

Nothing endures but change: Thinking strategically about ICT convergence

Rajendra Singh and Siddhartha Raja

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Table of contents

1.	Introduction.....	1
2.	Understanding convergence.....	1
3.	Convergence is reality.....	2
4.	Opportunities and challenges of convergence for the ICT sector.....	5
	Opportunities for users.....	5
	Opportunities for service providers	6
	Potential challenges	8
5.	Options for policy responses.....	8
	Types of policy responses.....	9
	Resistance	10
	Wait and watch	11
	Enable	12
6.	Conclusion	15
	Bibliography	16

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1. Introduction

Countries that adopt policy frameworks that enable convergence among telecommunications, media, and computing services will enhance the impact of information and communication technologies (ICT) on economic development. Technological innovation and market demand are driving the ICT sector towards convergence. This matters because convergence can lower entry barriers, allow service providers to try out new business models, promote competition, lower costs to service providers and users, and broaden the range of services and technologies available to users. On the other hand, convergence can lead to market consolidation, reduced competition, and new entry barriers.

This chapter explains convergence and its main forms, shows that convergence is a widespread market-driven process of change, discusses some of the main opportunities and challenges it poses to businesses, users, and governments, and outlines options for government policy responses along with the likely outcomes and potential benefits and risks.¹

2. Understanding convergence

Convergence serves as shorthand for several processes of change taking place in the ICT sector. Broadly speaking, convergence is the erosion of boundaries among previously separate services, networks, and business practices in the ICT sector.

For purposes of discussion, three main forms of convergence can be highlighted. The first, service convergence, or “multiple play,” allows a firm to use a single network to provide several communication services that traditionally required separate networks. The second form is network convergence, where a common standard allows several types of networks to connect with each other. Consequently, a communication service can travel over any combination of networks. While these two forms of convergence are technological, the third form, corporate convergence, results from mergers, acquisitions, or collaborations among firms. New business entities are created to offer multiple services, old and new, and address different markets. Table 1 summarizes and illustrates these forms of convergence and associated benefits, risks, and policy implications.

	Service convergence	Network convergence	Corporate convergence
Definition	Firms use their networks to provide multiple services.	A service can travel over any combination of networks.	Firms in one sector acquire, merge, or collaborate with firms in other sectors.
Examples	Communication companies offer telephony, television, and Internet services using telephone, cable, or fixed wireless networks. Examples are found in Chile, Egypt, India, Poland, and Ukraine.	Internet telephony services like Skype and Jajah carry voice telephony using the Internet and traditional networks. In the United Kingdom, BT's Fusion service carries calls over Wi-Fi and cellular networks.	Internet, broadcasting, and telecommunications firms partner, merge, or expand their range of services. Such developments have occurred in Brazil, Nigeria, and Sri Lanka.
Benefits	Service providers can enter new sectors, use their networks more efficiently, offer discounts for bundles, and increase access to new ICT services.	Reduced costs can lower tariffs. Network integration permits mobility for consumers and expands coverage.	Mergers create opportunities for new services or markets, lower costs and tariffs, and increase the coverage of individual firms.
Risks	Subscribers could be locked into one provider. Smaller firms, especially those without own broadband networks, might get pushed out of the market.	Could lead to lower investments in networks.	Mergers could lead to less competition, market dominance, and less diversity of media content.
Policy implications	Convergence changes the scope and boundaries of markets and alters entry barriers.	Connecting different networks allows location- and network-independent service provision.	Mergers create new business models, and alter the market structure, changing the dynamics of the sector.

Table 1: Different forms of convergence

3. Convergence is reality

A number of factors are pushing service providers towards converged business models. These market drivers are now increasingly common worldwide, including developing countries.

Convergence is primarily a process driven by technology and demand. Convergence results from service providers' adopting new technologies and business practices. The fundamental

technology drivers are the digitalization of communication and the falling costs of computing. Both, coupled to rapidly growing demand, led to a proliferation of digital devices. Further, digital data processing and increases in computing power allowed data compression, increasing a network's carrying capacity even if its bandwidth remains fixed. And cable and wireless network capacities have been growing steadily. More recently, the growing and widespread use of Internet Protocol (IP) based and packet switched data transmission has made it possible for different devices and applications to use the same networks. This has sharply reduced costs and significantly eased the design and deployment of access devices. Improved device capability is a significant contributor to convergence.

With these technical and market factors evolving, convergence has now found significant traction with service providers seeking to increase revenues and cut costs of service provision. Service providers around the world are embracing convergence through investments in all-IP networks – estimated to be \$300 billion by 2015 – and in converged business models. In an indication of this expanding underlying technological base, one analyst estimates that the global IP switch and router market grew about 10 per cent in 2007 to \$11 billion (Market Wire, 2008). One major IP network equipment manufacturer has seen sales in emerging markets double since 2005 even as worldwide sales grew 40 per cent (Cisco Systems Inc., 2007). Box 1 gives examples from developing countries and transition economies.

