting and implementing new laws and regulations to create the necessary legal enabling framework to support an ICT sector. These laws and regulations deal with such issues as intellectual property, content, data protection, security, and computer crime.

Another approach to convergence is to accommodate it within the existing legal and regulatory framework. This is possible in countries where there are no barriers to market entry or restrictions on the type of service offering. Although operators can, and do, offer multiple services over multiple platforms in fully competitive markets, it is often a cumbersome process requiring multiple licenses and regulatory oversight by different institutions.<sup>8</sup>

Even though convergence is helping drive down costs and increase revenues, there is still a need for governments to ensure a credible commitment ensuring that the large investments required for convergence face reduced regulatory risk. Given the regulated nature of the telecom industry, and the traditional separation between telecom and broadcasting, it is essential that any **convergence in the service or technology have to be supported with convergence in the regulatory regime that governs it.**

The phenomenon of access network convergence requires technology-neutral licensing regimes, which we refer to here as **unified access licensing**. Under a unified access licensing regime, a service provider can offer a telecom service using any access network. Most unified access regimes do not yet consider the specific issues related to fixed-mobile convergence, but do allow it, or in the least, do not prohibit it. The next step in the license regime is when an operator can offer any service using any network, i.e. the license is both **technology and service neutral**. Such a license might be called a **converged services license**. There are specific issues to be worked out in both these licensing regimes, and we shall discuss these later.

#### *Effects of convergence for Egypt, MENA, elsewhere*

**Convergence is a regulatory challenge and needs immediate attention and there are significant benefits from addressing convergence, and costs of ignoring or delaying it.** The question we address here is why is it important to attend to and support convergence. In effect, three effects of convergence are important and need consideration.

The first effect is that the telecommunications and broadcasting industries will benefit from reduced costs, improved revenues, and the ability to compete across traditional industry lines. Thus, the effect is to energize the industry and drive growth.

The second effect is for the industries supported by communications. First among these are content production houses, the second are IT and offshore service providers. Convergence will allow content producers to create better content to serve the Arab world, for example, while IT service providers will benefit from better connectivity and lower prices.

The third effect is for the economy as a whole. Growth in the communications sector and in the industries supported by it will drive job creation and improve the delivery of services. This will not only have specific socio-economic impacts, but also will also increase investor confidence and economic sentiment.

Hence, the enabling of convergence will unlock these benefits for the industry and the economy. It is important to understand the convergence has the potential, if allowed and enabled, to drive investment and growth in the economy as a whole.

## Necessity for converged regulation

The outcome of convergence will depend immensely on a country's regulatory regime, both for telecommunications and broadcast television. In most OECD countries, the two networks have evolved separately with different regulatory requirements and indeed, separate regulatory agencies. However, policy makers are beginning to re-examine the roles of broadcast and telecommunications regulators to decide whether they should be consolidated into one agency. In countries such as the United Kingdom and Australia, the regulatory oversight for telecommunications and broadcasting has been moved from two separate agencies into a converged regulator and under a single legal framework. In other countries, the broadcast and telecommunication regulators meet once a month to discuss issues common to both. Indeed, an OECD roundtable on communications convergence in June 2005 found that there is increasing need for communication between telecommunication and broadcast regulators as once distinct services begin to flow over multiple platforms

### *Need for converged framework*

There is widespread acceptance of the importance and challenge facing regulators and policy makers with respect to the models that will be in place to deal with the opportunities related to convergence. Below we detail some of the specific issues that demand converged regulation.

### *Conflicting regulatory philosophies*

Typical regulatory frameworks for the communications industry as a whole encompass a variety of different regulatory philosophies (Table below).<sup>9</sup> In the converged environment, different philosophies must be reconciled to avoid conflict and confusion in regulatory goals.

Telecommunication policy basics	Broadcasting policy basics
Universal service/access	Universal availability
Control over interference	Impact on public/society/morality
Strong competition is common	Competition is typically less severe
Control over carriage is primarily sought	Control over content is typically sought

### *Eliminate regulatory arbitrage*

If regulation is not converged, it is entirely possible that one technology is regulated by more than one set of rules. If a service provider has two choices, and one of these has lower regulatory requirements, taxes, or restrictions, the service provider will select the less burdensome path. Such regulatory arbitrage causes problems when one set of providers chose the more burdensome path, because there was no choice earlier, or because their business plans required such a choice. For example, if an operator wanted to offer GSM cellular services, it would need to acquire a typically expensive 2G cellular license. An Internet service provider might, at the later point, acquire spectrum and offer mobile broadband services, including voice services, for a much lower price. Thus, the 2G operator, in order to pirate the same type of service, would have had to pay a much higher license and/or spectrum fee. Such inequality makes the business environment unfavorable for large investments.

### *Mitigate regulatory risk and increase investor confidence*

There are conflicting and overlapping regulations and laws that govern the same types of services and technologies. Consequently, the **regulatory burdens and risks for investors increase**. An investor does not know which act or regulation might change and disrupt service provision, increase costs, or demand changes in the business model itself. In Egypt, lacking a converged regulatory regime, it is likely that investors or service providers will have to liaise with multiple agencies to offer converged services like IPTV. In this scenario, the number of rules and regulations they have to follow increase, increasing the regulatory overheads and the possible risks of conflicting legal statutes.

A regulator that has in place a stable, well-defined, and convergence-ready framework will increase investor confidence in the market. This is due to the demonstration of an awareness of the future of the industry and enabling its growth. Further, this signals the ability of the government to ensure credible commitment to the industry in order to ensure them a positive rate of return on their investment over a significant period.

A report by BMI indicated in its Business Environment Rankings that of 11 MENA markets, “Egypt, Iran and Nigeria continue to remain at the bottom of the table once again.” This assessment was based on five criteria to determine the appeal of markets to investors: economic risk, political risk, telecoms market maturity, future telecoms growth potential, competitive environment and regulation. BMI notes that, “bureaucracy and red tape have hindered the development and liberalization of these telecoms markets, with instability in their respective economic and political environs also leading to shaky investor interest.” Yet, the report is clear about the prospects of the future, stating that, “they are the only three countries in our table to offer the largest sources of future telecoms growth.”<sup>10</sup> It will important to allow markets full play in order that adequate investment can drive the evolution of technology within Egypt.

#### *Legal response to technical change is slow*

There is an alternative to having converged regulation: regulate each new technology *ex hoc*, with definite limits and boundaries. However, there are two problems with this approach – the first is that it takes a specific amount of time and effort to develop such rules, which is difficult given the rapid rate, and indeterminate direction of technology development. Second, such an approach will lead to a vast and complex body of rules that might be impossible to follow, or unduly complex to decode for service providers, which increases regulatory burdens and risk.

The underlying imperative for converged regulation is that as time progresses, technologies will improve, converge, and move away from remaining under control of traditional regulatory frameworks. There is a consequent need to permit flexible use of technology and provision of services and yet maintain stability in the design of the market. The simplest way to achieve this is to permit convergence to happen as and when the market sees fit; technology- and service-neutral licensing regimes are two of the steps in this direction and are already in place around the world. Beginning on the path towards converged regulation will ensure that as technologies and business models change, the state through its regulatory and legal institutions can still ensure stability to the market.

#### *Philosophy of converged regulation*

Convergence represents a significant break for the sector from the paradigms of the past. Here, we discuss some of the guiding principles for converged regulatory frameworks, which are essential for the successful introduction and spread of convergence. As Melody, Sutherland & Tadayoni point out,<sup>11</sup> it is important for national (and in some cases regional and international) ICT policymakers and regulators to reassess the extent to which, in the new environment, the established structures of policy and regulation:

- Set barriers to the achievement of benefits of ‘everything over IP’ for users, network development, the economy and society;
- Create unjustified biases favoring or retarding one segment of the industry over the others in the process of transition to the new environment;
- Adequately address new public service and public interest opportunities and requirements in the new environment; and
- Adequately facilitate the application of the new technological and services possibilities for extending network and services development to unserved and under-served regions and people.

The guiding ideas provided below address these concerns and will be required to ensure that the full benefits of convergence flow to the users and operators.

#### *Neutrality of service and technology*

As discussed above, licensing regimes will need to be both service and technology neutral to allow both access and service convergence. Without either of these completed, there cannot be legal frameworks in place that will allow or enable convergence.

#### *Level playing field*

Convergence has the possibility of disturbing the established power structure and relationships in the market. Mergers, acquisitions, service agreements, or content-access relationships, might cause monopolies or oligopolies. It will be essential in the era of convergence, even more than it is now, to ensure that policy and regulation enables free and fair competition and supports the full play of market forces. As the Director-General of Hong Kong’s telecoms regulator OFTA pointed out in a recent article, “the role of the regulator is not to promote or ‘accelerate’ convergence. However, the

regulator has the responsibilities to establish an environment for fair competition, i.e. the so-called 'level playing field' so that if (I repeat 'if') there is a demand for convergent services, such services can develop in the market and compete fairly with one another, so as to bring to consumers the benefits of innovation, convenience and choice."<sup>12</sup>

### *Flexibility in licensing and regulation*

In concordance with the idea of neutrality and free competition, regulators and governments will also have to ensure that service providers have the requisite flexibility to choose between different technologies, marketing and roll out strategies, and also choose whether they want to be converged or not. Regulators should focus more on setting frameworks, and not micromanagement; there will always be a need to monitor the market and step in if there are market failures, but regulators should stay away from limiting flexibility.

### *Acceptance of new technologies*

A significant change from the licensing and regulatory regimes of the past is that the quick advance of technology, especially given the use of open standards and open access will lead to deployment of new technologies without regulatory control. No control will be possible, for example, over specific technical parameters, and only general limits, such as power levels, spectrum bandwidth restrictions, and quality of service requirements might be specified. This lack of specificity is not detrimental to ensuring the efficient growth and deployment of networks, but will need a refocusing of attention towards ensuring quality of service standards and coverage.

## Options and qualitative analysis

There are in essence three options for the Egyptian Government with respect to convergence. The first is to do nothing, that is, maintain the status quo. This will require the continuation of the current regime into an era of changing technology. The second option is to go for a fully converged regulatory regime, which entails full service and technology neutrality. This will necessitate significant changes in the licensing scheme in place. The third option is a middle path between the status quo and complete change, which will require enabling technology neutrality.

Different countries have taken steps towards, or have reached the position of complete regulatory convergence. In this section, and throughout this report, we will focus on two specific examples – Ireland and Singapore. These examples are useful because they are not front line developed nations and have grown significantly only over the past few decades. Please see Annex D for comparative data. **Ireland and Singapore have seen significant growth in their telecommunications sectors in the past decade, driven mainly by their individual programs to develop their economies as regional hubs for information technology and telecom services.** These countries also form good contrasts because Singapore's policy structures are relatively interventionist, while Ireland is more liberal and market-oriented.<sup>13</sup>

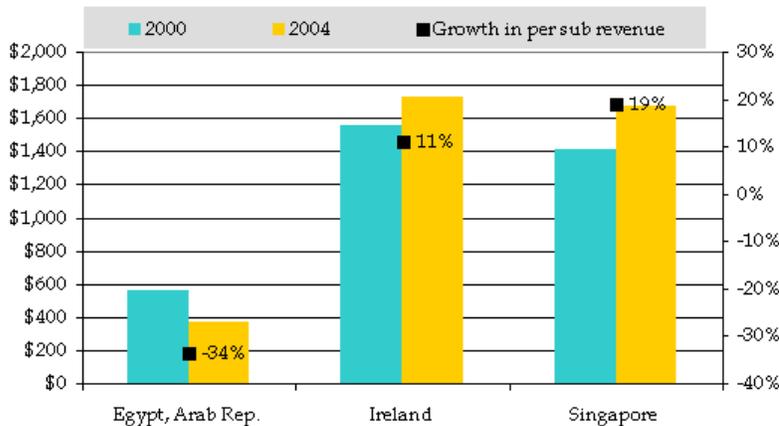


Figure 3: Revenues per mainline subscriber have fallen in Egypt

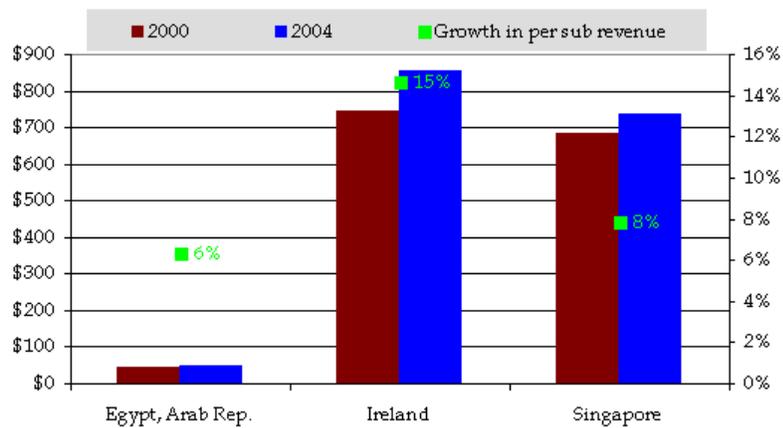


Figure 4: Telecom revenues per population are the smallest and have grown slowly

Both Ireland and Singapore have made significant progress towards convergence. In 1998, for example, Ireland's Advisory Committee on Telecommunications made recommendations to "creat[e] a fully open and internationally competitive telecommunications market that will stimulate investment in advanced information infrastructure and services in Ireland," ensuring that Ireland became and remained a "global leader in the growth of information-based employment and in the formation of Internet-based industries and electronic commerce."

