**Abstract**

Community-led broadband initiatives represent a relatively recent shift in rural broadband provision. They are locally-led organisations that voluntarily spring up to respond to the lack, or perceived lack, of adequate broadband in their communities. Particularly present in rural spaces, few studies have investigated this mode of broadband delivery, which is gaining attention in the United Kingdom and internationally. This paper seeks to explore the implications of the participatory nature of such broadband initiatives, identifying a) whether pursuing a participatory community-led model for broadband deployment plays a role in enhancing rural social resilience, and b) specifically how leadership and informal digital champions are positioned and perceived throughout this process, and their relationship with rural social resilience. The conceptual framework of 'social resilience' acts as a contemporary analytical tool for understanding the impact of community-led broadband. Using findings from 56 semi-structured interviews across two phases from two community-led broadband organisations, Broadband for the Rural North (B4RN) in England and Broadband for Glencaple and Lowther (B4GAL) in Scotland, this paper contributes to both digital scholarship and the theoretical development of 'resilience' as a concept.

Community-led broadband is shown to reflect a 'localism' development approach, and this process has strengthened local rural identity for individuals. The role of digital champions, as leaders in the community-led broadband movement, is key to developing the digital resource within rural communities. However, it can also be problematic, entrenching existing inequalities and feelings concerning exclusion, ultimately detracting from individuals' ability to participate. The process and the eventual presence of new technology have contributed to new spatial understandings of community identity, based on regional linkages, and new communities of interest. We conclude that community-led broadband, and in particular the leadership and participation processes, can contribute to social resilience overall, but ultimately is another example of uneven rural development.

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# 1.    Introduction

In 2010, the UK government announced its ambition "to have the best superfast broadband network and connected society in Europe by 2015" (BIS, 2010, p. 13). Superfast broadband services (Internet connections with line-speeds of at least thirty megabits per second as defined by Ofcom, 2013b) are often beneficially associated with individuals' social activities, employment options, and overall community resilience (DCMS, 2011; Grimes, 2003; Ofcom, 2012b). The government commitment to superfast broadband connectivity was further cemented in a 2015 strategy on digital communications infrastructure: to make broadband of at least 100 megabits per second (Mbit/s) available to 'nearly all UK premises' (HM Treasury and DCMS, 2015). However, from a spatial perspective, it is broadly acknowledged that households in rural areas of the UK remain less likely to have access to superfast broadband than their urban counterparts, even with these ambitious nationwide policies (e.g. Reisdorf and Oostveen, 2015). For example, as of 2012, the start of this research, the Office of Communications (Ofcom) reported that 65 percent of premises have access to superfast broadband in the total of the UK. However, rural coverage was limited to 19 percent (Ofcom, 2012a). This decreases the likelihood of broadband access and/or use having an impact on the development of rural social resilience.

The market-led, neoliberal approach of the telecommunications industry has traditionally neglected rural broadband infrastructure development due to its lack of commercial viability, contributing to this imbalance (Simpson, 2010; Sutherland, 2015). Urban coverage, conversely, is relatively stable and continuously being improved. This is primarily because superfast broadband roll out is cheaper to deploy in higher density areas and has been prioritised by a telecommunications industry structured within the principles of neoliberalism (Briglauer and Gugler, 2013; Ofcom, 2013a; Simpson, 2010; Skerratt, 2010). Public intervention, primarily structured as national subsidies such as Broadband Delivery UK (BDUK), is active across the UK to respond to this rural market failure and decrease the related spatial 'digital divide'. Complementing these subsidies are community-led broadband initiatives. These are locally based grassroots initiatives being developed to deliver broadband solutions to rural areas as a response to these prevalent market forces in the UK. Buneman and Hughes (2013, p. 1) noted that "There is a quiet revolution that is taking place in the provision of rural broadband. An increasing number of communities are building their own distribution networks…". However, these 'community-led' superfast broadband initiatives have not been considered in detail within the context of wider community development processes. The concept of social resilience provides a relevant and useful analytical method to understand the varied, but relevant, individual and community impacts of community-led superfast broadband initiatives.

Social resilience has increasingly been the subject of contemporary social research, both as a theory and an application for community-based enquiry (see Skerratt, 2013; Davidson, 2010; Magis, 2010; Adger, 2000). Community participation and leadership are understood theoretically to play significant roles in resilience (see Norris, et al., 2008; Pfefferbaum, et al., 2005) and the general dialogue of community participation and leadership, particularly within the rural setting, has been extensively studied and reviewed (see, for example, Beer, 2014; Dinh, et al., 2014; Torgerson and Edwards, 2013; Skerratt, 2011; Woods, 2005, 2011). This paper seeks to enhance this dialogue and specifically unpack the dynamics of participation and leadership in relation to social resilience using case studies of community-led broadband. We question a) whether pursuing a participatory community-led model for broadband deployment plays a role in enhancing resilience and b) specifically how leadership and informal digital champions are positioned and perceived throughout this process, and their relationship with resilience. These questions serve to further our understanding of community-led broadband processes in contemporary digital society.