Another market factor supporting the introduction of convergence is the deployment of broadband networks. Broadband connectivity facilitates convergence because it allows the provision of multimedia content—such as CD-quality audio and streaming video—at reasonable prices. As of 2007, broadband was commercially available in 166 countries, and nearly a quarter of the 300 million subscribers were in middle-income countries.²

Indeed, demand for converged services is also evident. By late 2007, there were more than 30 million “triple play” subscribers – typically receiving telephony, video, and Internet services worldwide. Skype, an Internet telephony service, has more than 250 million subscribers in 225 countries and territories (Skype, 2005), and carried 13.75 billion minutes of international PC-to-PC calls in 2007 (Telegeography, 2007).

There has also been consolidation in the development and provision of content and services. Investments, mergers, and cross-holdings in the media and telecommunications industries have increased the number of both content creators and network operators with access to content and delivery mechanisms. The development of online advertising has also allowed many content providers to offer their services for free or well below cost. Such arrangements allow consumers to sample, even if only in a limited manner, the content and find uses for it. As a result, consumers create a demand for that or similar content, which results in higher demand for services that can support such content.

Box 1: Convergence in developing countries: A few examples

India's incumbent public telecommunications provider, MTNL, started Internet Protocol television (IPTV) services in Mumbai in 2006. The service now offers about 150 channels, costs about \$5 a month, and has a reported 6,000 subscribers. A number of private operators have since begun offering IPTV services.

Since 2006, telephone and cable companies have been converging in **Brazil**. Telemar acquired Way TV, while Telefónica bought a stake in TVA. Convergence is emerging in response to the introduction of triple-play services by NET Serviços, which has an estimated 400,000 subscribers.

Sri Lanka's Dialog Telekom now offers telecommunications and broadcasting services. It has become a quadruple-play operator, offering fixed and mobile voice, television, and Internet service. Its satellite television service reaches more than 60,000 households, while its mobile phone service has 4.3 million subscribers and will soon include 3G (third-generation) services.

In 2007, MTN **Nigeria** acquired VGC Communications, a fixed and wireless phone provider. This is after VGC secured a unified license to offer fixed and wireless telephony, Internet, and value added services in 2006. The CEO of MTN noted that it made the acquisition with the intention of accessing VGC's infrastructure and labor to achieve convergence.

Telecom **Egypt** has begun to upgrade its fixed line network to an IP-based next-generation network, allowing it to provide voice and IP services. Its Internet service provider subsidiary, TE Data, introduced IPTV services in 2006.

In March 2008, **Ukraine's** Comstar began offering IPTV services over its fiber-based next-generation network. This offering makes Comstar a triple-play voice, broadcasting, and data operator—the country's first. It will soon face competition from Golden Telecom Ukraine and fixed-line operator Ukrtelecom. The IPTV offerings follow broadcaster Viasat's plans to introduce digital satellite TV services later in 2008.

In 2006, Telefónica **Chile** began offering IPTV and satellite television services to counter a decline in fixed line revenues and subscriptions. Cable operator VTR saw its triple-play subscriber base double in 2006, and is considering acquiring a 3G license to add mobile voice services to its portfolio.

Argentinian cable TV operators Multicanal and Cablevision are investing about \$310 million in fiber optic networks in 2008, with plans to offer triple-play services. This is part of a move to begin services before the government abolishes legislation that prevents telecommunications providers from offering broadcasting services.

Polish fixed-line operator Netia plans to launch multiple play fixed, mobile, and Internet services in 2008, and expects to invest \$311 million over the next three years. It also has 300,000 broadband subscribers, and has a WiMax network covering more than 30 cities using 80 base stations.

4. Opportunities and challenges of convergence for the ICT sector

Convergence has a significant impact on the ICT sector because it alters the market structure and dynamics. On one hand, users are able to access a wider range of services, choose among more service providers, and they produce and distribute content. On the other hand, convergence allows service providers to adopt new business models, offer new services, and enter new markets.

Opportunities for users

Convergence enables ICT users to access a greater variety of services through a wider variety of devices than before. For example, whereas households subscribing to telephone or cable companies only received one service, they can now receive three – voice, video, and data – over either network. As of 2007, estimates suggest that over a third of Canadian households now subscribe to triple play services, and that there are about 23 million subscribers worldwide (Pyramid Research, 2007).

Convergence also benefits users because it increases the reach of services. For example, any communications infrastructure now carries telephone service, moving countries closer to universal service. This also improves the utilization of the existing infrastructure, making it more cost efficient. As digital video broadcasting (DVB) and mobile television proliferate and evolve, they will make triple play over wireless networks possible. Similarly, the ability of cable television infrastructure to carry converged services has driven investment in fiber optic networks by telecommunications operators. Of the ten countries with the highest broadband penetration, nine also have strong cable infrastructures (Noam, 2007).