Thus, in 1998, the Committee recommended, "[A] **coherent approach to regulatory policy and implementation should be established between relevant Government Departments to effectively address convergence between the broadcasting and telecommunications sectors.** The Director of Telecommunications Regulation should have responsibility for regulation of all information networks including broadcast networks. Content regulation should be exercised by a separate agency, with the division of responsibility between the regulatory agencies being clearly defined."<sup>14</sup>

Consequent to these recommendations, Ireland's Commission for Communications Regulation (ComReg) was set up as the statutory body responsible for the regulation of the electronic communications sector (telecommunications, radiocommunications and broadcasting transmission) and the postal sector. ComReg was established on 1 December 2002.

Along similar lines, Singapore has also worked since the 1960s to boost its industrial importance and during the period of 1960 to 1980 invested heavily in telecommunications. The Government of Singapore has not opted to create a converged or unified regulator responsible for the telecommunications and broadcasting sectors. Instead, **the Government of Singapore has maintained separate ICT and media regulators and has placed them both under a single ministry.**

The IDA, formed in December 1999 from the merger of the Telecommunications Authority of Singapore and the National Computer Board, handles telecommunications regulatory and licensing matters, whereas broadcasting regulation and licenses are the responsibility of the MDA. In December 2001, in anticipation of the next phase of convergence between IT, telecommunications and broadcasting, the IDA was transferred from the former Ministry of Communications and Information Technology to the new Ministry of Information, Communications, and the Arts (MICA). In addition to the IDA, MICA oversees operation of the Singapore Broadcasting Authority.

Thus, Singapore and Ireland are two examples of different and yet successful approaches to the creation of converged regulatory structures. Each of these approaches has costs and benefits, with potential economic impacts. In this section, we will detail these options and then do a qualitative analysis of each. A quantitative analysis will follow in a subsequent section.

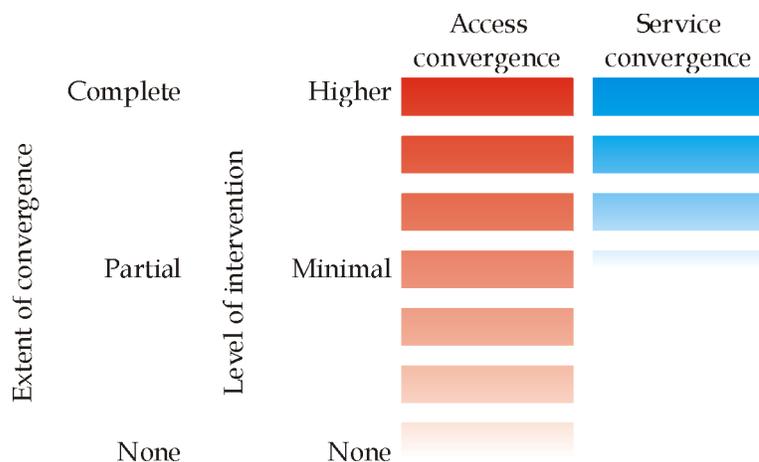


Figure 5: Three possible levels of intervention correspond to specific convergence extents

### *No policy intervention*

Egypt's current regulatory framework continues as is. In this situation, there are boundaries on which access networks a telecom service provider can use. For example, a license will only allow the use of cellular technologies, or only wireless data technologies. Even if these individual licenses are technology-neutral, they are not converged in any manner because they do not allow one licensee to employ a different technology family to provide the same service. Hence, a cellular GSM service provider cannot deploy a WiMax network without an operation license.

It is critical to distinguish operation licenses from spectrum licenses, i.e. the licenses to use specific bands of spectrum. operation licenses allow, among other things, the licensee to deploy infrastructure using specific or different technologies to actually provide a telecom service as defined by the license. For example, a WiMax provider will have a spectrum license in say the 3.5 GHz band, and an operation license that allows the import and deployment of the access points, routers, gateways, and other network equipment that will provide the service. **Consequently, in this system, there is no convergence either in access networks or in services.**

### *The costs, benefits of keeping things the same*

There are no long-term benefits in maintaining the status quo. In the short-term, the key benefit is that incumbent operators can continue their current business unchanged. In the long-term, however, as converged technologies take hold, and other MENA countries move to converged systems, Egypt will be left behind if it continues on its current path. Since any policymaking and legislative action will take up a significant amount of time, it is a negative if Egypt starts on the policy process late.

The costs of the status quo will primarily be in three areas. First, the absence of a forward-looking regulatory regime will **increase the regulatory risk and possibility of arbitrage**. This is because there will be uncertainty about how service providers should proceed with the deployment of new technologies. Each new system, say for example IPTV, will need significant discussion with the different agencies and ministries before it can be deployed and this will lead to a situation where service providers will be discouraged from investing.

This leads to the second cost - **reduced investments in the ICT sector** and a consequent loss of the economic benefits such as employment and service sector growth. According to the World Bank, between 1992 and 2002, annual investment in telecommunications infrastructure in the developing world increased from around US\$25 billion to around US\$65 billion, with investment as a percentage of GDP more than double the rate in developing than developed countries by the end of the decade.<sup>15</sup> It is clear that the ICT sector is a major investment destination, for both domestic and international investors. Egypt will lose the opportunity to have foreign direct investment or local investment in the sector if it is seen as a slow or stagnating market.

The third cost will arise from the **loss of potential socio-economic development opportunities**. There is significant potential for Egypt to grow as a hub for content development and as a source of offshore service provision. The media industry requires access to the cutting edge of content production technologies, channels to deploy this media, and in addition, an immediate market to serve. If Egypt falls behind in allowing the deployment of convergence, the content industry will not

favour it as a location for production. Further, the services sector will suffer because of lower investment and clear regulatory structures. Finally, lower investment, combined with stagnating content and service production will lead to losses in job creation. Hence, **the benefits of having a robust and growing ICT sector will be lost as the Egypt fails to move towards converged modes of operation.**

#### *Outcomes*

The outcome of maintaining the status quo will be over the medium and long term. The main outcome will be that the ICT sector will stagnate over time due to lower investment and complex regulation. Secondary outcomes will include loss of potential jobs creation, falling behind in content development and offshore or outsourced services provision.

#### *Minimal intervention: Package #1*

In this package, we propose that all telecommunications services converge. In this, the divisions between fixed-line, wireless, voice and data, and local and international networks do not remain. This convergence is **access convergence with partial service convergence**, i.e. it is possible to use any access technology to provide a range of telecom services. We refer to this arrangement as **unified access licensing**. Similar structures are in place in countries like Singapore (Annex D). Singapore's example is useful because of its position as a telecom hub in the South-East Asian region.

Another example is Hong Kong, where broadcasting and telecommunications are regulated by separate entities and are subject to different regulations. OFTA is the regulatory authority responsible for regulating the telecommunications industry and ensuring compliance with the Telecommunications Ordinance. Broadcasting in Hong Kong (SAR) is regulated by the Broadcasting Authority (BA) pursuant to the Broadcasting Ordinance, which divides broadcasting into four categories of television program services: (a) domestic free television program service; (b) domestic pay television program service; (c) non-domestic television program service; and (d) other licensable television program services. In addition, Hong Kong (SAR) has separate regulatory frameworks for the provision of media content or television program services and for the transmission of these services. Transmission networks are licensed and regulated by OFTA pursuant to the Telecommunications Ordinance, whereas television programming and content (regardless of the transmission mode) is regulated by the BA under the Broadcasting Ordinance.<sup>16</sup>

However, this step is a half-way measure and should be treated more as an intermediate, evolutionary step towards full convergence than a final resting point. In Hong Kong, Singapore, and India, all countries where access neutrality is more or less in place, there is a demand from industry and a clear understanding within the Government that the final resting point will involve greater regulatory convergence and allowing fully converged systems to pirate.

In Nigeria, for example, the Nigerian Communications Commission (NCC) in 2005, moved to a system of unified licenses. Within any geographical restrictions of their licenses, the mobile and fixed wireless access operators were allowed and encouraged to compete with each other with restrictions on the types of services being lifted. Spectrum could be used for voice, data, Internet access, and the like in particular, with no restrictions on handover between cells.<sup>17</sup>

#### *The costs, benefits of converged telecom-only services*

There are four main categories of beneficiaries from allowing converged telecom services. First, **service providers will be able to reduce costs** by using overlapping media to deliver a wider range of services. For example, a fixed line telephony operator will be able to deploy broadband wireless to offer Internet services at a lower cost than wireline networks. They will also be able to **increase revenues over the medium-term** by bundling different services. Hence, costs will reduce and revenues hold steady or increase over time.

Second, **consumers will benefit due to competition and coverage**. With the possibility of providing similar services through different networks, telephony or Internet monopolies will be broken. Hence, competition increases and subsequently, prices will fall, the quality of service will increase, and choice of services will be enhanced. On another note, allowing different service providers to offer similar services will increase coverage, because services will no longer be limited by network deployments of a specific type.

Third, the creation of a clear regulatory framework will allow **investors to be more confident, have better assured returns** and hence will enable to invest more which has significant benefits for employment growth, sectoral growth, and overall economic sentiment for the country.

Finally, there is second-order beneficiaries such as the **outsourcing industry and IT service sector**. These will benefit from the increased investment in and provision of greater coverage communications networks. Further, reduced pricing and availability of bundled voice-data or similar packages will enable these industries to **reduce their own costs and improve service delivery**.

The main cost arises from not converging fully. It is important that this **telecom-only convergence model should be recognized as a mid-point and not the final step**. Since the Government is only enabling convergence and not directly causing it, there is little scope for non-market forces to play truant with the development of the sector. It is perfectly legitimate for Egypt to use this point as a rest stop while it restructures the broadcasting sector and then opens to full convergence. However, not going through with creating an actual converged environment will lead to stagnation, loss of interest from foreign investors, and possible slow down in the growth of the telecoms sector.

#### *Outcomes*

The main outcome from Package #1, where telecom convergence is allowed will probably be a situation where service providers across the cellular voice, Internet, and broadband industries will begin to offer telecom products to compete with others. Market shifts will occur, and consumers will see a larger number of choices and more coverage for communications services. However, any change will last only over a medium-term, and ultimately, pressures will build up demanding full convergence.

#### *Higher intervention: Package #2*

This package requires **full access convergence with full service convergence**. Hence, it will be possible to use any access technology to provide any service – whether broadcast or telecom. For example, services like IPTV, which allows telecom service providers to broadcast television over private Internet networks, will fall under this package. Another example is a cable television operator that offers VoIP or Internet services over installed cable systems. This arrangement results in **converged service licensing**. This structure is similar to what is in place in USA, UK, and Ireland. In each case, one combined ‘super-regulator’ handles all telecommunications and broadcasting regulatory issues. The case of Ireland is most pertinent to Egypt as an example of a possible end-point because of the concerted efforts the country has made to establish itself as a regional hub for telecom services.

#### *The costs, benefits of completely converged (broadcast/telecom) services*

In a completely converged environment, once a service provider acquires a ‘service license’ it is free to provide any communication service to any subscriber over any medium. For example, a telephone company can offer Internet services (also possible with telecom-only converged licensing) and television using say, IPTV (not possible otherwise). This is an example taken from India, where public sector service provider Mahanagar Telephone Nigam Limited (MTNL) has begun offering IPTV services in addition to its earlier fixed and cellular voice, and Internet and broadband offerings.<sup>18</sup> The benefits of full convergence will follow from those of partial convergence, with possibilities for increased investment, growth in the sector and in allied industries.

The main cost or more specifically, concern with full convergence is that it should not lead to anti-competitive outcomes for the market. Given that convergence will allow bundling across currently segmented industries, it is important that service providers who do not wish to converge or move into new areas of business should not be crowded out of the market by anti-competitive moves of converging operators. This problem will need specific consultation and discussion within the Egyptian market, but has been discussed in detail elsewhere. Hence, we will not discuss it substantially here.

#### *Outcomes*

In a market like the US, UK, or Ireland, operators are free to offer different services and deploy any network as they see fit. This is subject to some constraints, however. For example, wireless deployments are restricted by spectrum allocations and licensing. These converged telecom markets are, however, extremely well developed and attract significant investment and generate a large

amount of taxes and jobs for the economy. In addition, these countries are noted as leaders in the fields of cultural production, content development, research and development, and services. The enabling of convergence in the telecom-broadcasting industries allows innovation and technological development to proceed unhindered by legislation or over-burdensome regulation. Consequently, the expected outcome for a fully converged communications industry is the creation of a superior communications infrastructure and a spur to the growth of allied industries.

