

# Digital convergence and its economic implications

G Finger  
Development Bank of Southern Africa  
GeorgeF2@dbsa.org

**Abstract:** *Humankind has come a long way since the development of telephones and computers and in the recent past, we have witnessed a proliferation of technologies as a result of converging information and communications technologies (ICT). The benefits of these converging communication networks are reduced transaction costs, increased productivity and a positive contribution to economic growth. This paper considers some of the economic ramifications which are raised by technological convergence.*

**Keywords:** *Economic growth, telecommunications, regulatory, Information Communications Technology (ICT) convergence.*

## 1. INTRODUCTION

The influence of information communications technology (ICT) in shaping the process of globalisation, particularly in productivity, commercial and financial spheres, is widely recognised. ICTs can no longer be considered marginal to the issues of economic growth and poverty reduction especially when ICT networks, key to most organisations' operations, are integrating.

The ICT sector is undergoing a revolution that has momentous implications for the current and future social and economic situation of all the countries in the world. The progressive pace of technological innovations, such as the rapid integration of the Internet and other telecommunications based activities into nearly every sphere of business, has given rise to new ways of communication, learning and conducting business.

Hence there is no denying the influential role of converging information and communication technologies in global economic realignments. As we talk of a global information or knowledge economy, it should hardly be difficult to appreciate the causal role of integrated telecommunications, broadcasting and computing technology in such economic developments.

## 2. CONVERGENCE AND ITS ECONOMIC IMPLICATIONS

In the industrial context, ICT convergence is all about the physical infrastructure and commercial systems for electronic services. It is primarily about establishing/ developing robust and competitive digital networks, industry structures and business models as a basis for competitiveness and effectiveness.

This definition could be seen as embracing three main characteristics of convergence where:

- Convergence affects not just telecommunications and broadcasting. The scope of convergence is the entire knowledge and transaction-intensive services sector;
- Convergence is structural in nature, and changes to industry structure are the most profound changes associated with it; and
- Convergence is enabled by technological change, but is not driven by it. The drivers of convergence are mainly commercial.

Convergence of technologies is the major contributor to the exponential growth of ICTs in the developed world and elsewhere. For instance, a mobile wireless networks have resulted in the phenomenal growth of mobile telephony in Africa and in other developing regions. Convergence, in a descriptive sense, is often understood to take place at various levels.

- At a technological or network level - it is associated with the integration of previously separate telecommunications, broadcasting and information technology networks or technologies.
- At the services/functional level information and communication technologies seem to offer more functions and services than they could in their unconverted form. For instance the computer in its undigital form is merely an information processor but nowadays computers can also be used to view television content.
- At a regulatory level, regulatory entities are seen to merge as a response to the integration of broadcasting, IT and telecommunications which are no longer seen as regulatable separately. At a functional level, regulators are rethinking old fashion ways of regulation that were sector-specific to either telecoms or broadcasting.
- At the policy level, when increasingly countries are looking at synergising their broadcasting, IT and telecommunications policies into convergence policy.

- At a market level, convergence is associated with the increasing mergers, acquisitions and strategic alliances amongst corporations in broadcasting, telecommunications and IT. Industry lines seem to blur as various communications company seek to explore investments in non-traditional sectors. At this level, convergence is thought to raise economic issues of competition when increasingly oligopolies seem to emerge out the various joint ventures between the three communication sectors.

At all these levels of convergence, it is often market convergence that is associated with economic issues. However, it can be argued that economic issues could also surface at the other four levels.

### **3. NETWORK CONVERGENCE - “ECONOMICS OF INFRASTRUCTURE”**

The growth of ICT depends on broad and affordable access to infrastructure, enabled by convergence of technologies, forward looking telecommunications policy, robust network infrastructure and sufficient bandwidth and support for targeted applications.

As the networks converge, who will be the principal/major players in network ownership? Traditionally telecommunications played a role as infrastructure for content (IT and broadcasting). With the emergence of wireless networks, virtually any ICT operator can participate in the infrastructure sector. Public utilities such as electricity distributors and municipalities are increasingly showing interest in telecommunications networks and may be keen to participate in converged networks.