Further, many non-traditional infrastructures, including cable television and electricity distribution networks, can now carry telephone service, moving countries closer to universal service and improving the utilization of existing infrastructure, allowing them to provide ICT services to communities that earlier had none. Such service provision brings with it the potential for significant social and economic transformation to otherwise underserved areas.

Convergence has another important implication for users: potential reductions in tariffs. The main reason for this reduction is increased competition in the market because of the provision of similar services by a number of networks, and because the cost per service reduces. The French Internet service provider (ISP) Iliad led significant price reductions in the triple play market by reducing its bundled tariff; the rest of the market soon followed (Wall Street Journal, 2006). This would not have been possible without Iliad's converged use of its network to deliver voice and video services.

Lower tariffs and a wider range of services also make some services more attractive to users that are price-conscious, or unsure of the personal usefulness of new services. In Sweden, for example, one cable company offering triple play services gives subscribers the least expensive service free (OECD, 2006). Such an arrangement might bring normally unwilling subscribers around to trying out a new service.

Convergence drives increased coverage for advanced ICT services over wireless media — a critical consideration for developing countries. “Wireless triple play” can significantly enhance access to services and content for rural or hard-to-reach communities. The number of mobile phone subscribers in developing countries is significantly higher and far more diffused than the number of personal computer users. As a result, if cellular operators can implement service-converged networks, financial services, public services, and entertainment applications can reach a far larger proportion of the population.

Similar possibilities arise from the mixed use of cable, wireless broadband, and other ICT networks. Access to high-quality, reliable, affordable ICT services can have significant impacts that strengthen governance, through e-governance, or provide distance health or distance education opportunities.

Already, the provision of digital video broadcasting over cellular networks has recognized potential to increase the number of television viewers in countries such as Kenya and the Philippines. As wireless networks proliferate, the use of broadband third-generation (3G) and digital video broadcasting makes wireless triple play possible.³ Networks in Afghanistan are using broadband wireless for data connectivity,⁴ and new technologies like WiMax, iBurst, and revisions to the Wi-Fi standard are raising expectations. For example, in 2005 Kenya Data Networks began deploying a WiMax system designed to offer converged services, including voice and data, to its customers (All Africa, 2005).

Providing new applications for users also create economic opportunities. Increased demand for content and applications drives significant economic development. For instance, media and entertainment expansion into mobile telephony is growing rapidly: mobile gaming is a \$4 billion market, and in 2005, more than 420 million songs were downloaded onto mobile phones around the world (SSKI Research, 2007). Creation of these new markets drives employment and investment, and act as a catalyst for network growth.

Moreover, the opportunities created by online services like blogs, video repositories, and social networking tools create opportunities for social development. The consequent exchange of ideas, boosts to creativity, and creation of new information and knowledge channels has positive impact. It also significantly alters the structure of the media sector, where content creation and distribution were traditionally in the hands of a few firms or the state. One recent example comes from Myanmar, where recent pro-democracy demonstrations received significant worldwide coverage—largely enabled by the protestors’ unprecedented access to digital video communication over the Internet.

Opportunities for service providers

Service providers in both the telecommunications and broadcasting sectors have seen convergence as a powerful means to leverage existing infrastructure to provide a wider range of services at lower costs, generating higher revenues and reaching new subscribers.

Convergence allows service providers to enter new markets, making it possible for them to compete in a larger market for more subscribers, and grow their businesses beyond their traditional sector or technology domains. The results are even starker in countries with only one

traditional communications infrastructure with limited reach or take-up. One recent report found that telecommunications firms offering IP television (IPTV) have succeeded in those countries that have relatively low pay television penetration but high broadband penetration (Telecommunications Management Group, 2008).

Network convergence also allows entry of new service providers, leading to competition that lowers prices. Some stark examples come from the voice telephony market. Significant discounts are possible, for example, if carriage is over IP networks. One service, Jajah, uses the Internet as a carriage network and offers discounts significant enough that if even half the international calls from the United States used it instead of traditional carriers, annual savings would top \$1 billion.

Singapore is a useful example of the potential for increased competition. As of late 2007, StarHub was the monopoly cable television provider in Singapore. Now SingTel, the incumbent telecommunications company, has begun to invest in and rollout a new IPTV operation, ushering service convergence into the market. The broadcasting regulator noted that the new service will "...inject vibrancy into the Singapore media scene and offer consumers more choices" (Business Times Singapore, 2006).

However, the ability of one service provider to enter a new market means that it also faces competition from those firms that earlier were in separate markets. Cable television companies began to provide Internet and telephone services in the mid to late 1990s, entering the telecommunications market on the back of quickly maturing VoIP technology. For example, the U.S. cable television provider Comcast has 4.1 million telephone subscribers (Comcast, 2008), while U.S. telecommunications firm Verizon lost 3 million fixed telephone subscribers due to increased competition from mobile telephones, broadband, and cable television services (Verizon, 2006).