## **Benefits of converging**

Convergence has both industry-specific and general economic benefits. For the industry, benefits include lower costs of network deployment and management for service providers because of the uniformity of devices and the open nature of the IP platform, which makes it easy for competition and interconnection of devices. Further, there will be increased revenues due to new business opportunities. Moves such as fixed-mobile convergence, according a June 2005 report by Pyramid Research, will lead to revenues of \$80bn in 2009, or 6 per cent of total communications spend worldwide. Pyramid expects the converged service revenue growth to come from value-added services and the migration of digital content from broadcasting networks to new converged networks.<sup>19</sup>

There are also general socio-economic benefits for the entire economy, and this section will focus on these benefits of convergence.

### *Effect of ICTs and convergence on rural and non-urban populations*

The World Bank notes that increased production of **ICTs contributes to output, employment, and export earnings**, while ICT use increases productivity, competitiveness, and growth.<sup>20</sup> Internationally, there is wide acceptance of the notion that investment in information and communication technologies (ICTs) benefits rural areas. The major obstacles to the roll out of rural networks, however, are affordability, availability, and provision of interesting services and content. Convergence can help drive rural penetration because it assists in each of these areas.

#### *Affordability*

- As explained earlier, convergence in technologies via the IP platform brings down costs
- Reductions in costs can help service providers reduce their service prices in order to drive competition and increases in market-share
- As services become cheaper, the addressable market for given service will increase, enabling a larger portion of the population to subscriber to and use the services

#### *Availability*

- Converged systems – both in terms of access and service convergence, can help in the increase of network coverage
- In case of access convergence, fixed or local broadband networks can be used to extend the coverage of cellular networks beyond their traditional areas of coverage
- Similarly, the services of voice, video, or Internet can be brought into the fold of cable, telephony, or Internet networks, enabling each of these services to move beyond being restricted to their traditional networks and their areas of deployment
- As services extends their reach, a larger market will be able to access and use them, which will enable a significant jump in penetration

#### *Interesting services and content*

- Since all types of services and content can be offered over a truly converged network, it will be possible for consumers to choose the services they wish to use, or the content they wish to receive in a more interactive fashion
- Due to the availability of a wide range of services and content, all types of subscribers – from those interested only in say television, to those interested in the entire combination of offered services can use the same network
- As initially 'light' subscribers become aware of the other types of content and services available over the converged network, they can expand their service packages to match their needs and demands without major changes in the network itself

- Hence, the ability to scale the types of services and content available on the same network will allow subscribers to grow their service bouquet as per their budget and interest, and not as per the requirements of the technology

Convergence is not a silver bullet that will solve the problems of rural infrastructure. However, convergence brings a number of benefits in improving affordability, availability, and the level of subscriber interest. These will act as catalyzing forces as and when service providers and subscribers supply and demand services in rural Egypt - helping to speed deployment, ease network management, and increase the penetration of services.

*Telecom development/convergence and economic growth*

Convergence heralds a new paradigm in telecommunications systems development. We expect specific business, economic, and social benefits to arise from this development, and in this section, we will detail the possibilities in terms of education, employment, health, and governance that arise from service and access convergence.

*Employment*

In general, the telecommunications industry is a major generator of employment. Egypt has, in the period between 1998 and 2002, has a steady increase in the number of people employed in services (Figure 6). As of 2005, unemployment is at 10 per cent of the total labor force, with the UN projecting that “GDP will have to grow by 6 per cent to 7 per cent to fully absorb the labor force, which is projected to grow by up to 3 per cent per year for the next two decades.”<sup>21</sup>

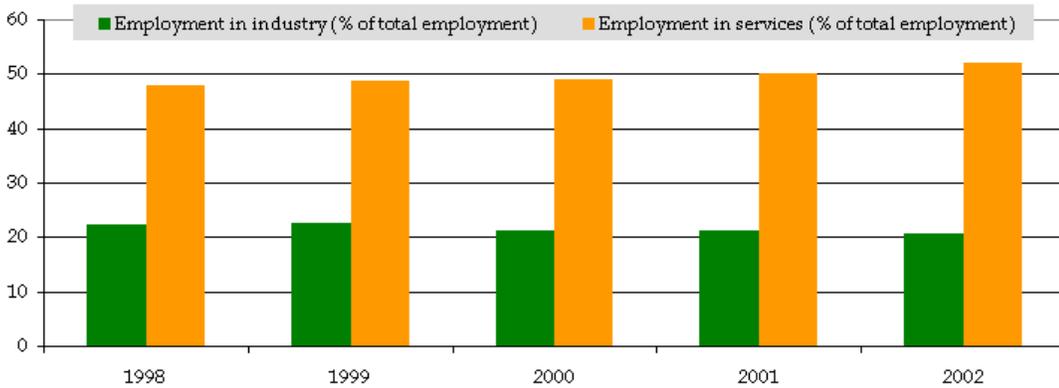


Figure 6: Employment trends in Egypt across industry and services

One of the important factors in the employment data about Egypt is that the private sector is the largest employer (Figure 7). Any further job creation should come from growth in the private sector - and telecommunications and media, as one of the fastest growing sectors in the world, can help in this task.

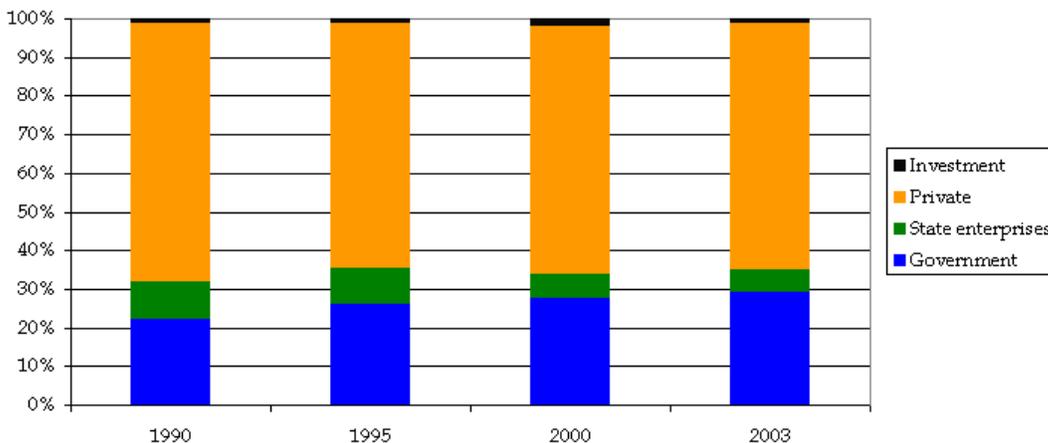


Figure 7: Distribution of employment by sector<sup>22</sup>

Even today, Egypt’s telecoms sector is a generator of employment. As of 2003, more than 53,000 people were directly by the industry (**level 1**). In addition, there will be a number of jobs that depend

on the industry - providing the industry with support services of various kinds and further jobs generated when governments, shareholders and lenders spend the tax revenues, dividends and interest payments generated by the industry (**level 2**). Finally, there are the additional (**level 3**) of jobs that depend on expenditure in the economy created by the industry (the multiplier effect). Based on data from the EU, the employment generated in these levels by the telecoms sector should be in the approximate ratio of 1 : 2 : 2 for the number of people directly employed in level 1 jobs. **Hence, the total employment currently in telecoms can be upwards of 250,000 people.**<sup>23</sup>

**Among others, the communications and information technology sectors has been identified by the United Nations in 2005 as a potential engine of employment growth.** Convergence will drive down costs and increase revenues. With the potential for large investments in communications networks in the near future, it is essential that Egypt should allow convergence to happen as the market demands it to help drive increased employment. As per data collected by CAPMAS, unemployment is most severe among people educated up to an intermediate level, followed by those with a university or higher education (Figure 8). Developing the telecommunications industry and allowing the newest services a freer run in the Egyptian market will increase investment and consequently employment due to the demand for educated and trained labor force.

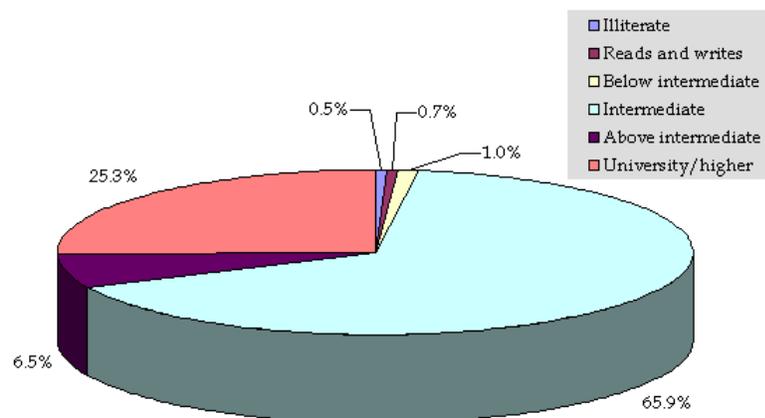


Figure 8: Distribution of unemployment across different educational groups

### *Education*

The UN points out that “job creation is hampered by slow economic growth and poor education and training.” Converged networks, which can offer voice, video, and data communication over the same medium, offer a way to provide educational services to a larger population across a wider coverage area.

There are three specific areas in education that convergence can assist in furthering. The first is school education, where converged networks can deliver nationally produced programming and information to young students to develop an interest in local history, culture, and to help them in topics related to science and mathematics. There is little doubt that children will be drawn to the new media and will experiment with it to learn more, which will also serve as a way to attract and retain children in schools.

The second set of students are college and university going students, where converged networks can help increase distance education programs, and enable students from around the country via correspondence or distance-learning programs. The lower cost of provision and of devices can make these programs more affordable, and the wider scope of service offerings will improve the ability for colleges and universities to improve student-teacher interaction and the overall educational experience. Continuing education, which forms the third category of students, will also benefit from the possibilities of real-time broadband level interaction across distance, which will strengthen training programs and reduce costs for employers and employees in maintaining a well-trained workforce.

### *Health*

Egypt has embarked on forward-looking plans to make health services and education accessible around the country. As the MCIT notes, the Ministry of Health is keenly aware of information and

communication technology's potential benefits to the healthcare system. As a result, the ministry has established the e-Health programmes to bring these benefits to a wider segment of Egyptian society.<sup>24</sup>

The use of communication technologies for health administration, clinical consultation, and continuing medical education to remote or underserved areas of Egypt will need a mix of video, voice, and data services. Hence, the deployment of triple-play networks will be essential to ensure that Egypt's e-Health goals are met. Especially important is the use of converged networks in projects such as the Egyptian Telemedicine Network, which will provide the transmission of live video, data sets, and medical documents and diagnostics. Converged networks will allow such communications in a straight forward and high-quality fashion.

#### *Governance*

As of the end of 2005, nineteen public services were being offered online in Egypt such as paying electricity bills, renewing car licenses, and applying to universities. Egypt is a model of e-governance and eleven countries sent delegations to study the Egyptian project. As the MCIT points out, "The initiative has focused on developing services that will have a high demand and attract users, such as services for business, investment, taxation, health, directory assistance, and results of the national yearly secondary school exams."<sup>25</sup>

If Egypt is to remain a leader in the area of e-governance, it is important to allow convergence. This is because:

- (a) The deployment of converged networks will allow citizens to access video, voice, and data services to contact public offices and officials at a lower cost,
- (b) Networks which are fixed-mobile converged, or use Internet over cable, for example, will drive the increase in coverage and hence allow a larger number of citizens access to e-Government.
- (c) As more services go online, and more people wish to use them, it will be necessary to overcome the literacy barriers using video or audio communication, and converged networks will be more effective in this.

#### *Development of Egypt as a regional and then international hub for ICT services and content*

Egypt has both cultural capital and a favorable geo-political location in the Middle East and North African region. Consequently, we believe that it has the potential to become a regional hub for ICT services and content in the medium term. In addition, given its position between the European and Asian markets, and its international name recognition, Egypt has the potential of becoming an international hub in the further future. Specifically, we will deal here with how convergence can assist in the processes of off-shoring into Egypt and the development of media content for the Arab world and beyond.

#### *Off-shoring*

According to AT Kearney, Egypt has great potential in IT services, technical support centers, and contact centers. AT Kearney expects the total contribution of these sub-sectors to Egypt's offshore services revenues is in the region of US\$ 600 million by 2010, creating more than 40,000 new jobs in the next five years. Converged media channels will allow Egypt's services to be at levels of service quality that will be among the best in the world. With the potential to offer video-conferencing, cheap voice support, and high-speed data access and transfer, Egypt can leverage its position and inherent strengths in these sub-sectors to increase revenues and shore up employment.

