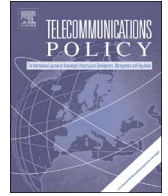


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Infrastructure investment on the margins of the market: The role of niche infrastructure providers in the UK

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ABSTRACT

Across Europe, policymakers and market forces are striving to deploy next generation access (NGA) networks and ensure ubiquitous access to superfast broadband services. Due to scale economies and sunk costs, the roll-out of NGA is expected to be profitable only for large-scale providers and in densely populated areas. Nonetheless, alternative providers, such as utilities and local communities, have significantly contributed to NGA diffusion in many countries. Over the past five years, several small-scale initiatives have emerged in the UK, bringing fibre networks to urban and rural areas previously overlooked by either commercial or subsidised deployments. A multiple case study approach is employed here to explore the nature and the drivers of niche providers in the UK NGA market. All these initiatives are demand-driven and to follow a modular approach. Despite adopting different business models, they all rely on the resources inherited from past broadband initiatives and relationships with local partners. By investigating the strategies of niche providers in NGA market, this analysis sheds light on their contribution to bridging the digital divide in the UK and is presented as a preliminary assessment of their sustainability and potential growth.

1. Introduction

The considerable opportunities of digitisation require an infrastructure capable of providing faster and more reliable connections (Broadband Commission, 2015). Basic broadband¹ is no longer sufficient to support the rising consumption of data and to satisfy the increasing hunger for bandwidth (Ericsson, 2013). However, in 2016, 26% of the European premises were unable to access either superfast² or ultrafast³ broadband (EC, 2017). With 72% of premises unserved by next generation access (NGA)⁴ networks (EC, 2016), rural areas are the most likely to be digitally divided (Townsend, Sathiaseelan, Fairhurst, & Wallace, 2013).

As a consequence, public authorities are increasingly committed to promote the development of NGA networks, as only the interplay between public and private operators is expected to provide the optimal level of coverage and speed (Falch & Henten, 2010; ITU, 2012). Nonetheless, the potential contribution of other organisations, such as utilities and local communities, has been highlighted due to their historic role in supporting broadband development (Analysis Mason, 2011; Mölleryd, 2015; Ragoobar,

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¹ Basic broadband provides a download speed between 2 and 30Mbit/s and is delivered through DSL on copper wires.

² In this paper we adopt Ofcom's definition of superfast broadband, namely, providing a download speed of 30Mbit/s or higher. The UK government, instead, defines superfast broadband as providing a minimum download speed of 24Mbit/s.

³ According to Ofcom's definition, ultrafast broadband delivers a download speed of 300Mbit/s or higher.

⁴ NGA networks deliver superfast or ultrafast broadband through a mix of copper and fibre (FTTC, fibre to the cabinet) or end-to-end fibre connections (FTTH/P, fibre to the home or premise).

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Whalley, & Harle, 2011).

The development of NGA in the United Kingdom exemplifies how the interaction between public and private parties in broadband market has evolved over the past twenty years. The focus of public intervention shifted from access regulation (Nardotto et al., 2015; Ruhle, Brusica, Kittl, & Ehrler, 2011) to the subsidisation of NGA investment (DCMS, 2011). The combination of private investment and public subsidies is expected to deliver superfast broadband to 95% of UK premises by 2017 (Hirst & Sutherland, 2015). In this context, though, numerous small-scale infrastructure providers have emerged across the UK to build fibre networks in underserved rural and urban areas (PRISM, 2014).

Such initiatives are increasingly drawing the interest of policymakers and practitioners because of their potential contribution to NGA diffusion in the UK (Ofcom, 2015b). Accordingly, this paper explores the nature and the strategies of these new infrastructure providers, to shed light on their implications for NGA development and their interaction with public and private initiatives. With this in mind, Section 2 reviews the literature on the drivers of broadband investment and, in particular, the role of alternative providers, while Section 3 investigates the rationales for these initiatives. The methodology is outlined in Section 4. Section 5 presents the four case studies, which are compared and discussed in Section 6. Concluding remarks are made and policy recommendations suggested in Section 7.