We outline, first, past resilience research, culminating in the identification of main dimensions of resilience for analysis. We then briefly summarise the place for community-led approaches in broadband deployment in the UK, setting the digital policy and broadband development context. Following this, the qualitative methods used in setting out the resilience framework will be outlined,

establishing the research methodology. Finally, we will examine the findings, illustrating a snapshot of rural processes relating to broadband deployment, and linking the roles of participation and leadership with resilience thinking.

## 2.    Developing a resilience framework through theory and practice

Officially named *Time* magazine's buzzword of the year in 2013 (Brown, 2014), 'resilience' has become an increasingly popular term in both academic and policy literature as well as popular media. Definitions of resilience are highly dependent on academic discipline, authorship and audience and are constantly evolving, even in independent fields. Ecologically, resilience refers to the development of ecosystems and their ability to absorb changes and maintain structure in times of disturbance (Holling, 1973). These traits also describe resilience in the context of physical materials (Gordon, 1978). Psychological resilience provides parallel lessons concerning resilience as a social process, and highlights the centrality of human agency and decision-making (Skerratt, 2013). Thus, the complexity of the term 'resilience', coupled with the wide range of potential uses, poses challenges to using it as a framework of social systems (Walker *et al*., 2004). This section builds our understanding of social resilience and contextualises the current literature in order to address it as a framework for social science research. We will place resilience in the context of its scalability, and the most relevant critiques of the concept. The resultant conceptual framework of social resilience captures three dimensions of resilience including the availability and development of capitals, the ability to proactively engage and exercise human agency, and place-based characteristics such as previous community engagement and community memory, which we term 'sense of place'.

Resilience, as a technical term, is generally understood to have originated in the 1970s from work done by Holling (1973) in ecology (Scott, 2013; Skerratt, 2013), as the development of ecosystems and their ability to absorb changes and maintain structures in times of disturbance, referred to as their ability to 'bounce back' (Adger, 2000). However, as the concept has become increasingly used and developed in the social sciences, recent literature, using both theoretical and applied approaches, argues for an evolution of the theory of resilience when applied in the social context.

Ideas of resilience at a community level have been developed to exemplify "opportunities that disturbance opens up in terms of recombination of evolved structures and processes, renewal of the system and emergence of new trajectories" (Folke, 2006, p. 259). This emphasises adaptive capacity building and generates a dynamic interplay between sustaining, and developing or transforming, *with* change. It is also demonstrated that "…community resilience takes us beyond making plans for a disaster, to building strengths in a community that will facilitate the process of resilience when needed" (Sherrieb, et al., 2010). Scott (2013) outlines 'evolutionary' resilience, where resilience acts as a 'bounce forward' mechanism, a transformative process. It reflects not only the capacities, or resources, of a community, but also the decisions and actions of the individuals within it, drawing on psychology of personal health literature (Berkes and Ross, 2013; Skerratt, 2013). This also perhaps draws on ecological models for human development, also discussed in psychology, which identifies the relationships between individuals and their communities (of family, peers, school, culture and so on) and how those factors can influence human development (Bronfenbrenner, 1994). Therefore building community resilience includes overlapping social and physical resources at various, nested scales (McManus, et al., 2013; Maguire and Cartwright, 2010). This is often directly discussed in terms of a capitals framework, incorporating social, economic, and environmental capitals (Steiner and Atterton, 2014). Graugaard (2012), for example, examined local currency as a tool for community resilience, emphasising how different elements of capitals could contribute to resilience in intersecting ways. Therefore, it is our belief that capitals and resources within communities play a central role in resilience development, and form our first 'dimension' of resilience.

A key critique of the resilience theory brings us to our second 'dimension' of resilience. This is related to ideas of vulnerability and resilience, and queries social resilience with respect to its relationships

with power (e.g. Armitage *et al.*, 2012; Cote and Nightingale, 2012; Keck and Sakdapolrak, 2013; Walsh-Dilley *et al.* 2013). Social resilience can be political, with authorities exerting control over resilience building (MacKinnon and Derickson, 2012; Pike et al., 2010). MacKinnon and Derickson (2013) state that an ecological underpinning of resilience, coming from a largely apolitical field, favours existing social structures which can be shaped by unequal power relations and injustice, but closes off wider questions of progressive social change which require interference with, and transformation of, established systems. Raco and Street (2012), for example, in their study of resilience planning in London and Hong Kong found that discourses of resilience reflected specific politics despite their outward appearance as neutral. Walsh-Dilley *et al.* (2013) argue that frequently, in past use of resilience in a social context, the research has failed to consider or incorporate relations of power in society. They state that its failure is on two levels: 1) that it ignores or diverts attention away from the cause of the vulnerability to the shock, and 2) that it does not question the normative valence of resilience. Brown (2014) also highlights that resilience has been depoliticised and does not take into account institutions within which practices are embedded. Lorenz (2010) identifies that power dynamics can potentially lead to uneven participative capacity due to factors including role systems, education, and the existence of strong or weak ties in social networks.

We argue that developing and building social resilience is political, and non-neutral, and there are authorities and institutions exerting control over social dynamics. Therefore, when conducting research using concepts of resilience, power dimensions should be incorporated into the conceptual understanding of resilience. The sum of these works emphasise the need to be explicit and to better articulate the role of values when discussing resilience of what, and for whom (Armitage *et al.*, 2012).