#### *Media content*

By 2010, Arab content should be a US\$27 billion industry internationally, with an expected CAGR of 28 per cent. Egypt, given its rich history, strong tourist industry, and global recognition as a member of the Arabic community, is in a strong position to take up a significant part of this growing industry. AT Kearney expects that Arab content to drive up to a US\$200 million business in Egypt by 2010. Current content export revenues are in the range of US\$ 30 million, which is less than 0.04 per cent of the international business. The presence of fully converged networks will allow international exchange of content regardless of the format, allowing better service to clients, and driving business opportunities because of the improvement in the ability of Egypt's content providers to serve their clients in real time over video-audio networks.

## Drawbacks of not converging

In speaking of drawbacks of not converging, it is important to compare the situation in Egypt with the rest of the Arab world, and with the rest of the world. Given that Egypt is in the planning stage at this time, one could look around the world and see that it is still not lagging behind considerably in the international scene (Figure 9 and Figure 10). As of 2004, the ITU's Study Group 1 found that most nations around the world were planning convergence policy and legislation. Yet, a significant number already had convergence policy or legislation, and it is critical that Egypt should not get left behind. Things have possibly changed since 2004 especially given the renewed investment in telecoms and the growing use of 3G and broadband services around the world.

If one looks specifically at the Arab world, in 2004, there was one Arab country with convergence legislation, while four had plans, and five had done nothing. In terms of policy, two countries had policy, four had plans to introduce such policy, and two had no plans to adopt any policy. Interestingly, four countries had not given any indication of whether they were planning to create and adopt a convergence policy.

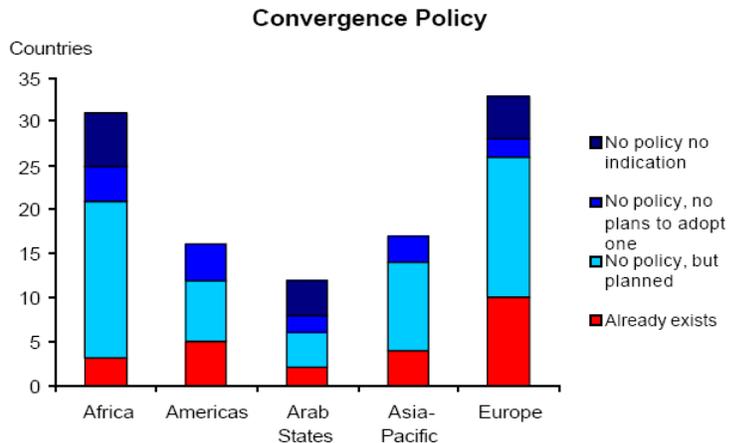


Figure 9: Status of convergence policy by region<sup>26</sup>

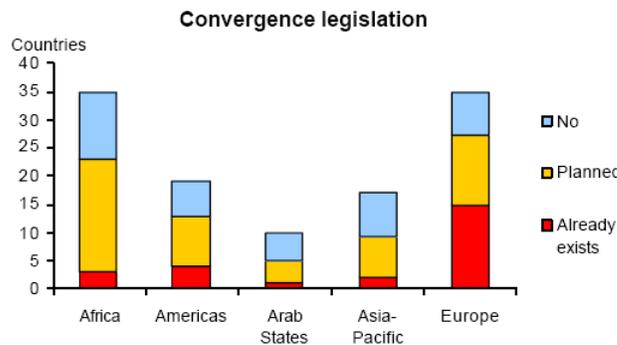


Figure 10: Convergence legislation by region<sup>27</sup>

The main lesson from these statistics is that **Egypt has a chance to be a leader in the Arab world and in the African region in establishing a converged regulatory and legal regime.** This will allow the country to benefit from convergence. However, if Egypt stays behind, it is likely that other nations will overtake Egypt and establish themselves as destinations for investment and service industry growth. Thus, **the main drawback of not converging is the loss in investment and consequent economic expansion.**

### *Bottlenecks for growth*

Even if convergence policy and law is in place, there are possible non-regulatory obstacles that might arise. This section briefly discusses the main obstacles and how they might be overcome.

### *Infrastructure and devices*

A main driver for convergence is IP devices. There are a large number of vendors and distributors for these devices, but it is still possible that restrictive import rules or taxes will cause increases in the costs to service providers in acquiring and deploying infrastructure. This cost can be time or money.

In either case, it is important that import restrictions and duties are relaxed to facilitate the acquisition of such devices and their quick deployment.

#### *Affordability and access*

Although convergence is expected to drive costs and prices down due to efficiencies and competition, it is possible that at least initially converged networks and their service bundles will be more expensive or not as widely available as older networks are. While this is a short-term effect, it can still be overcome and any long-term residual effects mitigated by the application of geographic roll out obligations and possible market monitoring by the regulator and Government. While it is acceptable to have higher costs for the initial subscribers, the Government and regulator should ensure either through adequate policy direction or discussion that prices should reduce over time. One option here is to have renewed universal service commitments, especially for urban poor and rural populations.

#### *Content and services*

One of the more important drivers for take up of any communications system is the availability of useful and interesting content and services. Typically, these co-evolve with the technology's deployment and growing use; it is rare to find communication technologies that have had the exact uses that were envisaged during their creation. If users do not find interesting content and services available on converged networks, they will not find it useful to subscribe, or if they subscribe, then it is likely there will be rapid fall-off and failure.

This obstacle can be converted to an opportunity, however. Egypt can use this to further drive the digitization of services offered by government offices (as is underway) and to encourage the Arabic and local content production industry. This serves two purposes – one is that Egypt will be able to develop its local industry for Arabic content and hence become a regional leader in the field. The second is that users of converged systems will ultimately develop their own uses and services (for example, YouTube.com) because of the ease of production in Internet and electronic services. This will enhance innovation and entrepreneurship in Egypt, which will have consequent positive effects on the entire economy and society.

#### *Non-converged frameworks impose costs*

##### *Complex regulation, regulatory burdens*

According to BML, in the MENA region, Israel and Bahrain score highly for having the least interventionist regulatory bodies. In the case of Bahrain, its independent regulator has helped to aid the industry towards greater liberalization without the need to suffocate the market with overbearing policies, which has seen the launch of two additional fixed line entrants. Although the Ministry of Communications regulates Israel's telecoms market, the ministry provides relatively low-key assistance. Trailing at the other end of the ranking is Iran, where the Ministry of ICT has demonstrated a highly interventionist attitude as in the case of Iran's SNO license. BMI notes that the NTRA still retains a great deal of control over Egypt's telecoms market. However recent initiatives such as introducing a third mobile license and future part-privatization of Telecom Egypt will serve to enhance its position in the rankings for this indicator for which it has been given a score of three at present.<sup>28</sup> If Egypt does not develop a converged regulatory framework, regulatory burdens on service providers and technology vendors promise only to increase, which will further worsen the situation and enable other countries in the region to pull further ahead.

##### *Reduced inflows of investment and reduced revenues for governments*

Convergence is magnet the next possible telecom investment wave. Already, more than US\$30 billion has been earmarked internationally for next-generation network development. If Egypt does not have a clear regulatory framework, it is likely that investment will find the market too risky and the country will miss this wave of investment. This loss will also result in less network deployment and investment, which will reduce potential for direct and indirect tax collections by the government arising from telecom services.

##### *Loss of ICT competitiveness*

One of the recurrent themes in this report is that convergence is likely to take hold of the telecoms and broadcasting industries in the next few years. If Egypt does not have in place a positive

regulatory response, it is likely that it will fall behind in the race to keep up with other countries in the region (e.g. Israel and Bahrain), and hence lose out in ICT competitiveness.

*Loss of position as leader in the MENA region for ICT content and services*

Egypt has great recognition internationally as a source of Arab culture. It is also a growing provider of information services and a destination for off shoring. If the ICT sector takes a hit due to slow regulatory response to convergence, it will be seen as a negative move for this market. Reduced investment, slowing growth, and any negative sentiment within the telecoms industry will hit Egypt's position as a leader in the region. In the examples of Singapore and Ireland, their governments made their regulatory structures and objectives very clear very early in the convergence cycle. This move should be replicated in the Egyptian market.

**Impact analysis**

*Economic impact of convergence*

In countries around the world, technological developments in the ICT sector, combined with changes in policy and regulation have resulted in rapid market growth. This has a direct economic impact as sector investment increases and it has an indirect economic impact through acceleration in productivity in the ICT sector itself and in other parts of the economy.<sup>29,30,31</sup>

The ICT market in Egypt has already witnessed significant investment and market growth, as shown in Figure 11.

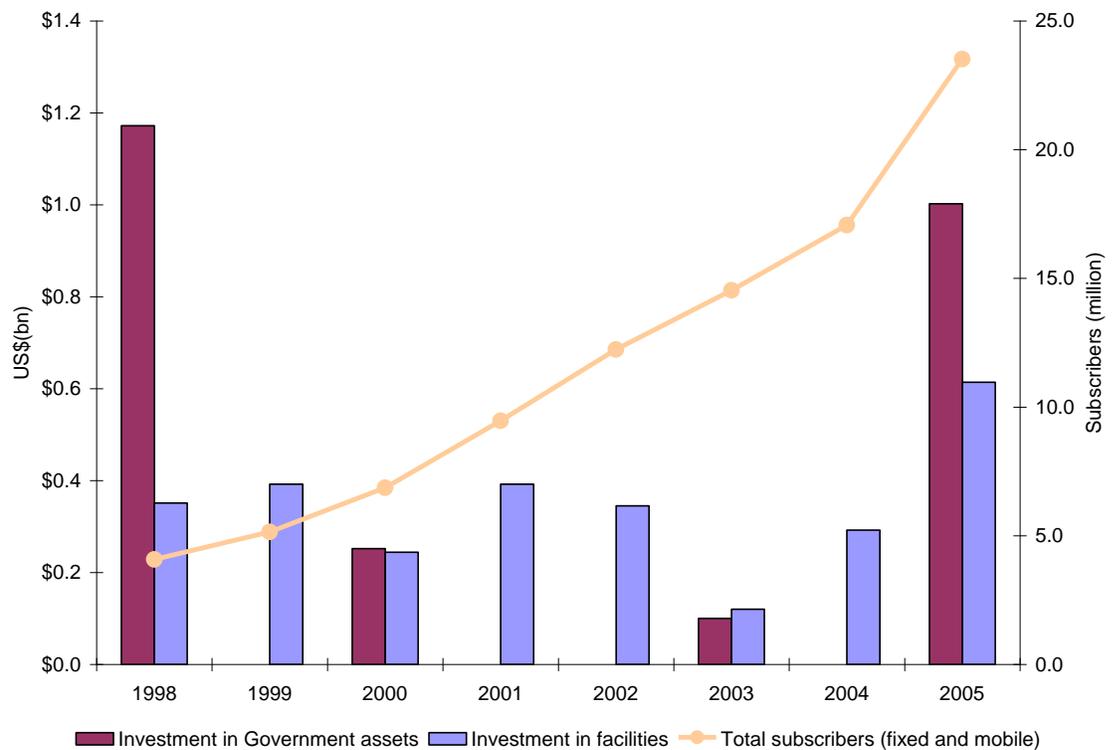


Figure 11: Investment and market growth in Egypt<sup>32</sup>

International evidence indicates that, if successfully implemented, a converged regulatory framework will result in growth of the sector. We would expect there to be a similar impact in Egypt and the evidence suggests that, growth in the ICT sector has a positive impact on the economy overall. However, this impact is complex and difficult to forecast with certainty. In this chapter, we therefore adopt the following simple approach: we identify some of the key trends that are likely to take place if the policy of regulatory convergence is successfully implemented. We then develop market scenarios that may arise from such a policy. Finally, we evaluate the size of the market under these scenarios.

Some of the key trends, which may take place if the policy of convergence is successful, adopted are:

- *Network access.* Under the traditional market structure, each type of network is linked to a specific type of content. The convergence of networks allows voice services to be carried over networks that were traditionally used to carry broadcast media content and vice versa. Under the traditional market structure, the choice of services available to a customer was determined by the networks to which he/she had access. For example, a customer would only be able to access subscription TV services if he/she had access to a cable or satellite network. Under a fully converged network structure, a customer can access, in principle, any service by only being connected to one network. One implication of this is that the overall number of customers with access to electronic services will increase.
- *Choice and value-added services.* Converged networks are typically capable of providing a wider range of services and these services are usually of a higher value-added. They are more valuable to customers and therefore customers will be willing to pay more for them.
- *Costs.* Network convergence is likely to have several different effects on costs. Since multiple services can be delivered over a single network, there is the potential to reduce average costs compared with the traditional market structure in which customers are connected to multiple networks and therefore there is a duplication of costs. A second effect may arise through increased competition. Under a converged network structure, networks which were previously not in competition with each other (e.g. cable networks and telephone networks) may find themselves competing with each other. This competition is likely to increase efficiency and reduce costs. A third effect on average costs will arise from the increase in traffic volumes arising from convergence. Finally, the total average (quality-adjusted) cost of end-user devices may also decline as multiple services are provided over individual devices.
- *Upstream content providers.* The convergence of networks may have knock-on consequences on upstream providers of services and content. For example, as more people gain access to subscription TV services carried over converged networks, the market for content may increase. Hence, there may be a knock-on positive impact on the providers of such content.