2. A theoretical framework for broadband development

A considerable amount of research has explored the factors affecting the development of broadband access networks (Avenali, Matteucci, & Reverberi, 2010; Grubescic & Murray, 2004; NESTA, 2015). NGA investment is expected to be viable only for a limited number of large-scale operators (Elixmann, Ilic, Neumann, & Plückebaum, 2008) focusing on the most densely populated areas (Grubescic, 2008). However, the incumbents might have an incentive to delay their investment unless they are exposed to the competitive pressure of other infrastructure providers such as cable operators (Briglaue & Gugler, 2013).

Due to this lack of competition and the externalities typical of network industries, a market failure exists in the provision of NGA networks (Gómez-Barroso & Pérez-Martínez, 2005). As a result, both incumbents and their competitors tend to invest only in urban areas, as the scale economies in network roll-out are a major deterrent to private investment outside cities (Glass & Stefanova, 2012). Rural areas can even experience an internal digital divide due to the excessive costs of connecting geographically dispersed premises (Rendon Schneir & Xiong, 2016). Where the market fails to provide universal access to broadband, public intervention is expected to complement private investment (Cave & Martin, 2010) through a variety of measures, such as access, regulation, demand aggregation or financial subsidies (Frieden, 2013; Gillett, Lehr, & Osorio, 2004).

Consistently, extant literature generally frames the development of NGA networks as relying upon the interplay between public and private players (Falch & Henten, 2010; Gomez-Barroso & Feijoo, 2010). However, often crucial has been the contribution of third-party players, that are alternatives to both telecommunications companies and public organisations (Tadayoni & Sigurðsson, 2007). Since the early 2000s, utilities, communities of end-users and private investors such as property developers have actively promoted the roll-out of fibre networks often focusing on small-scale projects (Nucciarelli, Sadowski, & Achard, 2010; Ragoobar et al., 2011; Salemink & Bosworth, 2014). The characteristics and strategies of these alternative providers are discussed, albeit briefly, in the following three sub-sections.

2.1. Utilities

Since the telecommunications market was liberalised, utilities have provided long-distance and access networks (Falch & Henten, 2008), either through vertically integrated subsidiaries or in partnership with retail ISPs (FTTH Council Europe, 2015). Their entry into the broadband market has been mainly driven by the synergies existing in the roll-out and management of networks (Tadayoni & Sigurðsson, 2007): utilities could leverage their large customer base and reuse existing infrastructures to significantly reduce the costs of NGA deployment (Angelou & Economides, 2013; Gillett, Lehr, & Osorio, 2006). Public ownership has been another driver of the involvement of local utilities in the broadband market (Trousos & Maglaris, 2011), but also private companies, such as Dong in Denmark, have invested in NGA (Mölleryd, 2015).

Overall, the entry of utilities has been assessed positively as an enabler of investment and competition in broadband market (Ford, 2007; Trousos & Maglaris, 2011). However, their actual contribution to NGA diffusion has varied widely across developed countries. In the UK, their role has been negligible and scarcely successful, allegedly because of the limited involvement of public authorities in utility sectors (Ragoobar et al., 2011). More broadly, their influence has diminished over time across Europe, after most of their networks have been acquired by telecommunications companies.⁵ Nevertheless, new projects involving utilities have been recently announced,⁶ thereby suggesting that their involvement should be reconsidered in future.

2.2. Community networks⁷

Initially aimed at building cooperative Wi-Fi networks (Sandvig, 2004), community-led initiatives have also been undertaken in

⁵ For example, the Danish incumbent acquired the FTTH networks deployed by Dong and other power utilities.

⁶ For example, Enel has started the roll-out of FTTB in 224 Italian cities.

⁷ Community networks may indicate infrastructure deployed and financed by either local authorities or groups of end-users. In this paper, we adopt the latter definition.

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