



Techno-economic implications of the mass-market uptake of mobile data services: Requirements for next generation mobile networks

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ABSTRACT

The growth of the mobile data services market is no longer dependent on push strategies from suppliers. On the contrary, demand is now driving the market to the extent that it will not be easy for mobile operating companies to cope up with the demand to come in the near future. Operators are forced to make heavy investments to upgrade and expand their networks, which then squeezes profits, as the evolution of income is not parallel to that of demand. On the other hand, the operators simply cannot refuse to take up the challenge. To decide how to handle the present and upcoming demand, they need to identify and understand the characteristics of the scenarios they face and will be facing. This is precisely the aim of this article, which provides figures on the consequences for mobile infrastructures of a generalised mobile data services uptake. To achieve this, the article collects information about the predicted evolution of different mobile services in the current and coming years and translates those expectations into service requirements. The paper closes with a discussion on the feasibility and the techno-economic implications for practical deployment, imposed by these requisites. Data from the Spanish mobile deployment case have been used to arrive at practical figures and illustration of results, but the conclusions are easily extended to other countries and regions.

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1. Introduction

Mobile data services and applications are having a similar life cycle to its fixed counterpart. Once technological solutions reached sufficient maturity, mobile data access was turned into a commercial offering, and early adopters rapidly joined. Lately, the market has moved into a growth stage that has been triggered by two facts: affordability of mobile broadband (i.e., diffusion of flat rates), and availability of data-friendly – and again affordable – devices. At this stage, technology, supply, and demand have entered into a virtuous circle in which market growth is no longer dependent on push strategies from suppliers; on the contrary, demand is now driving the market. This is nothing unusual for ICT products and it may even be a sign of success and early maturity. Paradoxically, however, it is worth noting that success, if not properly managed, may be fatal to some players in this domain.

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Where do the main risks lie? In the satisfaction of the demand. Once having experienced the benefits of mobile data access, users want everything in their mobile devices. This also includes every kind of media, anytime, anywhere. Although [De Reuver et al. \(2013\)](#) conclude that consumers only adopt mobile Internet services that strongly resemble the services they already use on the fixed Internet, substitution effects between mobile and fixed Internet are already in place ([Humphreys et al., 2013](#)). Moreover, in a growing number of situations, mobile services generate superior value-in-use for customers and will be – and already are in many cases – preferred to fixed services ([Gummerus and Pihlström, 2011](#)).

Whatever the blend of these effects, one conclusion is clear: it will not be easy for mobile operating companies to cope with the demand to come in the near future. The infrastructure that is needed to support such an ‘unleashed beast’ scenario – a ubiquitous deployment of next generation mobile networks (NGMN) – is far from completion. Companies are forced to make heavy investments to upgrade and expand their networks, which then squeezes profits, as the evolution of income is not parallel to that of demand. On the other hand, these companies simply cannot refuse to take up the challenge. To decide how to handle the present and upcoming demand, they need to identify and understand the characteristics of the scenarios they face and will be facing. This is precisely the goal of this article, which attempts to provide figures on the consequences for NGMN of a generalised uptake of mobile data services and applications uptake.

The article is structured as follows. Next section collects information about the expected evolution of different mobile services in the current and coming years. Third section translates those expectations into service requirements for NGMN. In order to do this, two steps need to be performed: a forecast of the broadband demand from mobile device users, and an analysis of prospective scenarios regarding the evolution of technical parameters that define services. Finally, the paper closes with a discussion on the feasibility and the techno-economic implications for the deployment of NGMN, imposed by these requisites. Data from the Spanish mobile broadband deployment case have been used to arrive at practical figures and illustration of results, but the conclusions are easily extended to other countries and regions.

2. Mobile services: a prospective overview

The study of the evolution of user demand in a mobile environment requires some previous categorisation, which classically can be produced from a content and applications perspective ([Feijóo et al., 2009](#)). However, for this paper it has been preferred to use a service perspective that, although less granular, allows for a much simpler translation into technical requirements.

For each service, overall trends derived from industry sources have been highlighted. Note that industry sources typically suffer from lack of homogeneity in terms of geographical coverage and the range of years covered. They are also generally obscure about the assumptions made for some of the calculations, and often overly optimistic about the future evolution of the industry. In spite of these considerable drawbacks, though, they offer a unique insight into the industry’s knowledge of the demand trends.

2.1. Voice and messaging

The shift of users towards mobile data is slowly eroding the relevance of voice and message services, as telephony is substituted by voice-over-IP (VoIP), and short text messaging is substituted by instant messaging (IM), and diverse types of over-the-top (OTT) services. In spite of this, traditional voice and messaging are still typically forecast to grow modestly in the short to midterm. It has been suggested that this market will show a 3% increase in data traffic until 2017,¹ although some other sources suggest a small decline in the amount of traffic over the longer term.² In 2012, just 5% of the total mobile traffic originated from voice communications in Europe, with this figure rapidly declining to a marginal rate of the total traffic.³ Only less developed countries will show, of the total traffic, a relatively larger proportion dedicated to voice for a longer period. Within this context, mobile VoIP is thought to substitute considerably for conventional voice, with an annual growth of 36% predicted up until 2016,⁴ reaching 1.07 billion users in 2017,⁵ and including the possible emergence of high-definition voice services.

Short text messaging (SMS) will follow a similar path to voice, according to industry expectations. It was expected that it will grow about 3% in the 2016 horizon, with a declining contribution to total traffic.⁶ According to the same sources, IM users will increase from one billion subscribers in 2012 to 1.5 billion in 2016.

Mail is also accessed increasingly via mobile devices. In 2011, just 400 million consumers accessed their email messages via their mobile devices. Prospects are that this number will increase each year by nearly 30%, resulting in a total of

¹ See *SMS will remain more popular than mobile messaging apps over next five years* (Telecomspace, 2012). <http://www.telecomspace.com/content/sms-will-remain-more-popular-than-mobile-messaging-apps-over-next-five-years-informa>.

² See *Mobile traffic forecasts: 2010–2020 report* (UMTS Forum Report 44, 2011). http://www.umts-forum.org/component/option,com_docman/task,cat_view/gid,485/Itemid,213/.

³ See *Traffic and market report: On the pulse of the networked society* (Ericsson, 2012). http://www.ericsson.com/res/docs/2012/traffic_and_market_report_June_2012.pdf.

⁴ See *Cisco visual networking index: Service adoption forecast 2011–2016* (Cisco, 2012). <http://www.cisco.com/c/en/us/solutions/service-provider/visual-networking-index-vni/index.html>.

⁵ See http://www.juniperresearch.com/whitepapers/mvoices_of_reason.

⁶ See Cisco (2012), footnote 4.

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