How must competition be introduced at the network level? Infrastructure markets tend to be dominated by former incumbents who will have a competitive advantage in the fixed service market. In mobile networks, the few mobile operators may collectively hold a dominant position thereby introducing oligopolies.

### **4. SERVICES CONVERGENCE- BUNDLED SERVICES**

In the converged market, there will be fierce contests in triple services – bundling services in telephony, broadcasting and Internet services. This would seem to suggest that any broadcasting, IT or telecommunications operator must prime itself to operate across all sectors. It will be a matter of how an operator evolves technologically in order to be ready to offer bundled services. In a triple service market, what will be the

behaviour of firms? Will some seek to have an upper edge in technology by investing in their networks and in new technology or through merging with other companies who can provide complimentary services?

## **5. REGULATING CONVERGENCE – ECONOMIC ISSUES SURROUNDING REGULATION**

What new tools do regulators need to deal with the economic and even social implications of convergence technology? Interconnection will become increasingly important in the converged environment where ‘any to any interconnection’ must be promoted. Interconnection will be one of the most important challenges. In addition, the regulator must be equipped to handle economic developments characterized by new markets, new synergies, re-definitions of market segments and new services.

## **6. ECONOMIC ISSUES IN POLICY**

There are also enormous challenges at the policy level whereby policies must be crafted to suit new competition issues raised by convergence such as threats of oligopolies as a result of merger activities. Interconnection pricing policy must also take into cognisance the converging networks.

## **7. ICT AND ECONOMIC GROWTH**

Some countries, population groups, and certain industries evidently have so far benefited more than others from the ICT revolution. The question is why would this be the case? What are the reasons for this? Various factors could be considered such as one country’s industrial structure being more conducive to the sort of ICT spread that increases productivity. It is not surprising that the same countries and population groups that lag in ICT adoption also generally lag behind in economic development. The factors that promote overall economic development are the same factors that enable a country, population group or an industry to successfully harness ICT benefits.

**Where would we look for indicators?** One could observe these at the macroeconomic (**country economic growth, national sector growth**) and microeconomic level (**firm-level**).

*Capital deepening*

ICT capital deepening is the major source and a driving force for economic growth. In comparison to developed countries, developing countries are financially constrained and therefore, ICT investment is relatively limited. Although ICT spending in developing countries doubled in the last decade, these countries continue to lag significantly behind developed countries in terms of ICT expenditure as a percentage of GDP. South Africa is currently above the world average and hence better than most countries in the continent.

#### ***At the network level***

The element of “network effects” which also relates to investment returns from ICT. Once the critical mass of investment is reached, network externalities – whereby there are increasing benefits per connection to the network with a higher number of other connections – comes into effect and marginal returns on ICT investment are increased. Metcalfe’s law states that the value of the network is in proportion to the square of the number of users in the system.

#### ***At the firm’s level***

At the firm level, investments in advanced ICT infrastructure are associated with improvements in productivity such as raising labour productivity. However, over-investment in ICT may not always yield positive returns on investment. Mostly there are positive spin-offs especially for SMEs. For instance, research has shown that SMEs in the UK who have migrated to a converged voice and data network have shown reduced infrastructure costs, improved productivity, easier deployment of new applications, and an improved competitive advantage (BT Convergence Report 2006).

#### ***At the industry/ sector level***

The information communication and technology sectors are drivers of our economy in South Africa. The sector accounts for 5.5% of GDP and for +/- 4% of the total employment. During the period of 2001 -2005, the sector contributed to more than 25% of the productivity growth. Computers and broadband communications are the brains and the backbone of the knowledge economy. The ICT sector consistently outperforms overall economic growth.

The current initiatives of broadband and the convergence of ICT will pave the way for the new phase of growth and innovation. This growth will of course depend on investment in

infrastructure and equipment but growth and jobs will mostly come from opportunities in the new services market for content, business services and security.

### ***Examining ICT intensive sectors***

The improvements in sectors that use ICTs intensely such as financial services and other business services sectors. Other examples are metros like Cape Town and Durban who use ICTs in the function of rolling out service delivery. The impact is huge in savings and improved service delivery and productivity.

