Telematics and Informatics 30 (2013) 121–131

Contents lists available at SciVerse ScienceDirect

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

"It's the services, stupid!": Identifying killer applications for next-generation networks

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ARTICLE INFO

Article history:
Received 9 March 2012
Accepted 18 March 2012
Available online 23 March 2012

Keywords:
Value-added services
Fiber to the home
Next-generation networks
Expert study

ABSTRACT

Cities and countries all over the world are currently in the process of developing large-scale broadband projects in order to upgrade their Internet access infrastructure. They justify this costly endeavor of rolling out fiber to the home (FTTH) networks in believing that state-of-the-art ICT infrastructure will function as a growth engine, bridge the digital divide and increase quality of living. In the meantime, they believe it to be simply indispensable because an ever increasing demand for bandwidth-intensive applications is anticipated. The former goals, however, can only be achieved if citizens and companies alike migrate to this new technology. Hence, it is essential to consider the utility of fiber networks for future users and to explore applications that can convince end-users to migrate from their current connections to high-bandwidth networks. By means of an international expert survey, this paper tries to identify value-added services that benefit from fiber's network potential and that can stimulate users to switch to fiber. Health monitoring, online content storage and management services, and desktop sharing were identified as the most promising fiber applications in the short term based on a combination of technological feasibility, time to reach the mass market and overall persuasiveness. Augmented video applications such as health monitoring and virtual classrooms on the other hand were deemed very persuasive but long-term oriented.

1. Introduction

In recent years, literature has witnessed an explosion of buzz words such as 'digital', 'intelligent' or 'smart' cities. Cities are trying to compete with each other, thus they seek for ways to distinguish themselves and to put themselves firmly on the global map. Deploying new ICT infrastructure, which is the common foundation of the above-mentioned notions, is one such method. Cities believe that novel ICT infrastructure such as fiber to the home (FTTH) will function as a growth engine, bridge the digital divide and increase quality of living (Caragliu et al., 2009; Dolente et al., 2010). They may have good reason to think so, yet new technology can only fulfill ambitions if there exists genuine demand for such ultra broadband networks, hence if people actually adopt and switch to it. With regard to this, the establishment of fiber broadband networks should be studied within a wider socio-economic context, challenging such a positivist, rather techno-optimistic vision on ICT development.

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http://dx.doi.org/10.1016/j.tele.2012.03.009

Especially in Western-Europe, where the broadband penetration is already high, this demand is still mainly unproven. In general, the number of homes passed is still small and commercially available offers have not yet fully convinced potential customers, which seem satisfied with their existing connection, to migrate to fiber (IDATE, 2010). Furthermore, as providers seek to compensate for high investment costs, they tend to demand higher prices for next-generation network (NGN) subscriptions compared to regular broadband. If the perceived utility for end-users is not in access prices, it might be in the supply of value-added services (or 'killer applications').

To date, however, many studies have focused on technological excellence of this new ICT infrastructure. While technological excellence is an important driver for cities to roll out new broadband networks, it is not the leitmotiv for users to adopt them. Users will only adopt new technology if it provides them with perceived added value and benefits (Rogers, 1995). Instead, in this paper it is proposed that services are the predominant factor while the infrastructure should be regarded only as the enabler and thus not in itself as the unique selling proposition. That is why this study renounces the technology-centered approach of traditional ICT research and adapts a more user-oriented method to study the perceived benefits of fiber to the home broadband networks. However, as is outlined in the next sections, these benefits are relatively disputed in literature. Hence, some authors doubt that current networks will become obsolete or that cities should invest public money. This paper first reviews the literature on smart, digital and intelligent cities, the rationale behind the deployment of new ICT infrastructure and the existing debate on the need for new broadband networks to meet future bandwidth demand. Secondly, the methods section briefly discusses the research on which the analysis is based. Finally, results of this study and concluding remarks are presented.

2. Why cities want to become smart

In bygone days, cities were enclosed entities, clearly separated from each other by distance and thriving on natural resources such as coal and iron ore. The major concerns of those cities were, roughly speaking, accommodating manufacturing enterprises and optimizing accessibility infrastructure, so as to ensure that laborers, feedstock and products could easily enter and leave the city. Globalization together with technological revolutions, however, have put a stop to that. Castells (2000) suggests that ICT has intensified the intercity competition in network societies, and that a worldwide network of interconnected city hubs has been established. This represents major opportunities but at the same time also threats for cities since, as physical movement is facilitated, manufacturing, capital, trade and consumption are less bound to a particular area, and become more flexible. This is sometimes referred to as the '*end of physical distance*'. In practice, this implies that multinational corporations (MNCs) increasingly take decisions with no regard to national boundaries as technology substantially reduces coordination costs (Thornley, 2000). In consequence, cities enter into fierce competition with peers that previously never posed any threat (Giffinger et al., 2007).

New technologies and innovation are often referred to as means to an end for cities to distinguish themselves from others. Williams et al. (2009) state that some aspects of cities are getting more similar but that in general, local differences still make it possible to distinguish between them. Freeman (1991) declares that, next to technology, other factors are also important in this global competition. According to Florida (2003), this focus on technology is too narrow, since talent and openness to new ideas are important as well to become a prosperous region. It should be clear that in this development process, other factors are as vital as technology, although this technological component is mostly overemphasized in policy overviews. These nuances already indicate that the notion of a '*global village*' is not commonly accepted, emphasizing that local influences act as a powerful counterforce to this enduring globalization wave. For example, adherents of Behavioral Geography contend that contextual factors (for example birth place) affects the location where companies and citizens end up as well (Boschma and Lambooy, 1999). Sassen (2008) adds that the dominant narrative of the transnational and global companies is only one part of the story since strategic nodes are required in information industries. Hence, globalization and localness are considered two sides of the same coin.

However, policy makers tend to overstress the importance of technology to attract new citizens or companies. As a consequence, cities all over the world have engaged in a race to become a 'smart', 'digital' or 'intelligent' city. As an example, the 'Smart Cities' project creating an innovation network between cities and academic partners in the North Sea Region could be mentioned, as well as the various living lab initiatives all over Europe coordinated by ENoLL. Pioneers of such networks have initiated this development for the abovementioned reasons. Others also understood the necessity to transcend and jumped on the bandwagon, resulting in a growing pressure for cities to become even 'smarter' (Hollands, 2008). In doing so, cities want to position themselves as centers of innovation that are worth living in, working in and visiting (Hospers, 2003). This trend towards a novel idea of cities as knowledge and innovation centers also fits in with the fact that cities increasingly abandon traditional value creation via manufacturing and instead invest in a 'creative city' in which value creation is derived from the conception of creative ideas and innovative services. Certain proxies are used to benchmark these cities; city-rankings and city-branding are two key parameters. City-rankings are a central instrument to assess the attractiveness of urban regions. They are used to indicate shortcomings and advantages of a city on certain criteria as opposed to rival ones and make it indispensable for a city to improve certain factors if it wants to be regarded as a genuine centre of excellence (Giffinger et al., 2007). This is closely linked to the phenomenon of city branding. The image of a city can affect whether potential citizens and companies settle there (Hospers, 2003). Hence, cities expect to benefit from branding themselves as 'smart' and substantially invest in maintaining this image.