The trends identified here indicate that convergence is likely to have a positive economic impact at the aggregate level. However, at the level of individual firms or market segments, there may be a negative economic impact. For example, providers of traditional broadcast network services may lose out to higher value-added IP-based networks as customers switch to triple-play packages, unless they can adapt their networks. Similar effects have already been seen in the video and music distribution businesses as people begin switching from traditional formats (e.g. DVDs and CDs) to new channels of distribution such as digital downloads).

A second potential negative consequence may arise from the increase in customer choice. Access to IP-based distribution channels (e.g. broadband networks) for accessing media services means that customers have a greater choice of which content they wish to consume. Convergence in Egypt may increase the potential audience for the domestic content production industry (e.g. film-making). However, it may also increase the level of foreign competition faced by this industry since it will be much harder to control the origins of content consumed by customers. The net impact on Egypt's domestic content production industry is ambiguous.

#### *Assessing the possible economic impact of convergence*

Our analysis of the potential economic impact of convergence in Egypt is done by comparing possible market scenarios. These scenarios are based on evidence from other countries in which convergence has already taken place. The objective of this is to understand the range of possible impacts that may arise from network convergence in Egypt. We begin by considering the development of networks and services for three segments of the market associated with convergence.

#### *Broadband*

One of the central features of converged network market structures is the extensive rollout of broadband networks. Broadband access has been increasing steadily around the world for a number of years but very significant differences in penetration rates remain between regions, as shown in Figure 12.

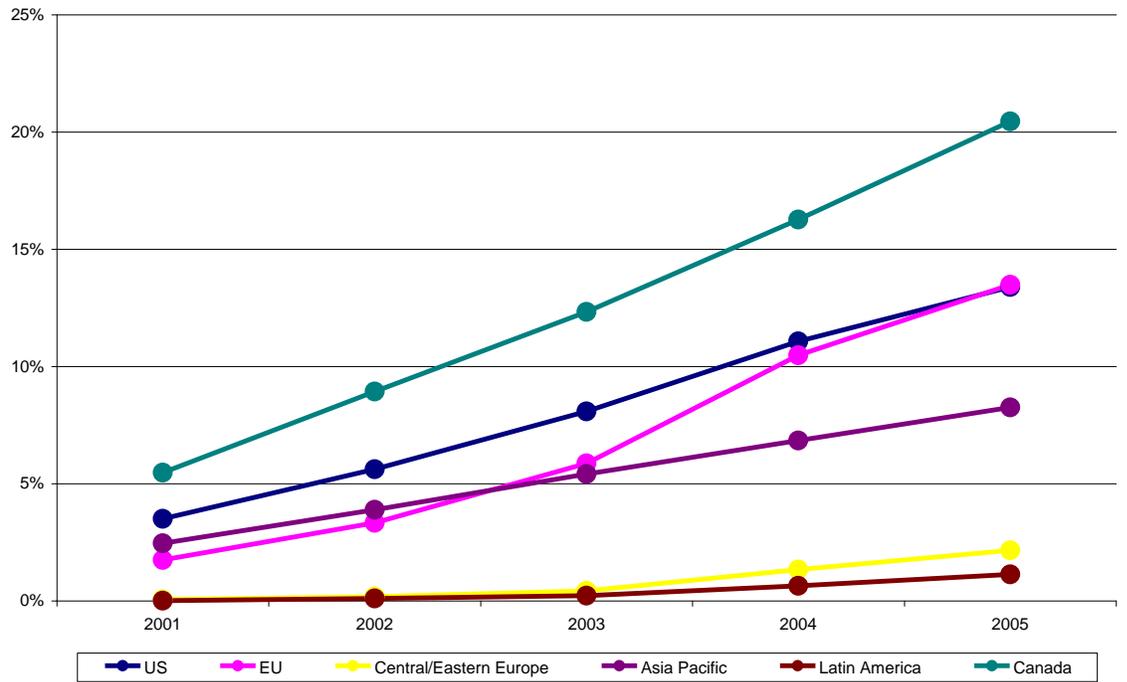


Figure 12: Broadband penetration (simple country average)<sup>33</sup>

There are many different reasons for this general increase in broadband subscription rates. Internet usage has generally increased, along with the number of services that are available on-line. Some of this increase is unrelated to convergence. However, a key driver of recent growth in demand for broadband has been the downloading of music and other forms of media content, which is one aspect of network convergence.

It is also worth noting from Figure 12, the increase in the growth rate of broadband subscription in Europe (EU-15) around 2002-03. There have been a number of initiatives at national and European level to promote broadband penetration and usage. One key factor was the introduction of the new regulatory framework in 2001. An important aspect of this framework was the recognition of convergence and a technology neutral approach to regulation. This may have been one factor in promoting the rollout of broadband networks.

Despite high-levels of access to broadband, some aspects of converged services are not widely available. For example, rates of IPTV usage are very low in many countries, despite widespread availability of networks, which are capable of providing it (see Figure 13)

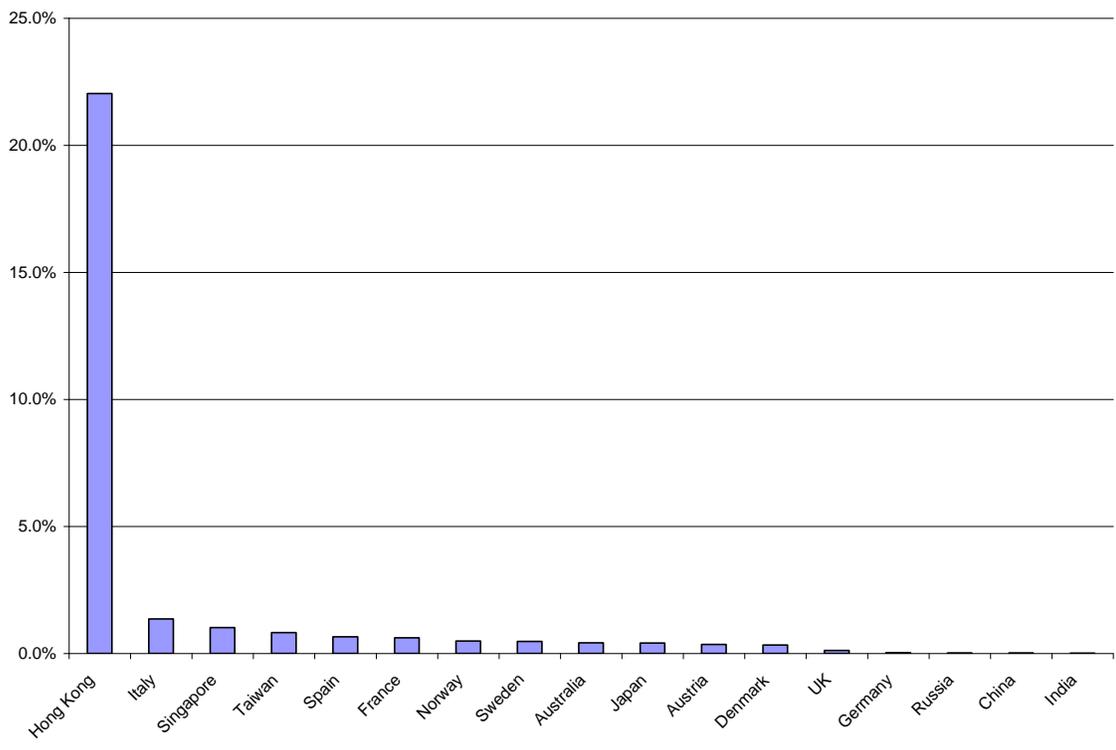


Figure 13: IPTV Household penetration (2005)<sup>34</sup>

Figure 13 shows clearly that, despite the availability of the broadband infrastructure, penetration is very low in all countries except Hong Kong. This has a number of implications for Egypt:

- Technical and regulatory convergence of networks does not automatically lead to rapid take-up of converged services. Diffusion of these services can take time and may require promotion by public authorities in order to stimulate demand.
- Some services require high-capacity networks which are capable of carrying higher data-rates than conventional broadband networks. Asian countries such as Hong Kong and Korea have developed networks based on fiber-to-the-building and fiber-to-the-home architectures, which provide much higher data-rates than many conventional DSL-based networks. These advanced networks may be a necessary (but not sufficient) condition for the take-up of some advanced converged services.

*3<sup>rd</sup> Generation mobile*

3G mobile networks are capable of providing high-speed data services that allows the delivery of some converged services such as TV, music downloads and video-calling. The take-up of 3G services in countries has generally been lower than anticipated at the time of launch. However, the rate of growth of 3G subscriber base has been steady and is expected to continue for the near future. Current 3G penetration rates for selected countries, together with industry forecasts for 2011 are shown in Figure 14.

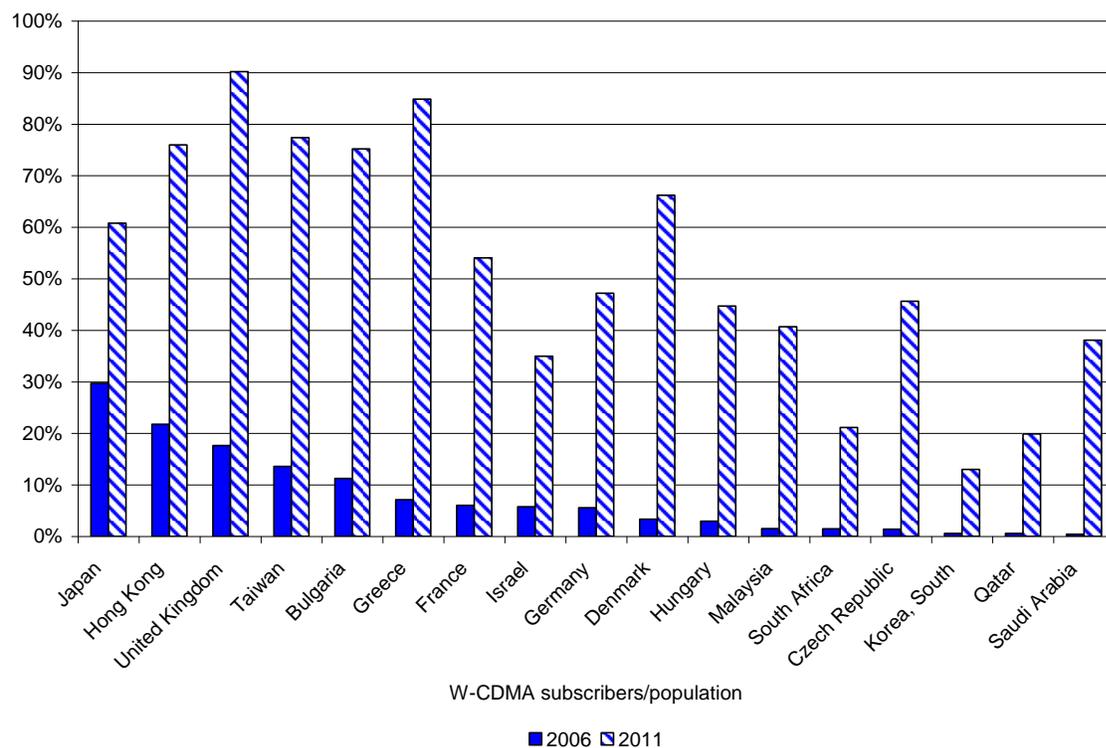


Figure 14: WCDMA subscribers/population<sup>35</sup>

The recent issue of 3G licenses to mobile operators in Egypt is an important step in the implementation of a converged regulatory and policy environment.

#### *Subscription TV*

The subscription TV market is likely to be strongly affected by network convergence. In countries where there are already high rates of subscription TV, the impact of convergence is likely to be felt through increased competition for traditional distribution channels (i.e. cable and satellite). This has been shown clearly in the US where broadband access has been shown to reduce rates of TV consumption by approximately 12 per cent.<sup>36</sup> Traditional broadcast media distribution channels will have to invest in order to be able to compete with the superior functionality of broadband IP-based networks. If they do not succeed in this, these networks are likely to lose market-share.

In countries where cable and subscription-based satellite distribution networks are not as widespread, the impact of convergence may be to increase the overall market size, since cable TV network coverage may be more limited than that of the broadband network.

Rates of TV ownership are above 90 per cent of households in Gulf States such as the Kingdom of Saudi Arabia, UAE, and Kuwait. In these countries multichannel free-to-air TV is the primary form of content with penetration rates of over 90 per cent. Satellite usage in Egypt is much lower at 35 per cent. Penetration rates of pay-TV in the Middle East are generally low by international standards but are lower in Egypt (see Figure 15).