Now, telephone companies are getting into the broadcasting business, following the stabilization of IPTV technologies in the mid 2000s. Hence, while traditional telecommunications companies faced greater competition in their original lines of business in the 1990s, they are now entering the broadcasting space and competing there. For this, telephone companies are deploying new networks to provide triple play services. Verizon and AT&T, both in the United States, are investing more than \$25 billion combined to upgrade their networks. These investments are giving positive results. For example, Verizon's recent financial reports show it has added 263,000 new television customers and 262,000 net new Internet customers on its new fiber network. Simultaneously, it has grown consumer revenues by about 1 per cent in legacy telecommunications markets with its video and broadband services driving growth.

Following from this, one important implication of convergence for service providers, which has repercussions for the wider market and economy, is that convergence enables greater competition across ICT markets. It reduces barriers to market entry—which has immediate implications for markets because it disrupts their structure and changes competition levels. In some cases, this represents an opportunity to increase the number of service providers. This can lead to a subsequent reduction in tariffs and increases in service quality and coverage.

Service providers also see convergence as a way to cut costs. They seek to lower operating expenses through consolidation of different sectors or by using standardized IP-based network

equipment. For example, BT is expecting that its operating expenses will decrease by £1 billion a year because its next-generation, all-IP network will integrate a number of operational and network management systems (British Telecom, 2006). Reduced costs translate to lower prices for consumers.

Convergence also alters the impact of the ICT sector on social and economic development—as could be expected given ICT’s role as critical inputs to most economic and social activity.⁵ Increased competition due to convergence leads to reduced tariffs, increased service coverage, and drives economic growth. This enhances the benefits of economic liberalization.

Potential challenges

Even as convergence has the potential to increase competition and reduce tariffs, it also can reduce or undermine competition (Katz & Glen Woroch, 1998). When Brazilian telephone company Telemar acquired cable television operator Way TV in 2006, regulator ANATEL responded to queries about competitive implications by initiating a review. The association of cable television operators opposed the deal, saying that the entry of these larger operators could impede competition—though their view was also seen as a defensive response to the entry of a new player in their market (Global Daily Insight Analysis, 2007).

Convergence can also reduce competition in other ways. If a subscriber gets all services from one provider, it is likely to increase the costs of changing to alternative providers. In addition, if a backbone or access network is owned by one converged service provider, other service providers may not have access to that network, or face high costs for interconnecting—a problem being discussed in growing debates on network neutrality and open network access (Frieden, R. M.).

The merging of firms in the telecommunications or media sectors might also reduce the diversity of content available to users. In 2003, when the U.S. Federal Communications Commission announced a relaxation on restrictions on cross-ownership of media outlets, one of the primary reasons of opposition was that it would allow mergers and acquisitions that could reduce the diversity of new and local content (US Congressional Research Service, 2003). In a sign of the social implications of advanced ICTs, most of the 3 million responses received were by email.

Thus, convergence entails both opportunities and challenges for service providers and users. These conditions, while specific to the markets they play out in, are also indicative of the tensions embedded in convergence.

5. Options for policy responses

The discussion above suggests that convergence is likely to gain further momentum around the world. As demand and supply align, advanced ICT services could develop as quickly in lower-income countries as in higher-income countries, even with a late start. This will enable the realization of significant benefits and enhance the development impact of ICTs.

For this to happen, however, it is essential that the policy and regulatory frameworks allow markets to function. The well-known success of mobile telephony worldwide has as much to do with market liberalization as with high demand and low-cost technologies. Research on the diffusion of advanced telecommunications services in developing countries finds that the rate of adoption depends on the existence of an appropriate business environment, which, in turn, is directly dependent on the regulatory and policy environment (Antonelli, 1992, p. 11).

If policy frameworks restrict competition, or stop convergence from playing out in a market, they lead to sub-optimal outcomes that reduce the development impact of ICTs. Consequently, developing countries can increase access to advanced technologies and innovative, high-quality services by opening markets, promoting competition, and removing regulatory barriers to new technologies and business models (Guerhazi & Satola, 2005, p. 25).

Types of policy responses

Although convergence is a universal phenomenon, its implications and appropriate policy responses vary by country (Raja & Williams, 2007), depending on the prevailing circumstances and legacy factors.

Yet, it is possible to create some useful—if broad—categories of policy responses to convergence. Some countries resist the introduction of convergence. Other countries “wait and watch”, embarking on changes only as and when they feel it is necessary. A third response is to create an enabling policy environment for convergence. Table 2 presents an overview of these responses.