Davidson's work (2010) succinctly addresses such criticisms to argue for the inclusion of 'agency' in the evolution of resilience thinking, defined as the ability of humans to anticipate, strategise and act collectively or individually. As an extension of this argument, we highlight empowerment as an integral part of resilience (see Norris et al., 2008), providing individuals and communities with the power to reshape the actions affecting their own lives through participation and leadership: that is, harnessing human agency. Whilst the concept of empowerment can be considered equally complex and has been discussed extensively across academic literature (see, for example, McLaughlin, 2016), a full review of this concept is outside the scope of this paper. However, its discussion within the resilience concept is inextricably linked to the inclusion of agency. It is "…an important component of the concept of resilience because, in order to develop community resilience, community members have to be able to actively engage…empowered communities, as suggested, are more likely to possess the ability to anticipate, and adapt to, stresses and changes…" (Skerratt and Steiner 2013, p. 326).This strand of thought also chimes with work in leadership literature: as Skerratt (2011) discusses in the rural leadership context, "within rural development, there is an increasing normative shift from development in rural communities towards development *with* communities…In such research, the analytical microscope focuses on attributes of communities: their capacity, capitals and assets" (p. 88, emphasis added). Therefore, from these strands of discussion around agency and empowerment, we argue for greater attention to leadership and participation processes in resilience research. We place our research as a starting point to investigate these aspects in a more detailed manner. As Norris et al. (2008) state, "empowered community settings are characterised by inspired, committed leadership and by opportunities for members to play meaningful roles" (p. 139). Multi-level participation is therefore a *fundamental* element of resilience (see also Robinson and Berkes, 2011; Pfefferbaum et al., 2005).

We argue that through identifying 'human agency' as central to the concept of social resilience, it can be distinguished from the physical resilience frameworks (Davidson, 2010; Norris *et al.*, 2008). This paper seeks to address power relations by bringing 'agency' into our understanding of resilience as our second 'dimension' of resilience.

Whilst the role of 'agency' has been central to recent critical debates on social resilience, these debates have also identified that social resilience must be understood or analysed within 'place' (e.g. Lyon, 2014). This brings us to our third 'dimension'. Shared values, and in some cases shared experiences, are thought to engender more community participation to contribute to resilience, and people-place relationships are considered exceedingly relevant to community resilience (Berkes and Ross, 2013; Butler *et al.* 2007; Pfefferbaum *et al.*, 2005; Sonn and Fisher, 1998). Lyon (2014) asserts that 'place' can shape people's adaptive responses, and therefore must sit centrally to properly engage with social resilience. Berkes and Ross (2013), for example, identify specifically 'community' infrastructure as a component to resilience building. Sense of community belonging (McManus *et al.*, 2012) in farming communities was strongly linked to the ability of a community to react and transform through change. Wilson (2013), in his discussion of resilience following the Christchurch (New Zealand) earthquakes in 2010 and 2011, similarly identified 'social memory', the accumulated wisdom, knowledge, skills and experiences. He found that within a community this social memory was integral to building successful pathways of resilience. Development does not always follow a single path, but rather multiple pathways, an often long-term, adaptive capacity building approach (Poortinga, 2012; Wilson, 2012). We consider this 'sense of place' as integral to resilience thinking, particularly as it relates and influences individual participation. Therefore, it becomes our third 'dimension'.

Social resilience as we frame it, looking primarily at the individual and community scale, is then part of the evolving nature of evaluating community growth and transformation. As a concept, social resilience is cognisant of neoliberal policy agendas that often relegate development to the communities themselves and emphasise the 'hyper-local' (MacLeod and Emejulu, 2014). We frame social resilience as a multi-dimensional construct, where 'resilience' is a state of being, and 'becoming more resilient' is a proactive process of developing capacities at both the individual and community scale, reflecting local and extra-local interactions. It emphasises transformation or path creation in response to disturbances, whereby development does not follow a single path, but rather multiple pathways (Wilson, 2012).

Whilst many definitions exist, an appropriate and widespread definition of community-based resilience is from Magis (2010), who stated that community resilience is "existence, development and engagement of community resources by community members to thrive in an environment characterised by change, uncertainty, unpredictability and surprise" (p. 402). As an extension of this, we also take a similar view to Berkes and Ross (2016) who summarised that "Resilience thinking needs to engage more thoroughly with the accumulated insights of other disciplines, by identifying concepts such as social capital, agency and power…" (p. 186). This is where we situate our research on resilience.

With its focus on processes, resilience is a beneficial concept for ongoing community practices such as broadband delivery. At the core of our conceptual framework of social resilience sits equal attention to dimensions of resilience as developed in this section, including the availability and development of capitals, the ability to proactively engage and exercise human agency, and place- based characteristics such as social memory and previous community engagement, termed 'sense of place'. Figure 1 depicts these dimensions.