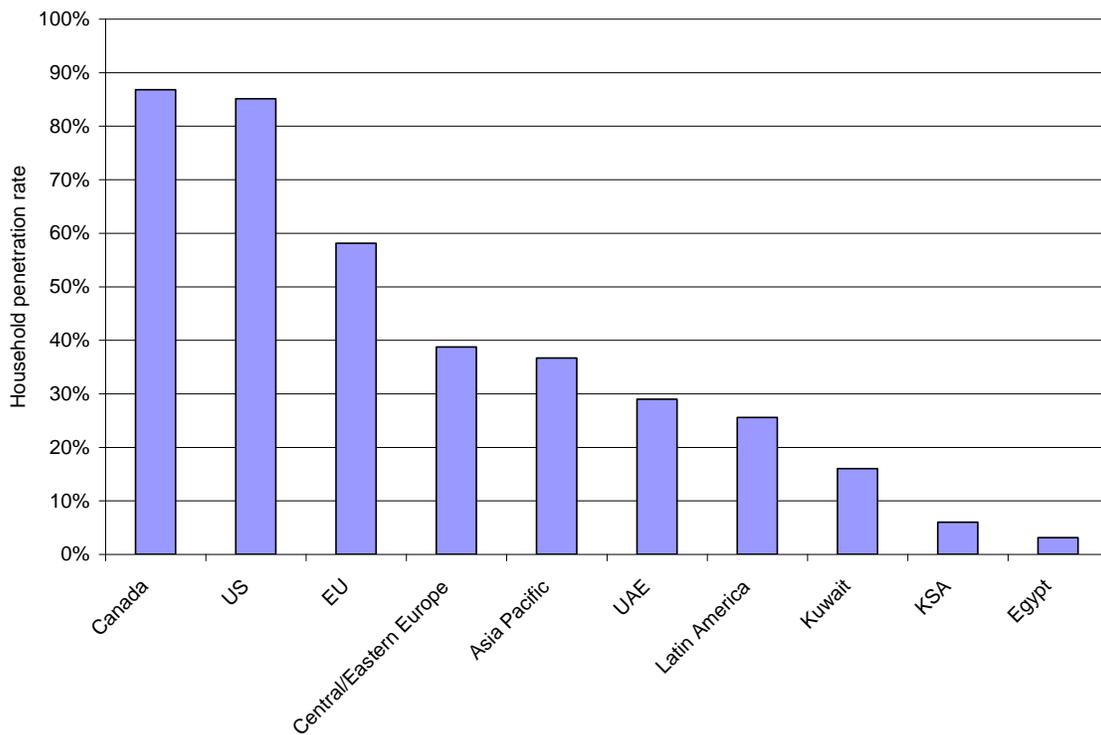


Figure 15: Subscription TV household penetration rates<sup>37</sup>

One of the reasons for low TV penetration rates in Egypt is the availability of a Government-owned terrestrial TV network.

The low rates of Free-to-air broadcast TV and very low pay-TV penetration rates in Egypt indicate that there may be significant room for growth in this market if services became available over a broadband network.

It is worth noting that, since wireline-based broadband services are currently limited in coverage in Egypt, it is possible that the alternative newer technologies may become more important in future, compared with countries in which the market is more highly developed. For example, if radio spectrum is allocated for developing broadband wireless access, it is possible that this could become a very significant source of broadband access for subscribers in Egypt.

#### *Assessing the economic impact of convergence in Egypt*

In order to assess the economic impact of convergence, we have compared a base-case/business-as-usual scenario with an alternative converged network scenario. The converged network scenario has the following features:

- Fixed line penetration rates are higher than under the base case scenario because the availability of a converged, broadband offering makes the product more attractive to customers and therefore raises demand.
- Mobile penetration is higher than under a base case scenario because the provision of multi-media converged services over a 3G network makes the service more attractive to customers.
- Narrowband internet subscription is lower than under the base case scenario because converged services are not available over narrowband and therefore more people are likely to upgrade to broadband.
- Subscription TV rates will be lower under the converged scenario than under the base case because people switch to the additional functionality of broadband networks.

- Under the converged scenario, the average revenue per subscriber generated by the 3G and broadband networks is higher because of the additional value-added services that are available.

This scenario analysis indicates that, the impact of convergence will be to increase total sector revenue over and above what would occur in the absence of convergence. The net present value of this additional sector revenue will be between US\$7bn and US\$8bn<sup>c</sup> between 2008 and 2015. This additional revenue will be generated primarily through higher demand for the access networks and higher revenues paid by subscribers. Some segments of the market, such as subscription TV, may suffer a reduction in revenues through cannibalization by the new networks.

In addition to this increase in the overall size of the market, it is reasonable to expect there to be other positive economic impacts. We consider three such impacts – the impact on the electronic content production industry, overall sector employment and the impact on GDP.

#### *Electronic content production*

Egypt has traditionally been a producer of media content such as films and TV for the regional Arabic market. The successful implementation of a convergence policy in Egypt could stimulate this industry through increasing the size of the domestic audience (as discussed above) and the revenue generated because of pay-per-view and subscription based distribution channels. The actual size of this market development is difficult to estimate since it depends on a number of factors including the consumption of foreign produced content, the regulation of the sector and the evolution of the industry structure etc. However, in order to understand the potential size of the industry in Egypt it is relevant to consider the contribution of the content-production industries in some benchmark countries. A recent study in Singapore<sup>38</sup> indicated that the segments of the copyright industry relating to the electronic media industry<sup>d</sup> accounted for 1.7 per cent of the total value-added in the economy and approximately 1.8 per cent of the workforce. A similar study in the US<sup>39</sup> does not report data at a sufficiently aggregated level to enable a direct comparison. However, using a broader definition of core-copyright industries, this industry accounted for 6 per cent US economy and 4 per cent of the workforce.

These benchmarks from Singapore and the US can reasonably be regarded as up per limits for the future share of the electronic content production industries in Egypt. To understand the potential significance of the sector for Egypt, it is instructive to use the Singapore benchmarks and apply them to the current economy of Egypt. Using this approach, we can conclude that, if the electronic content production industry in Egypt was as developed today as that of Singapore, it would account for 0.4million jobs and a contribution to total GDP of approximately \$5bn (at PPP exchange-rates).

#### *Employment*

The structure of employment in the ICT sector is complex since there are many different firms operating within the sector and ICT skills are used in sectors other than the core ICT industry. Firm investment in ICT also has a knock-on effect on employment through hiring of staff with new skills. A recent study attempted to measure the significance of ICT skills in the workforce in OECD countries.<sup>40</sup> This indicated that between 3 per cent and 4 per cent of the total workforce in the EU15, the US, Canada and Australia could be classified as ICT-skilled employment, under a narrow definition of the term. A much bigger proportion of total employment (approximately 20 per cent) could be classified as people with ICT skills (i.e. a broad measure) although this figure has been declining in the US, Canada and Australia recently because of off shoring.

It is reasonable to expect that, if implemented correctly, the policy of convergence in Egypt will result in an expansion of the ICT sector, increased investment in ICT infrastructure and an expansion of the workforce using ICT skills. The levels currently seen in the EU-15, the US and Canada can be regarded as up per bounds to the extent of this expansion.

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<sup>c</sup> The total net present value of sector revenues significantly depends on the value of the discount factor used in the calculation. The range presented here is based on a range of discount factors from 5 per cent to 10 per cent.

<sup>d</sup> Defined for the purposes of this paper as Motion Picture and Video, Radio and Television, Software and Databases and Advertising Services

## GDP

There is some evidence to suggest that investment in ICT infrastructure and services has resulted in an increase in productivity across the economy. This is because, as firms both within the ICT sector and outside it, intensify their usage of ICT services, their staff are able to produce greater levels of output. There are no studies linking specifically convergence with economic growth. Rather, the research that has taken place has focused on ICT infrastructure in general. One recent study considered the impact of mobile phone networks on economic growth in developing countries.<sup>41</sup> This study showed that, for every additional 10 phones per 100 people that a country has, its long-run annual rate of economic growth would be 0.59 percentage points higher. If the Government of Egypt is successful in implementing its policy of convergence, it is reasonable to expect that there will be additional investment and growth in subscriber numbers which will have knock-on impact on economic growth.

## Conclusion

This chapter has briefly discussed the potential economic impact of convergence in the ICT sector. This is a complex phenomenon and the economic impact has not been studied in detail. The approach adopted here is to identify some of the key sectoral-level trends that occur as convergence takes place. These are then used to develop a reasonable market scenario which is calibrated using benchmark data from other countries. This analysis shows that, even under conservative assumptions, the potential economic impact of convergence in the ICT sector, in terms of sector turnover, could be very significant.

Indirect impacts such as the effect on employment in the ICT sector and in the upstream content industry are more difficult to quantify without a detailed analysis of these individual industries in Egypt. However, the evidence from other countries indicates that these sectors could be significant in terms of the contribution to the economic output of the country and employment. Finally, we also considered the overall impact of the sector on economic growth in Egypt. It is not possible to isolate the specific impact of convergence on economic growth. However, to the extent that convergence leads to increased investment and use of ICT, international evidence indicates that there would be a positive impact on long-run rates of economic growth.

## Constraints

### *Regulatory framework<sup>42</sup>*

#### *Licensing issues*

Licenses typically defined the scope and limitations for using technologies and providing services. They were also used to control and restrict entry, and in many cases to raise money through license fees. However, IP convergence has been eroding the justification for these license restrictions, both the service limitations in existing licenses and entry barriers preventing new players from entering the market. In many countries, **conversion from specialized to unified licenses will be necessary to remove the inherited license restrictions against achieving benefits of convergence.** Where licensing is still needed, class licenses may be more appropriate than specialized licenses for most purposes. In many cases, simple registration by service providers may be sufficient.

#### *Interconnection*

Efficient interconnection is crucial for new entrants and fair competition. Market negotiations might not yield an efficient result or foster effective competition. Further, traffic or usage units of measurement for the interconnection and access provided have been the traditional telephone network units of minutes (time duration), miles (distance) and circuits (capacity), have been rendered obsolete in converged systems. **Interconnection and access arrangements will need to be renegotiated in the new environment** with many more players in markets that are still characterized by major asymmetries in negotiating power among the players.

#### *Level-playing field*

In general, the services offered by multiple play providers are subject to sector-specific regulation as determined by telecommunication and broadcast regulators, especially with regards to competition. **The bundling of services is not anti-competitive in itself.** Bundled services can indeed signal that a vibrant market is responding to consumer demand. However, competition law could be applied in

circumstances where a dominant operator takes advantage of a dominant position in a market to tie or bundle additional services that consumers may not want but are required to purchase as a package. Tying and bundling could also be deemed anti-competitive if a dominant operator offers service bundles that competitors have no means of matching.

#### *Market constraints<sup>43</sup>*

##### *Migration from a legacy regime to a converged regime*

As IP convergence provides for the integrated supply of all kinds of communication services using a common protocol, at the same time it removes the boundaries and limitations traditionally associated with particular technologies and services. This means that **regulators must shift their focus from managing the defined (and restricted) roles of the individual licensed players in the market to managing the market environment**. This implies a change from regulating incumbent monopolies in vertically integrated markets across infrastructure and services, to regulating imperfectly competitive markets that are horizontally structured.

**Regulators will need to be proactive in changing the market environment** to one where existing market players and new investors see the regulated telecom market environment as inviting and supporting participation and investment, with success determined by the marketplace rather than privileged market positions awarded policymakers, regulators or courts.

##### *Bit caps and the walled-gardens of content*

One potential bottleneck in multiple-play markets is the anti-competitive potential of bit caps in a few OECD markets. Bit caps are limits on the amount of data traffic that subscribers can use in a given month. Potential problems arise because providers typically do not include video streams from their own servers in the calculation of bit caps but the caps would apply on content such as videos from other sources. **Bit caps should not be an issue in competitive broadband markets** since providers could differentiate their products and attract subscribers by removing bit caps.

However, **bit caps could possibly provide an unfair competitive advantage for incumbent cable and telecommunication companies** over independent Internet television providers if the market lacks sufficient broadband choices for consumers. Bit caps **can serve as a deterrent to accessing content from outside the provider's network** but incumbents can also create "walled gardens" where outside content is actually blocked.

##### *Lack of killer applications/content*

A final concern of some stakeholders is no specific killer application or content can support the growth of converged service offerings. While there is an understanding that both voice and video are possible 'killer apps', especially since voice is growing over time, and video has seen a huge push with the increased use of websites like YouTube or Google Video, there is little understanding how a viable business model might include only these services. As discussed earlier, bundling allows multiple service offerings over one pipe, which can increase the subscriber's use of one channel of delivery and keep them online long enough to drive growth. However, **pending the development of a clear killer app, there will be some concern about what service(s) will drive penetration** independent of discounts and the early adoption of converged technology.

## **Revenue sharing between content and carriage providers**

In a media channel, the content provider and carriage provider are typically separate. There are three types of economic relationships: one between the user and content provider, between the user and carriage provider, and the carriage and content provider. Traditionally, the economic relationship between the providers and user has been the focus of revenue arrangements. For example, a user might pay an ISP for a broadband connection (the carriage) and then pay a news magazine website for subscriber access (the content).