Policy responses			
	Resist	Wait and watch	Enable
Perceptions	Government believes that convergence may undermine social, political, cultural, or economic objectives.	Government believes that existing policy accommodates convergence, or decides not to act.	Government believes that convergence can benefit the ICT sector and economy at large.
Actions	Government takes steps to prevent new services and providers from entering the market.	No policy changes. Issues are dealt with on a case-by-case basis.	Government updates policy, promotes industry responses, or directly invests.

Policy responses			
Resist			
Wait and watch		Enable	
Outcomes	<ul style="list-style-type: none"> • New services cannot develop legally, but may still defeat restrictions. • Users lose potential benefits from innovation and cost reduction. • Government faces increasing pressure to remove restrictions. 	<ul style="list-style-type: none"> • Case-by-case decisions allow progress, but expose policy inconsistencies. • Growing uncertainty discourages investors and operators. • Government faces increasing pressure to revise policy. 	<ul style="list-style-type: none"> • The market evolves with new services and business models. • Growth and innovation accelerate. • Users benefit from increased access and choice, and reduced prices.

Table 2: Government responses to convergence around the world

Resistance

Governments may believe that convergence may undermine social, political, cultural, or economic objectives. In developing countries, Voice over IP (VoIP) is often perceived as potentially undermining the revenue of incumbent telecommunications firms (and government, where the incumbent is a state enterprise), especially when lack of competition has allowed these firms to draw large monopoly rents (ITU, 2006, p. 13). Similarly, the political, cultural, and social importance of broadcasting makes governments wary of new providers.

In response to these concerns, governments may decide to resist convergence and take steps to prevent new services and providers from entering the market. By 2006, 36 of 54 African countries forbade VoIP (Balancing Act). In some countries, the idea of convergence is broadly accepted, but specific modalities are restricted. In the United Arab Emirates, incumbent Etisalat offers a full range of converged telecommunications and video services, but Internet telephony services like Skype were banned in 2006 (Business Monitor International, 2008). Concerns involving content regulation have led Bahrain, which has a liberal telecommunications sector, to restrict private participation in audio-visual services, preventing fully converged services (Reporters without Borders, 2008). As of early 2008, India, which has an open and competitive media sector, does not allow private FM radio stations to broadcast news.⁶

Resisting convergence reduces potential benefits, is difficult to enforce, and inevitably leads to pressures for reform. Restrictions cause users to lose potential benefits from innovation and cost reduction. Since Kenya legalized VoIP in 2004, prices for international calls have fallen by up to 80 percent. Legalization of VoIP drove both its own growth and the adoption of broadband and triple play in Kenya, Tanzania, and Uganda (Balancing Act). Where VoIP is permitted, small providers can evolve into information technology businesses (Economist Intelligence Unit, 2007).

Even if new services cannot develop legally, innovators may still defeat restrictions. The presence of a global grey market for international voice telephony, accounting for between a quarter and a third of international call revenues, attests to the possibility of service provision irrespective of market restrictions.

Resisting convergence may protect short-term interests of governments and particular players. However, the evolution of technology, and the potential for provision in spite of restrictions, will ultimately undermine such a policy. The outcome of resistance will be to delay convergence and its benefits while damaging policy credibility.

Wait and watch

Governments might believe that their existing policy accommodates convergence, or decide not to act on market developments. Countries seeking to maintain a *laissez-faire* or free market approach to the sector might choose not to regulate for or against convergence. On the other hand, some governments might not have the political capacity to resist or enable convergence, so “wait and watch” may be their only practical option.

With the “wait and watch” approach, governments do not make changes to their policy frameworks. Instead, they rely on existing policy, legal, and regulatory instruments to deal with issues on a case-by-case basis. In the United States, the Federal Communications Commission and the Department of Justice track mergers and acquisitions in the ICT sector and use general competition law to stop the formation of monopolies or anti-competitive behavior.

The “wait and watch” approach does not necessarily hold back convergence. However, it can lead to confusion and uncertainty. Convergence blurs the boundaries among ICT sub-sectors and case-by-case decisions on structural issues might expose inconsistencies due to the different business and regulatory histories of each sub-sector (Bar & Sandvig, 2000). When rules and policy frameworks overlap or conflict, it increases regulatory risk and the cost of capital by up to 6 percentage points, depending on the country or region. This slows investment in infrastructure and services.⁷

In the United States, the “wait and watch” response is leading to conflicts and concerns. A dispute over the introduction of video over IP services in the state of Connecticut led telecommunications operator AT&T to consider cancelling \$336 million in investments and suspending 1,300 jobs (New Haven Register, 2006). The conflict arose because the state required city-level franchising for cable television operators. AT&T faced delays and increased costs if their video service was to be treated as a cable television service because instead of securing one statewide telecommunications license, they would have had to seek licenses city by city. This conflict was resolved in October 2007 after 17 months of uncertainty (Telecommunications Reports, November 2007). The process saw the state cable television regulator reversing decisions and being challenged in the courts twice. Not only did the uncertainty cause risk to significant inward investment and job creation for the state, it also undermined the credibility of regulation.

