

# Chapter 112

## The Global Telecommunications Industry Facing the IP Revolution: Technological and Regulatory Challenges

**Harald Gruber**  
*European Investment Bank, Luxembourg*

### 1 INTRODUCTION

Technological innovation in the telecommunications sector is a key contributor to the rapid diffusion of e-business. The steady drive towards semiconductor miniaturisation leads to a continuous decline in the price of telecommunications equipment and increase in performance. Technological change therefore continues to transform the way telecommunications services are provided and used. Telecommunication networks are subject to a technological switch from so called circuit switched technology to packet switched technology. In fact, digitalisation of audio and video signals has led to the convergence of telecommunications, data pro-

cessing and broadcasting technologies into a single service platform based on Internet Protocol (IP). This has strong implications on legacy networks of existing operators, because they need to support during a transition period both technologies in the network, but this duplication is inefficient. This is more so as the incumbent telecommunications operators are subject to sector specific regulation. This regulation was motivated by the externalities that telecommunications generate and the concern that operators would exploit market power to the detriment of users. This appears to be less the case when there is a multiplicity of telecommunications networks.

In Next Generation Networks (NGN) all communication services (voice, data, Internet and TV/video) will be migrated to IP, will share a single

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aggregation and backbone infrastructure and there will be a unique service management platform and integrated provision of applications, including e-business. The migration of services from the switched network to NGN will be progressive. Data is the first to migrate and voice (VOIP) is normally the last because of the technical constraints, volume and investment required. Even larger investment would be necessary for access networks with sufficient transmission capacity, which may need to increase as type of e-business applications become more demanding in terms of network performance.

Telecommunications companies are thus facing the need for significant investment volumes on NGN for both the core network and the access network. They expect from this operating savings in the future as a result of having unified IP networks and also by the increased revenues as a result of being able to offer a broader product range. However, there is the risk that if the demand for the new services and applications does not materialise on the fixed and/or mobile networks, a part of the forecast savings are overestimated and NGN investments will not yield expected financial returns. This risk induces several operators to adopt a cautionary approach to investment, also because they do not take into account the externalities they cannot appropriate. In particular they fear that they will not have any share in the increasing value of the information, to a large extent created through e-business, which will transit over their networks. This market failure represents a reason for public support to investment into access infrastructure.

To put the role of telecommunications for e-business into perspective, this study unravels the interplay between the evolution of technology, market performance of the telecommunications sector and regulation. It is arranged as follows. Section 2 provides an overview of the main market trends on a global level. It illustrates which regions show a particular strong market performance. Section 3 links the technological evolution to the

market strategies that telecommunications operators currently are faced with. It shows that rapid technological change challenges the positions of established operators across a broad range of markets. A critical step is the setting up of broadband access networks close to the end-customer. They are key for satisfying demand of high bit rates such as High Definition IPTV. Section 4 illustrates the regulatory challenges, as regulation has profound implications for investment. The debate is still going on and is far from being concluded, while international comparisons suggest that different access provisions do lead to different results. Section 5 concludes.

## **2 MARKET OVERVIEW**

The market dynamics in telecommunications are characterised by rapid technological change and the introduction of new services. This leads to a rapid and increasing penetration of telecommunications infrastructure, in particular for mobile and broadband services. Telecommunications infrastructure is an important input for sustained economic growth (Röller and Waverman, 2001) and thus there is a strong public interest in good performance of this sector.

The market is typically divided into the following segments: fixed voice services, mobile voice services and data/broadband services. These segments have fairly different growth profiles. Growth in the mobile telecommunications sector has remained sustained since the adoption of digital (mostly GSM) technology and competitive supply of services by two or more companies in each country (Gruber, 2005). The worldwide mobile subscriber base has reached 2.6 billion in 2006, which corresponds to 40 subscribers per 100 inhabitants<sup>1</sup>. As a comparison, in 2000 there were 12 subscribers per 100 inhabitants. What is even more striking is that two thirds of mobile subscribers are in developing countries, which are also contributing to most of the growth in the sub-

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