### ***Skilled versus Unskilled Workers***

Evidence from several countries suggests that the ICT revolution is skills biased and increases demand for high skills relative to low-skilled workers thereby creating a significant disparity in wages. With higher skilled workers more likely to be hired than low-skilled workers, the ensuing result is a skewed pay differential between educated and less educated colleagues. This means the highly skilled workforce reap the benefits of economic opportunities while the uneducated are excluded. At a broader level, the digital divide causes some sort of economic divide.

## **8. IMPLICATIONS FOR INFRASTRUCTURE DEVELOPMENT FINANCE INSTITUTIONS**

A host of factors, including overall macroeconomic and political stability, are obviously important in attracting private investment in telecommunications. The World Development Report (2003) asserts that in order to encourage private investment in the telecoms sector, two factors in developing countries need special attention - political reform and the establishment of independent regulators as part of efforts to enhance the credibility in the government's regulatory frameworks.

Policies that allow for full cost-recovery which also assuring the investor a reasonable rate of return is the preferred alternative for expanding private investment. Often, governments have failed to adopt or implement such policies through credible regulatory arrangements, thus actually deterring private investment.

The unsaturated markets in Africa have been identified as a major attraction for investors investing on the continent, but this has historically been offset by the poor political and economic conditions in many African countries, particularly the low per capita incomes. Unfortunately, in Africa, the perception of high-risk investment conditions has pushed up

rates of return on investment in the telecommunications sector and resulted in demands for guarantees on returns even where actual risks are relatively low.

Despite the above challenges which may introduce reluctance by foreign direct investors, infrastructure investment is still very much needed in the continent. For telecom operators, there are huge costs associated with investing or upgrading telecoms infrastructure. However, in instances where there has been lack of telecoms infrastructure, alternative means of networks would need to be put in place.

How are the roles of development finance institutions in ICT infrastructure investment configured in the age of convergence and what economic factors should be considered? It is observed in some quarters that traditional methods of funding telecommunications infrastructure are no longer relevant.

There are some preferences that private sector investment should be the main driver of improving the ICT sector. Even with such persuasions, development finance institutions could still mount partnerships with private sector investors which would offer an advantage of risk sharing to them.

In the actual phenomenon of convergence, when DFIs invest in infrastructure at the 'converged' network level, if for instance, there seems to be an oligopolistic market, will it be feasible to invest in new start-up operators who may later be edged out of the market? A strong regulatory environment should be considered in such cases.

What is discernable economically in terms of convergence is that the market might be characterised by existing players who may have consolidated their positions through alliances to offer bundled services. In such contexts, how will/should SMMEs, which should be key finance recipients if ICT growth is to be achieved, behave to stake a claim? The implication would then be that DFIs must contribute more beyond finance but also participate in the capacity-building of small or weak players in the ICT market.

## **9. CONCLUSION**

ICT has been widely used to positively affect economic development. Its applications provide access to worldwide information and allow for collaboration between people on different continents. Greater access to information and opportunities for collaboration can create job opportunities, transfer of skills, and greater efficiency and transparency in

politics and business. This paper provided an overview at the macroeconomic (country economic growth, national sector growth) and microeconomic level (firm-level).

In the developing countries, due to resource constraints and other reasons, ICTs contribution to overall economic growth is limited. Many developing countries face challenges because of their approach to development and lack of relevant policies to benefit from this resource.

Implementing relevant policies would contribute to increased investment flows, greater returns on investment and sustainable economic growth. Moreover, ICTs can be used as tools to broaden, enrich and enlighten people and institutions in a way that expedites overall economic development.

## 10. REFERENCES

Baliamoune, Mina N. 2002. "The New Economy and Developing Countries: Assessing the Role of ICT Diffusion." August.

Bayoumi, Tamim and Markus Haacker. 2001. "It's Not What You Make, It's How You Use IT."IMF Working Paper.

Basu, Susanto, John G. Fernald, and Matthew D. Shapiro. 2001. "Productivity Growth in the 1990s: Technology, Utilization, or Adjustment." NBER Working Paper No. 8359.

Beaudry, Paul and David Green. 2001. "Population Growth, Technological Adoption and Economic Outcomes: A Theory of Cross-Country Differences for the Information Era." NBER Working Paper No. W8149.