As conflicts and uncertainty grow, governments face increasing pressure to revise policy. The absence of a response can have a significant negative effect by failing to provide certainty for investors, as well as not providing a means to overcome inconsistencies in the legacy frameworks. The United States is now concerned that it is falling behind its European and Asian peers in broadband penetration and low tariffs (EDUCAUSE, January 2008). This has led to calls for government intervention and a national broadband strategy even in a market that has typically adopted a *laissez-faire* approach to the ICT sector (NTIA, 2008).

Thus, while a “wait and watch” response might not prevent convergence, it may lead to outcomes that result in sub-optimal benefits.

Enable

Some governments believe that convergence can benefit the ICT sector and the economy at large, and choose to create an environment that actively promotes innovation and competitive service provision. The international experience with the mobile telephone revolution is that when service providers have clearance to offer a service, face few government restrictions, and have explicit or implicit government support, the market can develop very quickly. A similar expansion in investments and access to advanced ICT services can result from the creation of an enabling policy environment for convergence.

Enabling policy environments allow markets to evolve with the introduction of new services and business models. Box 2 illustrates the importance of allowing firms to overhaul their business models in response to changing technology and market conditions. Policy that promotes convergence will accelerate growth and innovation. This reduces inconsistencies and artificial barriers, cuts risks and entry costs, and creates a better environment for investments. Further, users benefit from increased access and choice and from reduced prices.

Creating an enabling environment can involve different levels of government engagement with the ICT sector. First, governments can amend policy to address convergence and remove barriers and restrictions. At a minimum, a policy response to convergence will resolve some of the conflicting rules among converging sectors and create a level playing field in the market.

Several countries have reformed their policy and regulatory frameworks to accommodate and enable convergence while simultaneously moving towards a greater focus on market forces. Singapore and Kenya, among others, have moved towards technology-neutral licensing regimes that allow service providers the flexibility to deploy the most efficient networks. Going further, the United Kingdom, Malaysia, and more recently South Korea, among others, have restructured their entire legal and regulatory frameworks to align with convergence and allow multiple play without restriction.

Given that the primary implication of convergence is a change in market structure, policymakers have the opportunity to promote competition as they undertake policy reform. Creating a competitive market, on a level-playing field for different service providers, has been recognized as the most effective means to drive growth, encourage efficiency – leading to reduced prices and improved quality, and support investment.

The second level of government involvement may provide incentives for firms to invest in the deployment of advanced ICT services. Japan’s government provided interest-free credit, subsidies, preferential tax rates, competition-enhancing rules, and other measures to promote the deployment and use of fiber optic broadband networks (Dow Jones International News, 2003). Today Japan leads the world in fiber optic to the home subscriptions, with more than 8 million homes connected (The New York Times, October 2007).

Finally, some governments directly invest in infrastructure and services. Government investment can provide a significant push during the early stages of convergence and make the government's policy stance clear. One study found that fiber to home deployments are financially feasible in cities only if take-up is more than 25 percent of homes, mainly due to high costs of deployment (Sigurdsson, H. M., 2007). Passive infrastructure accounts for up to 80 percent of these costs (Gauthey, G., 2006). Hence, governments that reduce the cost of rollout by sharing costs or providing right-of-way can jumpstart development.

As part of their investment, governments can lead development of advanced networks or create an open-access infrastructure that can attract private investment. By 2006, 40 percent of French households had broadband service, and multiple service providers had benefited from the unbundling of incumbent France Telecom's network. Now, the national and local governments are investing in the rollout of open-access fiber networks, which private service providers will pay to use. Included in this plan are opening sewers and conduits to allow competitive service providers to lay their fiber optic cables. According to one estimate, this will reduce costs by up to 60 per cent (Paul Budde Communication, 2008).

There are some risks and challenges in direct investment. First, the government's preferential treatment of some service providers may distort the market. In Germany, for example, the incumbent Deutsche Telekom (DT) invested €3 billion to build a hybrid fiber high-speed digital subscriber line (VDSL) network. The government gave DT permission to keep its network closed to competitors, in opposition to European Commission (EC) guidelines. While DT claimed that opening its network would diminish its returns on investment, the EC saw this as anticompetitive—benefiting DT but cutting off potential benefits from increased competition from other service providers.

A second risk is that public funding of broadband networks can distort the market. To address this issue, the EC verifies that interventions are in line with state aid rules.⁸ These rules require justification for state intervention and an analysis of the impact of the aid on competition in the market. In areas where there are competing private operators present, the EC can prohibit state investment if "...intervention may crowd out existing and future investments by market players" (Papadias, L., Riedl, A., & Westerhof, J. G., 2006). This also implies that governments need to demarcate their role as an investor from possible roles as a service provider. Put another way, public investments should not serve as a way for governments to reenter service provision, effectively rolling back the sector reforms of the past two decades.