These are all understood as multi-scalar, and can be nested within each other (Berkes and Ross, 2016). This nested, multi-scalar feature of resilience is particularly reflective of ecological models of human development, discussed in brief above. This paper queries these three facets of resilience and seeks to enhance our understanding, specifically of the influence of participation and leadership in community-led broadband organisations on resilience of those individuals and communities. Community participation and leadership are understood theoretically to play significant roles in resilience (e.g. Berkes and Ross, 2013; Pfefferbaum *et al.*, 2005), and this paper seeks to better understand those

components in a rural-digital setting. We will now outline the growth of community-led broadband in technology policy and deployment, signifying the digital domain for this resilience analysis.

## 3. Broadband deployment: a place for community-led approaches

In order to explore these aspects of resilience in the context of a digital society, we focus on broadband deployment in rural UK. The provision of broadband connections in rural UK is a significant topic for research; in spite of the commonly held understanding that rural economy and society are enhanced by the inclusion of information communication technologies and the Internet (see Clayton and MacDonald, 2013; DCMS, 2010), rural communities are rarely at the forefront of next generation technology. Broadband provision is often aggravated by a lack of market presence due to smaller and more dispersed populations, and physical geography challenges, such as distance from exchanges, backhaul access points and fewer street cabinets (Fortunato, et al., 2013; Townsend, et al., 2015; Skerratt, et al., 2012). In an effort to combat the inequalities that commercial avenues create between urban and rural fixed-line provision (see Briglauer and Gugler, 2013; Ofcom, 2013b; Townsend et al., 2013; Skerratt, 2010; Prieger, 2007), policy frameworks are shifting to include government intervention for increased broadband access. At the European Union level, the Digital Agenda for Europe (DAE) (European Commission, 2010) broadly advocates for broadband access and education. Nationally, *Digital Britain 2009* represented an initial step towards achieving universal access across the UK (BIS, 2009) and *Britain's Superfast Future 2010* lays out the UK's priorities for network development, focusing mainly on superfast broadband to spur economic growth and innovation (DCMS, 2010). This includes a focus on Fibre-to-the-home or cabinet (FTTH or FTTC) options, rather than traditional copper cabling.

Community-led broadband initiatives are increasingly present in this rural digital landscape. They are identified as pioneering communities, often with informal digital champions, or leaders, which have chosen to tackle the lack of broadband in rural areas 'head-on', developing locally-based broadband infrastructure and/or services (Carnegie UK Trust, 2012). Community-led initiatives may involve focusing on one area of digital support, or stimulating demand within a community to attract better services from the private sector, or they may include engaging in local authority-led plans. Finally community-led initiatives can also represent a complete Internet infrastructure development process, from identifying funding, network mapping, and running the service as a community Internet Service Provider (ISP) (Carnegie UK Trust, 2012). Current live examples of community-run broadband service providers include Cybermoor, Ltd., in Cumbria, England[1], Lothian Broadband, in East Lothian, Scotland[2], OnsNet from the Netherlands[3] and the Olds Institute, in Olds, Alberta, Canada[4]. Some UK policy initiatives have sought to support such endeavours through knowledge exchange and small funding opportunities including Community Broadband Scotland (Digital Scotland, 2013) and the Rural Community Broadband Fund (DCMS, 2011).

Whilst each community initiative may take a slightly different path, we have developed an outline guide that demonstrates the main processes of community-led broadband. This is depicted in Figure 2.

Past research from a community perspective in general has begun to elucidate the potential for community broadband to enhance communities in two ways: overall social wellbeing and economic development. O'Donnell et al. (2007), for example, investigated the use of community-based organisations in First Nations communities in Canada to support videoconferencing and found that this allowed individuals to share stories within and outside of the existing communities, fostering community development. Jackson and Gordon (2011) similarly found that community broadband

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[1] See http://www.cybermoor.org/.
[2] See http://lothian broadband.coop/.
[3] See http://www.onsbrabantnet.nl/.
[4] See http://www.o-net.ca/.

organisations were an opportunity for localised economic development, but many challenges from higher up levels (funding bodies, bureaucratic requirements) limited their success. More recently, work by Salemink and Bosworth (2014) identified community-led broadband as a potential model for neo-endogenous development, whilst Wallace *et al*. (2015) examined community-led broadband initiatives in terms of their organisation, identifying common skills and resources that are necessary for those community initiatives to be successful. This has begun to reflect the processes that community-led broadband organisation must navigate, something that has, "little research-based guidance available on the core issues and challenges that must be addressed by a community during the process…" (Mandviwalla et al., 2008). These processes, and the way they may be engaged in by communities, together with potential barriers to engagement, form the focus of this paper.

This study provides an in-depth account of the participation and leadership processes surrounding community-led broadband development and installation in two case studies. Research into community-led broadband practices, as a current and novel method of broadband Internet deployment, is posited to be highly useful and relevant to policymakers, Internet service providers and other rural communities faced with poor broadband. Broadband, as a relatively recent phenomenon, can be beneficially examined through the use of a theoretical resilience framework, which draws on the developed history of social and ecological theory. Within this paper, we will query the complex influence of such participatory technology developments, adding to both digital and resilience scholarship.

