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Challenges for a broadband service strategy in rural areas: A Romanian case study

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ABSTRACT

Broadband network deployment plays an important part in the strategic policies in Europe to promote growth and innovation in all sectors of the economy in addition to social and territorial cohesion. In compliance with existing community policies, Romanian strategies in this field seek to provide the necessary support for broadband connectivity in rural areas. The goal of this study is to define a rural end-user profile to plan the most appropriate broadband service strategy from both a technical and a marketing perspective. Our empirical research involves an exploratory survey conducted in rural areas in northwestern Romania ($n=1040$ respondents). The findings reveal low levels of customer satisfaction and users more interested in data transfer than voice or video applications. Given this rural user profile, simulations of network traffic were conducted. The simulation results suggest that WLANs are the most suitable solution for the "last mile" broadband segment.

1. Introduction

The Digital Agenda for Europe (DAE, 2010), a key initiative of the EU's Europe 2020 strategy (OJEU, 2013), acknowledges the socio-economic benefits provided by broadband connectivity in terms of increasing competitiveness and innovation and providing job opportunities and economic growth, thereby attracting internal investment and preventing the relocation of economic activity. By adapting the National Broadband Strategy (NBS) 2009–2015 to the DAE's requirements, the Ministry of Communications and Information Society (MCIS), in collaboration with the National Authority for Management and Regulation in Communications of Romania (ANCOM), approved various pieces of legislation intended to provide the legal framework (HG444/2009, 2009) for providing state support for the development of broadband networks through public intervention (RoNet, 2011). The motivation for defining a service strategy for broadband connectivity in rural northwestern Romania is deeply rooted in this context. The existing broadband network infrastructures in the Romanian rural areas reveal a low level of broadband penetration with many "white areas", where no broadband coverage is available.

The main objective of this study is to guide broadband service providers in selecting the most efficient service strategy while meeting the rural user's needs. This study is, to the best of our knowledge, the first attempt to define a broadband user

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profile in rural Romania. We believe the profile can be extended to other east European countries with similar development patterns. *The originality of this study* resides in the development of an integrated broadband service strategy within the framework of the NBS for rural areas in Romania that addresses both technical and marketing considerations.

The research was conducted using two methods: a survey for exploratory and descriptive research and simulations to evaluate the service performance of various broadband technologies. The study included the following steps:

- build a comprehensive understanding of European broadband markets and broadband strategies;
- determine the level of adoption of broadband in Romania in the European context (market situation, strategies set forth by governmental policies);
- develop a profile of rural broadband users (connection type, access speed, service type, consumer behavior, demographical aspects);
- assess the satisfaction of broadband users with provider marketing mix in the rural areas;
- propose suitable technologies for local-loop infrastructure based on the rural user profile and the NBS.

The remainder of the paper is organized as follows. Section 2 comprises a literature review of several broadband service strategies and Romanian broadband network deployment in the European context. Section 3 describes the methodology for the exploratory research and findings. Based on these findings, Section 4 proposes several technical solutions for providing last-mile broadband connectivity in rural areas. Finally, Section 5 concludes with a summary and outlines possible implications of the study.

2. Broadband network deployment overview

The Global Competitiveness Report 2012–2013 reaffirms the positive correlation existing between leadership status in broadband connections and innovation-based economies (Klaus & Sala-i-Martin, 2013). Planning an appropriate and effective service strategy can be a challenge, even in a developed country. One of the first conclusions drawn from this report is that the socio-economic development of a country is closely linked to the quality of the available broadband connection.

Other studies have shown that there are a number of geographical patterns in broadband adoption, with urban areas being more likely than rural ones to adopt broadband services (Bell, Reddy, & Rainie, 2004; Horrigan & Murray, 2006). Rural consumers are characterized by low income, out-migration, few opportunities for improving their economic status and a lack of transportation, healthcare services, education and information regarding government policies. Several researchers (LaRose, Gregg, Strover, Straubhaar, & Carpenter, 2007) found a paradox in the US rural markets: despite the availability of broadband infrastructure, usage has lagged behind that of urban areas. According to the Cisco Broadband Quality Study, Romania ranks 10th in the world in Internet connection speeds (Cisco, 2010). Nevertheless, gaps in radio coverage and broadband services remain within the country, with rural regions being particularly affected (RoNet, 2011). Thus, a second conclusion is that infrastructure availability and high connection speeds do not necessarily guarantee broadband use.

Many studies have emphasized the existing differences in broadband diffusion across countries and the main factors that affect it, including economic, technological, socio-demographic and political/legal factors (Andres, Cuberes, Diouf, & Serebrisky, 2010; Dwivedi, Papazafeiropoulou, & Choudrie, 2008; Ferreruela, 2008; Ford, Koutsky, & Spiwak, 2008). Empirical findings have demonstrated the existence of a positive relationship between a provider's marketing orientation and its performance in the European telecommunication industry (Kurtinaitienė, 2005). Consequently, to achieve our goal, a third conclusion that can be drawn is that the marketing macro-environment must be assessed to create effective marketing strategies. Therefore, *the motivation for our work* lies in the fact that there are no empirical studies that provide data on the effectiveness of various broadband service strategies in a rural marketing environment from an eastern European perspective. This aspect remains unexplored.

2.1. The Romanian broadband market in the European context

The DAE stresses that all of the member states must have an operational broadband plan and a realistic set of policies for meeting the broadband targets in the Europe 2020 strategy (DAE, 2010). The anticipated outcomes of this strategy are to have basic broadband connectivity for all Europeans by 2013 with a connection speed of at least 30 Mbps for all users and at least 100 Mbps for at least 50% of all households by 2020. The development of the broadband market is evaluated using penetration, coverage, speed and price as the criteria.

In 2010, according to (RoNet, 2011), the fixed broadband penetration rate in the EU27 reached 26.5%. However, Romania ranked last with a penetration rate of only 13.7%. The slow evolution of broadband services in Romania could be explained by the late launch of DSL (at the end of 2005), the limited number of PCs (only 35% of households own a PC), the low coverage of broadband infrastructure (30% of the population lives in cities without broadband access) and a low per capita income, especially in rural areas (Eurostat, 2011a).

The total fixed broadband coverage rate in the EU27 has reached 95% of the total population. Only 6 member states have achieved full coverage. At 82%, Romania is ranked the 2nd lowest, above Poland. Across the EU27, the fixed broadband