Finally, governments risk investing in technologies or services that eventually might not find a mass market, become obsolete, or slow down further innovation. France's recent successes in the broadband market came after much criticism of its deployment of the pre-Internet data service "Minitel." The government invested \$11 billion in the system over 20 years, with service beginning in 1981. At that time, Minitel was an advanced data service and it made a pioneer market. However, with the development of the Internet, other countries overtook the French, while the Minitel remained a policy and business priority well beyond its useful life (International Herald Tribune, January 8, 1996).

The three levels of government involvement outlined above can be cumulative. Creating a framework that promotes competition and innovation may need these stages in sequence.

Box 2: The impact of an enabling environment for convergence: Wireline telephony and job creation

Worldwide, the wireline telephony business is stagnating or shrinking due to the shift to mobile, cable, and broadband telephony. This transition is threatening wireline telephone companies, raising the possibility of job losses.

In April 2008, US telecommunications firm AT&T announced that it would cut 4,600 jobs in its shrinking wireline business. However, the firm is simultaneously hiring about the same or more numbers of employees to support the rollout and operation of its expanding wireless, television, and broadband services. AT&T's shift into converged and broadband services is allowing it to keep its total headcount about the same. Along similar lines, telecommunications firm Verizon is investing \$18 billion in its fiber rollout for its triple play business.

In fact, wireline firms worldwide invested more than \$36 billion in equipment over 2007, up more than 10 per cent from 2006, with spending increasing on optical transport and routers, as well as VoIP equipment.

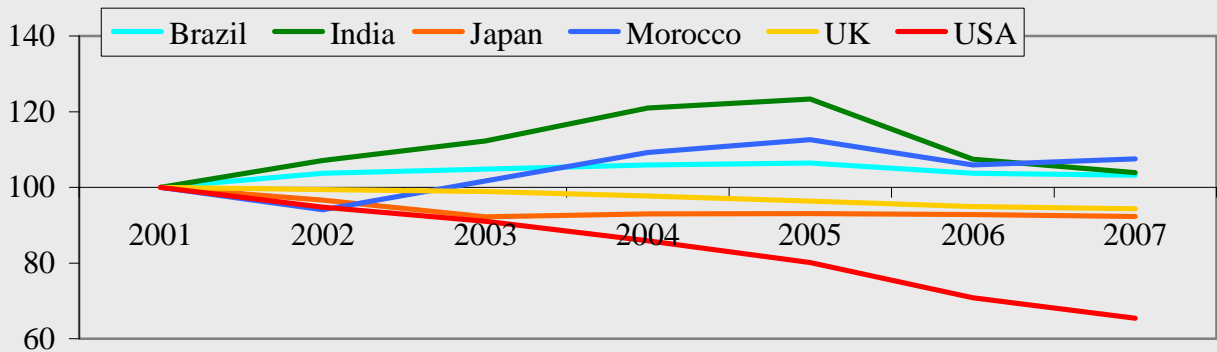


Figure: The subscriber base for wireline services is stagnating or reducing around the world (Index: subscriber base in 2001=100)

If AT&T or other similar firms are not allowed to expand into new market segments, they cannot build their businesses, leading to negative outcomes like job losses. Restrictive policy frameworks prevent such new business models and negatively impact the economy. Having an enabling framework will allow an expansion in economic activity and potential job creation.

Sources: Dow Jones, Pyramid Research, AT&T, DellOro Research, authors' analysis

Experience suggests that the priority has been to first remove policy and regulatory restrictions, then create new frameworks to address convergence and promote competition and innovation, and finally move towards encouraging or investing in these technologies and services. These might be considered as stages in the creation of a policy framework that enables convergence.

The United Kingdom began with creating an enabling policy and regulatory framework in 2003, when it promulgated the Communications Act and created a converged regulator, the Office of Communications (Ofcom). In 2004, however, the government and regulator began to push incumbent BT to reorganize. The impetus was to lead BT towards opening its local access

networks to competitors, because the government believed that this would promote competition and drive the penetration of broadband services. In 2007, the government began discussions about investing in its own national fiber optic network, costing about £10 billion. The reason for this move was to catch up with other countries who were investing in fiber-based infrastructure, "...delivering considerably higher bandwidth than is available in the UK" (BBC, 2007). Thus, the UK displays a migration from a policy response to working with firms, and most recently, planning a direct investment in the ICT sector. Further, the government has formed a "convergence think tank," to suggest means to improve the policy framework given further technological and market developments since their last major revision in 2003.⁹

6. Conclusion

Around the world, service providers embrace convergence to enter new markets, drive growth, and improve their business case. Users are also responding, with significant numbers subscribing to innovative services at lower prices. Undoubtedly, the market is driving convergence forward, leading to significant potential benefits.