## 4.      Research Methods

This paper considers two rural community-led superfast broadband initiatives in the UK: Broadband for the Rural North (B4RN) in England and Broadband for Glencaple and Lowther (B4GAL) in Scotland. Both these initiatives embody a not-for-profit business model whilst mapping and installing their own superfast, fibre-optic cable, broadband networks, representing a locally-based solution to achieving superfast broadband. The schedule for national broadband rollout did not include plans for reaching their communities in any foreseeable future, and any development through such avenues was thought to take too long, ultimately leading to their formation (see B4GAL Community Broadband, 2014; Forde, 2013). Figure 3 depicts their location.

B4RN has a mixture of rural towns and hamlets, covering a total area of approximately $420km^2$ with a population of 13,193. It is an economically active population with a high percentage of self-employed individuals, low deprivation and a large retired population.  B4GAL is more sparsely populated, with an approximate area of $499km^2$ and a population of 2,220, has a high percentage of self-employed individuals and those that work from home, an evenly mixed workforce employed in a range of sectors including retailing, specialist consulting and agriculture, medium level deprivation, and a similarly large retired cohort. Both areas have relatively slow broadband access at the time of the study (an average of 4.22Mbit/s in B4RN and 3.68Mbit/s in B4GAL, compared to the average UK speed of 12.49Mbit/s[5]), and unreliable broadband access, and both are pursuing a superfast FTTH network.

The scope of both B4RN and B4GAL is aligned with what Gaved and Mulholland (2010) term a 'cooperative' from their initial review of community Internet projects: B4RN and B4GAL both identify with a *specific geography* and are attempting to engage with the *majority of the population*, yet they operate more regionally than Gaved and Mulholland (2010) initially discuss for a 'cooperative'. This reflects perhaps the extended mass required to be viable as a broadband service provider in the modern superfast telecommunications market. Put more theoretically, B4RN as an project appears to embody an 'activist' approach, a response established through stressing the unfairness of market and governmental positions (which tend towards a neoliberal approach, leaving

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[5] Ofcom (2012a, 2012b)

rural areas behind with regards to broadband access) (Salemink and Bosworth, 2014). This is highlighted in B4RN's rationale for a community-centric approach, their overall business plan and the self-digging process. Although B4GAL is less developed, it embodies a combination of an activist response and also what Salemink and Bosworth (2014) call a 'dialogue' or negotiation response. This means that B4GAL acknowledges this unfairness of the market, but have sought to create external market and government connections to enhance their development, interacting with other groups like B4RN, as well as developing partnerships with government entities including Community Broadband Scotland (CBS). B4RN and B4GAL, ultimately, are utilising different funding and construction models, and embodying diverse theoretical approaches for broadband development. These characteristics will enable a relevant comparison of the research findings in order to shed light on the myriad of community-led superfast broadband pathways and their relationship with social resilience.

*4.1 Sampling*
This research was undertaken during two distinct phases. The first (Phase I) was a pre-connectivity phase in the summer of 2012 and the spring of 2013 as the two initiatives, B4RN and B4GAL, were in the initial stages of developing their broadband networks and signing up customers but had not yet rolled-out the service. In keeping with much case study methodology, a partnership was created with both the B4RN and B4GAL management teams to identify and seek out respondents through emails and word of mouth advertising. In essence they acted as 'gatekeepers' to respondents (Cresswell, 2013). Local print media were also contacted, with a press release calling for respondents. Posters were also put up on local bulletin boards, and we utilised social media such as Twitter and Facebook. Current users and non-users of the Internet (both members of the public and business users) were targeted, as well as those not taking up the respective services, to better represent broad opinions. 36 individuals were interviewed in total. In the B4RN case study there were 25 respondents (18 users, 6 leaders within the initiative, and 1 policymaker) and in the B4GAL case study there were 11 respondents (8 users and 3 leaders).

The second phase (Phase II) was conducted as an analysis of the 'post-installation' atmosphere within B4RN and B4GAL, to develop an in-depth understanding of the outcomes of the community-led approach to broadband provision. We sought to engage with the same participants to create a continuous narrative. Between Phase I and Phase II data collection, the B4RN case study was successful in installing their superfast broadband network. However, the B4GAL case study was unable to overcome a multitude of challenges and remains, to date, in the planning stage for a superfast broadband network. As of spring 2015, B4GAL has successfully gained approval from the Scottish Government to build a broadband network within a smaller area than their original intended plan but installation had not yet begun. This difference has highlighted the complex interdependencies within broadband provision. Ultimately, 20 semi-structured Phase II post-installation interviews were conducted (a follow-up rate of approximately 55% of Phase I interviewees). Of the Phase I interviewees (25 in B4RN and 11 in B4GAL), 16 did not take part in a Phase II interview. Within the B4RN case study, 9 interviewees from Phase I did not participate in Phase II. Approximately 2 had provided no contact information (had been snowballed from a gatekeeper), 2 had invalid contact information, and 5 did not respond to repeated requests for information. In the B4GAL case study, 6 did not take part. Of those 6, 2 had expressed interest for a Phase II interview, but did not respond to repeated communication to identify an appropriate time, and the remaining 4 did not respond to any request for information.