The converged environment further divorces content from carriage, and hence revenue sharing will be a factor given the greater choice in carriage mechanisms, but not a necessary increase in content production.

### Net neutrality/common carriage and revenue sharing

There are essentially three models for revenue sharing: free, utility, and paid content models. In the free model, advertising revenues pay for the content and carriage, just as in traditional broadcasting models (called free-to-air). In the utility model, like in cable television, the content provider is paid by the cable channel for content as a part of the subscription fees. In the paid content model, there is unit subscriber or per user fee paid to the content provider. In the recent past, there has been an increased interest in revenue sharing because of the possibility of differentiating content delivery and narrowcasting over IP networks, and because of the economics of network deployment.

Network operators charge that they have significant investments in the network deployment processes, especially in the case of broadband and advanced wireless. The content providers that users access, either free or by paying some subscription fee, get to use these expensive and capital-intensive networks without paying the carriage provider.

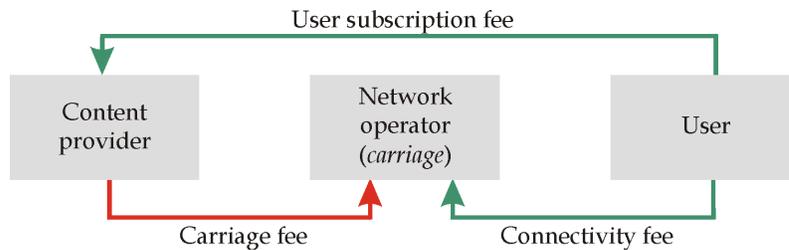


Figure 16: Revenues (green) flowed from users; carriers now want content providers to pay (red)

This debate has now become a major policy debate, challenging a fundamental principle of the Internet: common carriage. Simply put, early designers wanted the Internet to carry all packets without discrimination – **they made the network neutral**. Given that, there has been a recent increase in the bandwidth requirements and consequent increases in capital expenses on networks, operators want to charge for packet carriage, much like toll roads.<sup>44</sup> The outcome is that a content provider who pays a network operator more of a share in their revenues gets their packets delivered faster.

**This discrimination has troubling outcomes**, specifically for the development of content and innovation. One potential problem is **corporate censorship**, that is, deciding what content users can access based on whether the content provider is paying the network operator. Without net neutrality, network providers determine what services and equipment you can use on the Internet, which **leads to anticompetitive setups**. For example, Cingular Wireless in the USA bars access to PayPal online payment services because it has struck a deal with another online payment service, which pays for that privileged status.<sup>45</sup> There are also **damages to content development** because network owners can dictate the price to access services or content developed by non-major producers, or bar access altogether. For example, in the USA, BellSouth blocked Internet access to popular websites MySpace and YouTube in a supposed trial of a discriminating network system.<sup>46</sup>

### Relevance to Egypt

There are two issues here: one of network neutrality, and the other of revenue sharing. On the issue of network neutrality, for the even development of entrepreneurial content creators in Egypt, and the free exchange of information without corporate censorship, **it will be important that network neutrality is maintained** over the Internet and if possible over other telecom services that can access data or content outside the network. This issue is in debate in the US Congress, and has been considered by Ofcom in the UK. While the US is considering passing legislation,<sup>47</sup> Ofcom has decided to hold off, but allow competition law to hold in case there are conflicts.<sup>48</sup>

Given that a multitude of carriage options exist, it is likely that content prices might increase. However, this will be detrimental to the content producer because higher prices might lead to loss in subscription, even if revenue shares can be negotiated. Hence, the market forces might themselves take care of the issue. It is thus better that revenue sharing should be left to market forces at the outset. However, if the regulator feels, or if there are industry concerns voiced about the use of bargaining power to drive up or down prices, the regulator can and should then intervene. Hence, **the issue of revenue sharing should be dealt with as a competition issue**.

## Investor's point of view

In terms of FDI flowing in as per cent of GDP, Egypt is the fifth-ranking country in the MENA region.

Rank	Foreign direct investment, net inflows (per cent of GDP)	2000	2001	2002	2003	2004	Average
1	Tunisia	4	2	4	2	2	2.33
2	Jordan	9	1	1	4	5	2.13
3	Israel	4	3	2	4	1	1.87
4	Yemen, Rep.	0	2	1	-1	1	1.40
<b>5</b>	<b>Egypt, Arab Rep.</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>1.13</b>
6	Djibouti	1	1	1	2	5	1.00
7	Morocco	1	0	0	5	2	1.00
8	Syrian Arab Republic	1	1	1	1	1	1.00
9	South Africa	1	6	1	0	0	0.93
10	Middle East & North Africa	1	1	1	1	1	0.80
11	Algeria	1	2	2	1	1	0.73
12	Lebanon	2	1	1	2	1	0.73
13	Oman	0	2	0	2	0	0.67
14	Kuwait	0	0	0	0	0	0.07
15	Iran, Islamic Rep.	0	0	0	0	0	0.00

The table below considers the top five countries, in terms of their GDP growth and commercial service exports per person aged 15-64 years. It is clear that Egypt has a way to catch up with Israel, Jordan, and Tunisia.

<i>2004 figures</i>	Broadband subscribers (per 1,000 people)	GDP growth (annual %)	Commercial service exports (per pop of 15-64 years in current US\$)
Egypt	0	4	\$316.99
Tunisia	1	6	\$528.94
Jordan	1	8	\$654.29
Yemen	N/A	3	\$28.17
Israel	135	4	\$3,561.28

The growth potential for Egypt is thus present, but it will need specific and immediate policy interventions by the Government to ensure that the potential is reached. In a recent report, for example, the Arab Advisors Group point out that Egypt has the potential to grow its cellular market by a CAGR of 20 per cent between 2006 and 2010.<sup>49</sup> The recent Etisalat investment in a 3G license points to overall confidence in the market.

From the investor's point of view, the most important three factors within the telecoms industry determining if Egypt will be a successful investment destination are:

- The market has growth potential to allow returns on investment. This is affirmative given the projections for the Egyptian market and low penetration rates for Internet and broadband services.
- The growth of advanced services and secondary industries will be strong to drive demand even after initial penetration is completed. Once cellular, Internet, and broadband networks roll out, it will be important to create conditions for the growth of industries and services that use these networks. Here, the creation of a clear regulatory path for converged and multiple-play services will be critical.
- That Egypt will maintain a forward-looking and responsive policy environment. The first step here is to ensure that rules and regulations are in tune with paradigms in place around the world. Again, fixed-mobile and service convergence is one of the main trends in international regulation and it will be important to show that Egypt is serious about these moves.

To ensure investor confidence, above everything, it should be clear to them that the Government is engaged with the industry and is willing to make the changes in the structure that will not only support rollout, but investments. Convergence is an important piece of this picture.

## **Proposed convergence policy strategy**

Based on the foregoing, we now recommend a specific set of steps Egypt must embark on as a strategy to enable investment and economic growth to result from convergence. The strategy is as follows:

- **Goal:** Have a converged regulatory structure in place by 2015
- **Approach:** Evolve the regulatory regime by passing through two phases of reform – one involving unified access licensing, and the second involving completion into full converged licensing.
- **Institutions and structures:**
  - **Licensing:**
    - Begin a consultation process to determine the best conditions for licenses that allow unified access operation by 2010.
    - Over the next five years, develop a regulatory regime with appropriate licensing to allow converged operation by 2015.
  - **Regulator:**
    - Consolidate carriage regulation for both broadcasting and telecommunications into one agency by 2010. The Singapore model is useful here.
    - Create a mechanism for the close coordination of the content and carriage regulator that can ensure smooth converged operations by 2015. If determined as necessary or prudent, create a combined carriage-content regulator. The Irish model can be put to use here.
  - **Ministry:**
    - The different ministries should work together to create a policy environment that addresses the entire industry and provides a clear and reduced-risk environment for investors.
    - Coordination between the carriage regulator, content regulator, and appropriate ministries can be ensured by regular meetings of a nodal group formed out of personnel from these different agencies.
  - **Industry structure:**
    - Telecom Egypt should not be allowed special privileges in the telecom services market, but be allowed to compete freely with private operators by having the same license.
    - Operators who have current service licenses should be allowed to migrate to new licenses by choice, or face the possibility of living out their current license's sunset. These operators should be charged reduced or differential license fees to enter into new license agreements with the Government in order to keep the competition fair.
- **Expected outcomes and preparation:**
  - **Content development:** Egypt can become a source of content development for the Arab world. The Government should take appropriate measures to support and encourage content developers and entrepreneurs through loans and infrastructure support.
  - **Services:** Provision of adequate bandwidth, a clear legal framework, and the encouragement of businesses to develop their services offerings should be one of the priorities of the Government. The trade, commerce, and human resource development ministries should work together with the MCIT to develop a plan to support the growth of the IT and knowledge services industries.
  - **Technology and employment:** As investment in the sector grows and employment requirements increase, it will be necessary that Egypt has well trained and

skilled workers. The Government should develop technical and vocational training programs to support the growth in the high-tech sector.

- **Infrastructure support:** As telecom networks roll out, they will support, and also lead to increased demand for other public services like public transportation, good roads, electricity, and education. The Government has to keep in mind that ICTs are not a panacea for overall socio-economic development, and hence, develop other supporting and allied infrastructures as well.
- **Consultation and discussions:** Adopting convergence is a major regulatory step. In order to ensure that the process is smooth, and more importantly, is a process that reflects the interests of the public and the operators. One of the critical steps to ensure this smooth transition is to ensure public participation in the policy-making process. Egypt has set a positive example with its previous consultations on important policy issues like broadband wireless access spectrum policy.

## **Annex A: Current ICTs situation in Egypt**

*Telecom indicators in Egypt, comparison with MENA countries*

*Market structure and details of the sector's organization*

*Growth and prospects for the Egyptian market*

*Regulatory frameworks, licensing, and policy structure*

## **Annex B: International regulatory practices**

### *USA*

The Federal Communications Commission (FCC) is an independent United States government agency, directly responsible to Congress. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC also regulates content.

However, provision of cable TV services requires approval/ license/ franchise at municipal level. The Telecom Companies wishing to provide IPTV services on their broadband networks have been demanding that the laws must be amended to provide for national level franchise to enable them to roll out their services. The cable industry has been opposing this demand in view of the fact that the cable industry had to undergo the time consuming and expensive process to secure city-by-city franchise over the last three decades.

In the US the Telecommunications Act of 1996 opened the doors to telecommunication companies (telcos), cable TV companies and information network service providers entering each other's markets.

### *European Union*

Through the first half of 1998, the EU gathered opinions on a Green Paper on Convergence issued in December 1997, which took as its starting point three options:

- Building on current structures
- Developing a separate regulatory model for new activities, which would coexist with telecommunication and broadcasting regulation
- Progressively introducing a new regulatory model to cover all existing and new services

Directive 2002/21/EC of 7 March 2002 of The European Parliament and of The Council lays down a common regulatory framework for electronic communications networks and services. The regulatory framework consists of this Directive and four specific Directives on related matters. The Directive, inter alia, recognizes the following:

- The convergence of the telecommunication media and the information technology sectors means all transmission networks and services should be covered by a single regulatory framework.
- It is necessary to separate the regulation of transmission from the regulation of content.
- Accordingly the scope and aim of the directive is stated to be the establishment of a harmonized framework for the regulation of electronic communications services, electronic communications networks, associated facilities and associated services.

In pursuance of this directive Twenty Member States out of a total of Twenty Five Member States had completed the adoption of primary legislation and notified the Commission thereof by December 2004.

### *UK*

Ofcom is the regulator for the UK communications industries, with responsibilities across television, radio, telecommunications and wireless communications services. OFCOM was created in 2002

combining the regulatory functions of the Broadcasting Standards Commission, Independent Television Commission, Office of Telecommunications, Radio Authority and the Radiocommunications Authority. Content regulation is also assigned to OFCOM.

The UK is clearly opting for an evolutionary approach. While it acknowledges that convergence calls for new regulatory approaches, it believes that change is happening at a pace which can be handled through adapting existing regulatory bodies rather than starting again from scratch.

It does, however, have guidelines for handling change. In its discussion of the issue, **Regulating communications: approaching convergence in the Information Age** issued by the Department of Trade and Industry, these are outlined as:

- Greater coherence in economic regulation across all digital delivery media.
- Reassessment of the current regulatory distinctions based solely on the method of delivery to the consumer.

### *Australia*

On 1 July 2005, the Australian Broadcasting Authority and the Australian Communications Authority merged to become the Australian Communications and Media Authority (ACMA).

### *Canada*

The Canadian Radio-television and Telecommunications Commission (CRTC) was established by Parliament in 1968. It is an independent public authority and reports to Parliament through the Minister of Canadian Heritage. The CRTC is vested with the authority to regulate and supervise all aspects of the Canadian broadcasting system, as well as to regulate telecommunications common carriers and service providers that fall under federal jurisdiction.