As such, a policymaker's role is to respond to these changes. In this, different countries have followed very different paths in response to convergence. With a variety of options available to policymakers on how to respond, it is essential that they have a firm understanding of the implications of convergence and their decisions.

In the long term, countries that resist are likely to lose out the benefits of improved ICT technologies and services. Countries that "wait and watch" might benefit if they have appropriate policy frameworks already in place, but risks remain because convergence typically does not fit easily into traditional policy frameworks. Evidence suggests that the greatest benefits are derived in markets that enable convergence.

If a country decides to create an enabling policy environment, it will have to implement specific regulation that supports this decision. Moving towards an enabling environment will at least require a review of policy and regulatory frameworks. Indeed, translating a broad vision and policy for convergence into a set of specific regulations is likely the more difficult task. In this, emerging trends suggest best practice principles as promoting competition, creating a level playing field, and reviewing their authorizations regime and spectrum management frameworks. These lead to regulatory frameworks that enable convergence. A detailed examination of the possibilities is provided elsewhere.¹⁰

Policymakers seeking to respond to convergence and enable it will find that this move to promote competition and support innovation in services will benefit the ICT sector. As a market phenomenon that can reduce prices, spur growth in coverage, and drive investments, convergence will enhance the effects of earlier liberalization. Those countries that begin on these second-generation reforms in the ICT sector, then, will find themselves and their economies the better for it.

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Notes

- ¹ For conciseness, this chapter focuses on the supply of information and communication services rather than on their demand and use, including content and applications. The chapter presents a selection of the different views on convergence found in current practice, bearing in mind the interests of ICT policymakers and businesses in the developing world.
- ² Estimated from Internet World Stats (2007), available at <http://www.internetworldstats.com/dsl.htm>; ITU (2006). *World Information Society Report*.
- ³ Many countries have also begun to consider digitizing terrestrial broadcasting. Such developments alter the scope of services that can be carried over the broadcast spectrum, because it reduces the amount of spectrum needed to carry television signals. The freed excess spectrum—the “digital dividend”—can be used for broadband and other new wireless services and networks, introducing convergence among wireless technologies. It can also significantly increase coverage, especially since the bands used for broadcasting have wider reach.
- ⁴ Afghan Telecom’s high-speed wireless dial-up Internet service uses cellular networks to carry data and voice services. Information available at: <http://www.afghantelecom.af/Services.htm>
- ⁵ There is a significant amount of literature dedicated to the analysis of the development impact of ICT. See, for example, Wang, E. H. (1999). “ICT and economic development in Taiwan: analysis of the evidence,” *Telecommunications Policy*, 23: 235-243; Grace, J., Kenny C. & Qiang, C. (2004, January). *Information and Communication Technologies and Broad-Based Development: A Partial Review of the Evidence*. World Bank Working Paper No. 12.
- ⁶ There is a recent recommendation from the sector regulator to allow these FM stations to broadcast news. However, these still have to be accepted by the ministry of information and broadcasting. Telecom Regulatory Authority of India, *Recommendations on 3rd Phase of Private FM Radio Broadcasting*, February 22, 2008, p. 24.
- ⁷ See, for details, Smith, W. (2000). *Regulatory Infrastructure for the Poor: Perspectives on Regulatory System Design*. World Bank; Kirkpatrick, C., D. Parker & Y.-F. Zhang (2006). “Regulation and Foreign Direct Investment in Infrastructure: Does Regulation Make a Difference?” *Transnational Corporations*, 15: 1; Jamison, M. A., Holt, L., & Berg, S. V. (2005). “Measuring and Mitigating Regulatory Risk in Private Infrastructure Investment,” *The Electricity Journal*, 18: 6; Estache, A. & Pinglo, M. E., (2004). *Are Returns to Private Infrastructure in Developing Countries Consistent with Risks Since the Asian Crisis?* World Bank Policy Research Working Paper No. 3373.
- ⁸ The Commission’s Director General for Competition (DG Competition) “monitors state aid to the ICT sector and contributes to the development of State aid policy in this field. State aid is defined as an advantage in any form conferred on a selective basis to undertakings by national public authorities. In view of this definition, a number of measures such as research and development aid or regional aid to ICT companies have to be monitored by DG Competition in order to avoid market

distortions. DG Competition also clears aid that is beneficial to consumers, by providing new research grants and encouraging the development of new products, such as open source.” Available at: European Commission, Competition in ICT: Overview, http://ec.europa.eu/comm/competition/sectors/ICT/overview_en.html

⁹ More information on this Think Tank is available at <http://www.culture.gov.uk/Convergence/index.html>

¹⁰ A more detailed examination of these possibilities, in the specific case of multiple play, is in a separate report to be published by the World Bank’s Global ICT department in 2008. Singh, R. & Raja, S. (forthcoming). *Convergence in ICT services: Regulatory responses to multiple play*, World Bank Policy Research Working Paper.

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