The interview sample broadly reflects the socio-economic profile of each case study. Nevertheless, given the purposive nature, and snowball and gatekeeper approach to interview sampling, the distributions described cannot claim statistical significance with regards to the B4RN and B4GAL regions. This sampling process sought to identify representation across each of the case studies, rather than focusing on one village within B4RN or B4GAL, for example. We also did not take into account

gender when selecting participants, meaning that we could not make any assumptions with regards to gender differences in technology use and influence. Within B4RN, we obtained participants across the region, with a concentration in the larger villages and several outliers representing the more remote, rural spaces. Within B4GAL, an attempt was made to interview people across the nine villages that made up its scope, with participants from six being obtained. This location information for both B4RN and B4GAL has not been disclosed in detail due to the potential loss of anonymity for participants. This multivariate sample was carefully compiled so as to capture individuals who would be able to engage with and respond to our research questions.

All respondents were assigned a number to ensure anonymity and as such each quote in Section 5 is attributed to B4RN or B4GAL 1, 2 and so on.

*4.2 Interviews*

In-depth semi-structured qualitative interviews were conducted, targeting two perspectives: the user perspective and the governance or organisational perspective (the leadership). Within the user perspective, business and personal users were identified and interviewed, as well as various adopter types (from keen adopters to non-adopters). In order to best understand the community-led approach, three sections of questioning were pursued including discussing the community-led organisation and participatory practices, the concept of rural living and the place for Internet technology, and current attitudes and perceptions about digital society. These were understood and pursued in conjunction with the investigation of resilience concepts. The same set of questions was used to see whether common themes emerged across the user and governance perspectives, as well as across user types.

*4.3 Analysis Process*

Qualitative data is attractive because of the 'richness' it provides, but finding an analytical path can be problematic (Bryman, 2012). For this analytical component of the study, there was a necessary focus on resilience 'phenomena' (in terms of feelings, perceptions and experiences) with corresponding emphasis on analysis of content and understanding and interpreting substantive meanings in the data. This research utilised a thematic approach in order to fully encompass themes of resilience, community and technology that are not always explicitly expressed by the interviewees. This process of thematic analysis is considered highly flexible (Braun and Clarke, 2006), and in consequence is useful in analysing interview data from a range of respondents, such as we had gathered. The interview data was thematically coded, using QSR NVivo 10, based on the following processes: 1) thematically coding the interview transcripts according to broad themes identified in the topic guides including broadband initiatives, rural community life and broadband use and behaviour; 2) A second iteration of this coding involved scrutiny of each theme, through refinement and identification of links, and as appropriate, themes were grouped and nested in higher order main themes, a reflection of axial coding (Cresswell, 2013); and 3) A pre-designed resilience coding structure (based on Table 1), an entirely pre-determined set of codes drawn from the literature, was applied over the open and inductive coding, reflective of the central concepts of resilience laid out in Section 3.

**Table 1** Resilience Dimensions and central questions

| Resilience Dimension | Description | Central Questions |
|---|---|---|
| **Capitals/Resources** | *Presence of resources – both physical and social structures* | In what ways does participation/leadership in community broadband services increase (or decrease) resources (including societal and economic interactions) within the community? |
| | *Capacity to develop and/or adapt resources* | |

|  |  |  |
|---|---|---|
|  |  | In what ways does participation/leadership in community broadband aid the community in developing new or adapting current resources? |
|  | *Capacity to engage and interact with resources* | In what ways does participation/leadership in community broadband increase (or decrease) the ability to engage with community resources? |
|  | *Encouragement of equitable distribution of resources* | In what ways has participation/leadership in community enabled equal involvement of vision setting or encouraged equal access? |
|  | *Human agency and self-efficacy* | Is there a strong presence of connected and proactive individuals and groups within the community (digital champions)? In what ways do they interact with the community? |
|  | *Networked, or collective agency* | In what ways does the community access and develop networks to benefit itself? Are there any participation networks in place? |
| **Human Agency** | *Capacity to anticipate, strategise actions* | In what ways does participation/leadership in community broadband facilitate imagining, and strategising actions for individuals and community? |
|  | *Capacity to maintain mobility and dynamism within social and physical structures* | In what ways does participation/leadership in community broadband increase (or decrease) flexibility of resources? |
| **Sense of place** | *Sense of community bonds and cohesion (shared culture and vision)* | Does participation/leadership in community broadband strengthen local identity? |

This serves to develop an understanding of the links between resilience and rural individuals and community. The use of two sets of coding is reflective of what Hahs-Vaughn *et al*. (2007) term a Hybrid Evaluation Method. The resilience analysis is representative of a deductive approach, whereby an a priori template of codes is utilised (Crabtree and Miller, 1999, cited in Fereday and Muir-Cochrane, 2006). This study incorporates capitals as resources and concurrently analyses adaptive capacities within individuals and communities. As this study is the first pre- and post-study with respect to social resilience, the questions are thus understood in the context of expectant broadband access, current broadband access, and future broadband access via community-led broadband. Where not explicitly stated, all questions can be coded for both positive and negative responses (i.e. 'has the community demonstrated flexibility' can be for both a positive and negative response). This was done to ensure that the researcher did not exert any undue influence on the textual data.

The findings now reported in Section 5 represent key themes that we identified in relation to the research questions during the thematic analysis, analysing both layers of grounded and resilience coding.