### *South Africa*

The Independent Communications Authority of South Africa (ICASA) is the regulator of telecommunications and the broadcasting sectors. It was established in July 2000. It took over the functions of two previous regulators, the South African Telecommunications Regulatory Authority (SATRA) and the Independent Broadcasting Authority (IBA). The two bodies were merged into ICASA to facilitate effective and seamless regulation of telecommunications and broadcasting and to accommodate the convergence of technologies.

### *Bhutan*

Bhutan not only has a converged regulator for Telecom and Broadcasting but the Royal Government of Bhutan has already introduced a Convergence Bill, viz. Bhutan Information, Communications and Media Act 2005 (A Bill) in their Parliament which is likely to be approved in the 1st quarter of 2006.

### *Other countries*

A number of other countries also like Malaysia, Tanzania, Botswana, Papua New Guinea, Hong Kong, Bhutan and Brazil have converged regulators – i.e. a regulator whose responsibilities cover both – telecommunications and broadcasting. However as in the case of some of the examples listed above content regulation is not always with the same regulator.

## **Annex C: Various drivers and applications of convergence**

## Annex D: Comparisons with Ireland and Singapore

Both Ireland and Singapore have established themselves over the past two decades as regional hubs for information technology and telecom services. This Annex details some of the comparisons between Ireland, Singapore, and Egypt.

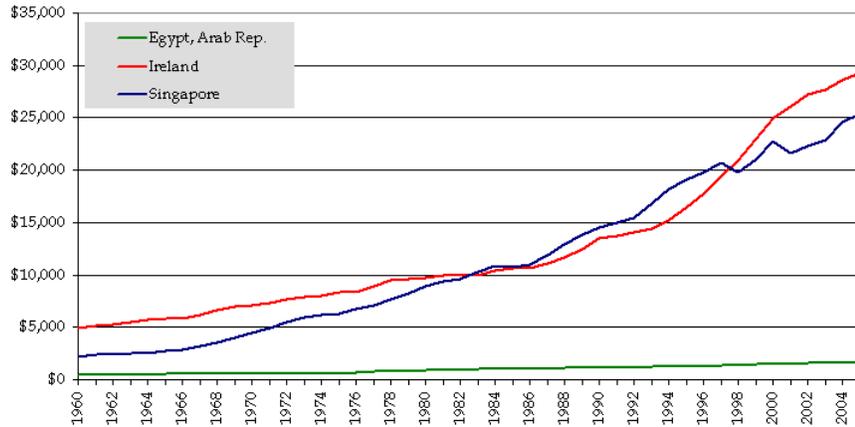


Figure 17: GDP per capita of Singapore and Ireland have significantly grown since 1960<sup>e</sup>

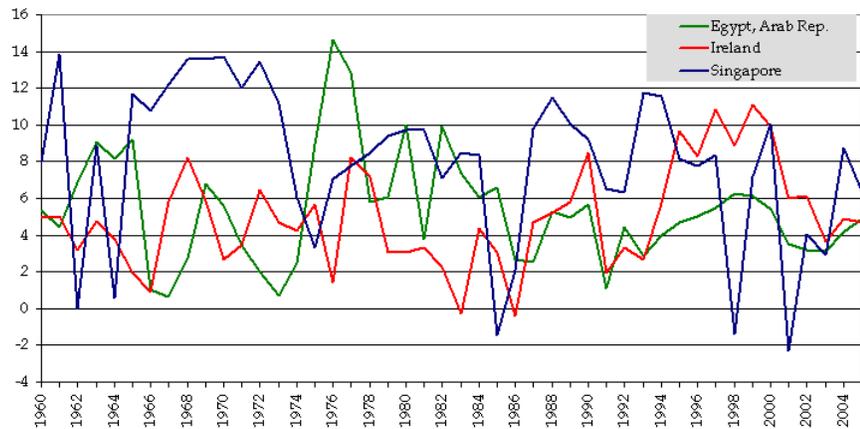


Figure 18: Annual GDP growth (per cent) with averages of about 6 per cent

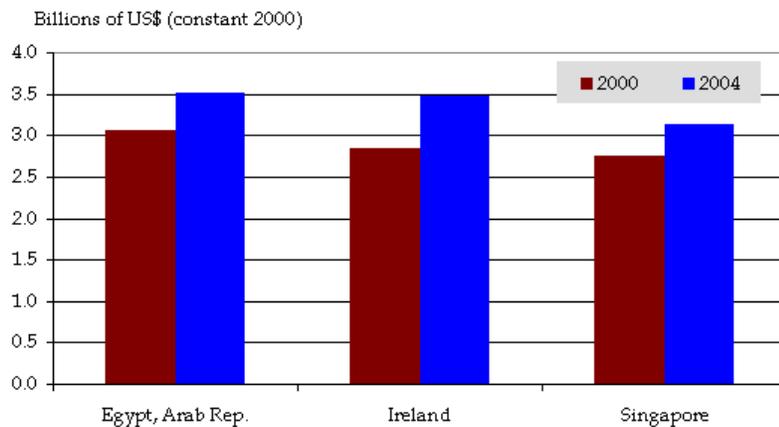


Figure 19: Telecommunications revenues from the case countries

<sup>e</sup> Source: World Bank Development Indicators Database, all figures in constant 2000 US\$

	Ireland	Singapore	Egypt <sup>f</sup>
Computer, communications and other services (per cent of commercial service exports)	61 <sup>05</sup>	42 <sup>04</sup>	27 <sup>04</sup>
Employment in services (per cent of total employment)	65 <sup>03</sup>	76 <sup>03</sup>	52 <sup>02</sup>
Exports of goods and services (per cent of GDP)	80 <sup>04</sup>	-	32 <sup>05</sup>
Internet users (per 1,000 people)	265 <sup>04</sup>	571 <sup>04</sup>	54 <sup>04</sup>
Policy uncertainty (per cent of managers surveyed ranking this as a major business constraint)	6 <sup>05</sup>	-	66 <sup>04</sup>
Service exports (BoP, current billion US\$)	53.8 <sup>05</sup>	41.2 <sup>04</sup>	14.2 <sup>04</sup>
Secure Internet servers (per 1 million people)	355 <sup>05</sup>	270 <sup>05</sup>	1 <sup>05</sup>
Services, etc., value added (per cent of GDP)	56 <sup>03</sup>	66 <sup>05</sup>	47 <sup>05</sup>
Technicians in R&D (per million people)	621 <sup>03</sup>	381 <sup>02</sup>	- <sup>05</sup>
Telecommunications revenue (per cent GDP)	3 <sup>04</sup>	3 <sup>04</sup>	3 <sup>04</sup>
Trade in services (per cent of GDP)	61 <sup>05</sup>	76 <sup>04</sup>	28 <sup>04</sup>
Unemployment, total (per cent of total labor force)	4 <sup>04</sup>	5 <sup>03</sup>	11 <sup>03</sup>
Broadband subscribers (per 1,000 people)	34 <sup>04</sup>	121 <sup>04</sup>	0 <sup>04</sup>

## Notes

<sup>1</sup> EIU-IBM convergence survey, February 2005

<sup>2</sup> Arthur D. Little & Exane BNP Paribas, Facing off on convergence, February 2006

<sup>3</sup> <http://www.btfusionorder.bt.com/>

<sup>4</sup> Organisation for Economic Co-operation and Development, Multiple Play: Pricing And Policy Trends, April 2006 [DSTI/ICCP/TISP(2005)12/FINAL], p. 10

<sup>5</sup> OECD, Multiple Play, p. 6

<sup>6</sup> OECD, Multiple Play, p. 11

<sup>7</sup> EIU-IBM convergence survey, February 2005

<sup>8</sup> ITU-Infodev ICT Regulation Toolkit

<sup>9</sup> OECD, Policy Considerations For Audio-Visual Content Distribution In A Multiplatform Environment, December 2006

<sup>10</sup> BMI Research, Middle East - Gulf States Dominate Telecoms Activities In The MEA Region, 2005

<sup>11</sup> Melody, Sutherland & Tadayoni, Convergence, IP Telephony and Telecom Regulation, LirneAsia, March 2005

<sup>12</sup> M H Au, Director-General of Telecommunications OFTA, On "Fixed-Mobile Convergence" Again, November 2006

<sup>13</sup> Mauro F. Guillen & Sandra L. Suarez, Developing the Internet: entrepreneurship and public policy in Ireland, Singapore, Argentina, and Spain, Telecommunications Policy 25 (2001) 349-371

<sup>14</sup> Report of the Advisory Committee on Telecommunications, Ireland

<sup>15</sup> World Bank, The Next Decade of ICT Development: Access, Applications and the Forces of Convergence, Global ICT Department, August 2006

<sup>16</sup> ITU-Infodev ICT Regulation Toolkit

<sup>17</sup> Ewan Sutherland, Fixed-Mobile Convergence, Global Symposium For Regulators, Dubai, February 2007

<sup>18</sup> <http://mumbai.mtnl.net.in/iptv/index.html>

<sup>19</sup> Pyramid Research, Fixed - Mobile Convergence: Creating Value with Successful Business Models, June 2005

<sup>20</sup> World Bank, Contribution of Information and Communication Technologies to Growth, Working Paper No. 24

<sup>21</sup> UN Human Development Report: Egypt, 2005

<sup>22</sup> UN Human Development Report: Egypt, 2005

<sup>23</sup> Ovum Consulting, The economic contribution of mobile services in the Europe Union before its 2004 expansion, December 2004

<sup>24</sup> MCIT, Egypt's Information Society, October 2005

<sup>25</sup> MCIT, Egypt's Information Society, October 2005

<sup>26</sup> ITU-D Study group 1, 2004

<sup>27</sup> ITU-D Study group 1, 2004

<sup>28</sup> BMI Research, Industry Survey & Forecasts Series: Egypt Telecommunications Report, Q4 2005

<sup>29</sup> Roeller, Lars-Hendrik and Waverman, Leonard, "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach" American Economic Review, 2001, 91(4), pp. 909

<sup>30</sup> Lydon, Reamonn and Williams, Mark, "Communications Networks and Foreign Direct Investment in Developing Countries", Communications & Strategies, 2005, 58(2), pp 43

<sup>31</sup> Contribution of Information and Communication Technologies to Growth, World Bank 2003

<sup>32</sup> Source: World Bank, PPI database; Wireless Intelligence; World Bank, World Development indicators; Government of Egypt

<sup>33</sup> PriceWaterhouseCoopers

<sup>34</sup> PriceWaterhouseCoopers

<sup>35</sup> Wireless Intelligence

<sup>36</sup> Strategic Review of the Television Broadcasting Sector in the Middle-East, Booz Allen Hamilton, 2006

<sup>37</sup> PWC, (regional analysis), Booz Allen Hamilton (Middle-East countries)

<sup>38</sup> "Economic Contribution of Copyright-Based Industries in Singapore" How Kit Boey, Leo Kah Mun, June 2005 IPAcademy

<sup>39</sup> Copyright Industries in the US Economy The 2004 Report, Stephen Siwek Economists Incorporated, 2004

<sup>f</sup> Source: World Bank Development Indicators Database, the two-digit superscript numbers indicate the year of the data point in the decade beginning in 2000. Thus, "04" means 2004.

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- <sup>40</sup> 2004 OECD Information Technology Outlook, OECD and New perspectives On ICT Skills and Employment, OECD 2005
- <sup>41</sup> Waverman L, Meschi M, Fuss, M; The Impact of Telecom on Economic Growth in Developing Countries, Vodafone Policy Paper Series, Number 2; March 2005
- <sup>42</sup> infoDev, Convergence, IP Telephony and Telecom Regulation: Challenges & Opportunities for Network Development, with particular reference to India, Workshop on Convergence, VoIP and Regulation, sponsored by infoDev in association with the Telecommunication Regulatory Authority of India (TRAI), New Delhi, 11 March, 2005
- <sup>43</sup> OECD, Multiple Play: Pricing and Policy Trends, April 2006
- <sup>44</sup> Odlyzko, A., The Evolution of Price Discrimination in Transportation and its Implications for the Internet, Review of Network Economics Vol.3, Issue 3, September 2004
- <sup>45</sup> The Denver Post, August 23, 2006
- <sup>46</sup> <http://www.pcmag.com/article2/0,1895,1971082,00.asp>
- <sup>47</sup> <http://commerce.senate.gov/hearings/witnesslist.cfm?id=1705>
- <sup>48</sup> [http://www.theregister.co.uk/2006/11/02/currie\\_on\\_neutrality/](http://www.theregister.co.uk/2006/11/02/currie_on_neutrality/)
- <sup>49</sup> [http://www.tradearabia.com/tanews/newsdetails\\_snIT\\_article117205\\_cnt.html](http://www.tradearabia.com/tanews/newsdetails_snIT_article117205_cnt.html)