## 5. Results from interviews with community-led broadband users, volunteers and leaders

This section outlines our key findings from the two phases of qualitative data collection. Structurally based on our two research questions, we first examine how a participatory approach to broadband

development influences social resilience. We then focus in on the idea of leadership and 'digital champions' to specifically identify their role in shaping rural social resilience.

## 5.1. Participation in community-led broadband

Participation in community organisations, in this case volunteering and engaging with the broadband development process, is often heavily linked with local community-level identity politics. Rochester (2006) identifies that more long-term volunteerism is based on traditional cultural identities, emphasising that the sense of place is relevant for participation in a community initiative. It is therefore relevant to first develop an understanding of local identity politics and the potential impact that has on participation in the community-led broadband initiative.

The concept of community-led superfast broadband was inextricably linked to community identity. It was presented by many interviewees as a means by which the community as a whole could 'stick together', to respond to change on their own terms in a local fashion, rather than relying on exogenous forces. The overarching concept of a 'social' project, or a 'by the community' project was often more enticing than the technology - the superfast broadband offer - and this introduces the idea that community interest acts as the principle incentive for participation in a community broadband scheme. Often interviewees expressed the view that the community element was primary, and technological benefits were wholly subsidiary to them.

> *"To support the effort mainly, even if it was a bit more expensive than BT [British Telecom] or whatever the alternatives, more to support them" (B4GAL 6).*

This concept of 'community belonging' as an incentive to an individual becoming involved in a local initiative can be understood in multiple ways. Firstly, it was significant as the community-led broadband initiative enhances an already existing sense of community spirit or belongingness in general.

> *"As soon as I saw that it was something that was local, I thought 'oh, right, this looks interesting'" (B4RN 6).*

Similarly, it followed that involvement does not need to be 'claimed for', in the sense of repayment for volunteer efforts, as participation in itself was considered satisfactory recompense.

> *"I think if it's a community thing then everybody mucks in…It's the sort of thing that I would expect to put a few days in but not expect to claim for it" (B4RN 17).*

Secondly, participation was also important as it could encourage those new to the community, or those who had not always been involved in the past, to become involved in a local activity, thereby forging new community links and connections for individuals, potentially increasing their internal, or local social and economic networks.

> *"B4RN was a great help because now we have something to chat about with our neighbours and a reason to meet. We're enjoying the project, whether it works or not" (B4RN 16).*

> *"It's the first time I've felt like part of the community. We're so remote. That was my community, this house and those two over there! But now it's much broader!" (B4GAL 9).*

Finally, the 'by the community' aspect of community broadband projects was important in its relationship to larger, global companies. This discourse was evident through discussing current and historical provision of broadband in the B4RN and B4GAL areas, with interviewees repeatedly noting that they felt ignored or misled by providers about the broadband options available to their household, and that they were left powerless to the whims of the higher level telecommunications industry.

> "…enough is enough, we can't wait for [national broadband provider] or local government or anyone else…" (B4RN 6).

> "[National broadband providers] have let us down. They have let us down big time" (B4GAL 8).

Frustration was expressed regarding the unreliability of current broadband services, and lack of any coverage or options for fair competition from alternative providers. Many interviewees felt that in terms of signing up to a broadband provider their options were negligible due to their place of residence. It was hoped that these frustrations would be largely eradicated with a community-led initiative.

> "We were very determined it was going to be a community thing…if we went the commercial route, we would be under duress in a way to not provide for everyone. Some of the outlying farms and buildings…you could never make a business case to provide for them! We determined that we were going to. So it's very important" (B4GAL 9).

In many ways then, the concept of a community initiative such as B4RN and B4GAL was structured conceptually as a counterweight to large telecommunications companies, as opposing forces on the digital infrastructure provision scale. This is evident in the terminology used by project volunteers, leaders and general users, where wording about current provision was often structured in a manner that represented antagonism, or deviousness or incompetence on the part of the ISP.

> "…it sounded like one way to beat [national broadband providers]…" (B4RN 7).

> "I had all the discussions with the local provider…and they weren't really…I've been promised everything and delivered nothing" (B4GAL 10).

> "[National broadband provider] admitted there was no way that they'd get to us if we relied on them" (B4RN 15).

In terms of the broadband technology itself, the idea of community broadband being 'local' was seen to generate more 'goodness' in the product and services being offered, and reflected in some cases a perhaps more political decision to support local, as a means of retaliation against larger scale, anonymous external bodies. Those working for the community broadband projects are ultimately trying to collectively bring back power to the local level to be able to engage with those services and the way services are provided in a more direct way.

> "Because it's a community run thing, rather than a 'big cats' – like BT [British Telecom] and TalkTalk[6]. I just think it's local people trying to create something good. And that's why I am all for it" (B4RN 2).

This level of local goodness generated from a community initiative was highlighted as being compatible with those communities that already have some level of participation and involvement in

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[6] BT and TalkTalk are both national telecommunications providers in the UK.

other domains. This highlights an opposing effect of community-led broadband: that community broadband may not be increasing a 'community' identity, and that participation may not be moving beyond already active individuals and groups, but it serves to continue such activities.

> "…it is a not-for-profit organisation, a community organisation that also makes a lot of sense. This, [village], is quite a community spirited village really…" (B4RN 12).

This perspective enabled a reflection on the differences between a community infrastructure project and a larger, national infrastructure project. An interviewee spoke about how individual expectations of the local community broadband project should be managed more in line with a general 'community-led' ethos, rather than from the perspective of the project being one of high-tech infrastructure implementation, which could be compared unfavourably to large telecommunications companies' processes.

> "I think they are doing the best they can…it's almost like they'd like B4RN to be O2…so they have all the benefits and a weekly letter and updates on when things are going to arrive. It's a community-based project. It's running on limited funds, you're not going to get all that…I think they're doing a brilliant job with the resources that they have" (B4RN 8).

For many interviewees, the abstract social benefits accrued through engendering community links and new understandings of community, could also be discussed in terms of very tangible, short-term benefits. The process of building a physical community asset was associated with hiring new local employees and creating job opportunities for the rural community.

> "I think potentially as well when we are contracting other companies in, we can make it part of their contracts to take on local workers, and that's all for community benefit" (B4GAL 4).

Participation of volunteers in the projects in a wide range of tasks, including individuals undertaking physical labour (i.e. digging ducts to lay fibre), spending time going door to door to spread information or recruit new volunteers, grant-writing and encouraging new subscribers to the service, is a critical part of community-led broadband, but, similar to other community initiatives, poses ongoing challenges.

> "The weakness I think is going to be…that they are reliant upon volunteers. Anything that relies on volunteers has inherent problems…" (B4RN 1).

> "The biggest challenge of any community group is cohesion. It's that cohesion and sticking together and supporting each other, rather than, you know, everyone going off on their own that is important. That's really hard" (B4GAL 11).

This challenge is exemplified by the well-developed research on volunteerism and professionalism (Cavaye, 2001). Volunteerism can reflect both long-term and short-term, or episodic, engagement, with the latter often leading to fluctuating and conditional participation patterns (Rochester, 2006). Some interviewees discussed that high-tech infrastructure development requires stability and professionalism to ensure that the network runs smoothly, which stems from having in place permanent, more formal organisational practices and procedures.

> "…if they're only doing it on a voluntary basis, I think it's going to be difficult to maintain the enthusiasm. Again I don't know…" (B4RN 3).

The result of experiencing such issues was that work on developing the community broadband service was slowed and enthusiasm dampened for the project from an individual level, which potentially would limit future participation.

> *"I think the plan looked reasonable…some of the implementation hasn't worked as well as it could have been…" (B4RN 14).*

> *"…the timescale, everybody always thinks it should be a lot faster, and I think people are disappointed it's not already in the ground…" (B4GAL 11).*

Although this was a frustration - the uncertainty and inability to access knowledge about likely project timescales, leading  to a feeling of 'floundering' as one interviewee recalled - there was a prevailing sense overall that as a community volunteer project, it was all right to have less defined goals and tasks occasionally, and to  pursue the project via an informal process.

> *"…we're all amateurs you know. Which is nice as a community project" (B4RN, 3)*

Finally, the potential for a community-led model to be transposed to other rural areas was met with some enthusiasm, tempered with a healthy amount of scepticism, particularly due to the dominant role and importance of participative community capacity. This brings Lorenz's (2010) cautionary discussion about the dynamics of such participative capacity into reality.

> *"I can see a fundamental flaw in this community broadband thing, and that is that not all communities are equal. There are rural communities all over Scotland, these former mining communities…you know everybody in B4GAL has been all over the place, ended up here as part of you know, whatever, there is a lot of techies, a lot of degrees, a lot of education, which wouldn't be true out in the boondocks" (B4GAL 9).*

The presence of such skills, even simple interest in technology, was identified as a critical component, encouraging participation overall.

For individuals, current links to a 'community' identity can be the very reason for participation, or can be created through participation. Therefore, this local identity can be enhanced or expanded for the individual, fostering new or existing networks, and potentially empowering individuals to contribute to the individual and collective sense of place. Conversely, some villages in the case study areas struggled to encourage participation in the digital project despite having active participation and a sense of community identity revolving around other areas of life. The unreliability of previously available broadband services, and the continuing dialogue of 'us versus them' with respect to telecommunications access, have perpetuated feelings that being 'rural' meant having to fend for oneself. This encouraged the community's interested parties (primarily the digital champions and active volunteers) to obtain services that they desired through collaborative, locally-based, hands-on approaches. These have the potential to engender equal access to services and highly linked locales, but do not specifically address the creation of any extra-local linkages or future collaborations. This contentious relationship between higher-scale commercial telecommunications providers and local providers has the potential to entrench ideas of rural self-sufficiency, whereby rural communities are perceived to always be able to band together on their own and, in this case, gain the technology they desire. This could potentially lead to overarching policy frameworks that assume the presence, and success, of such community initiatives for superfast broadband installation. In turn, this can limit the opportunities available for communities that are historically inactive, and casts doubt on whether all communities would be able to engage with this method of installation.

Throughout these discussions it was apparent that the easier it is for key individuals to access, engage and develop resources within the community (such as volunteer time and skill set), and engage interviewees, the more likely the community-led broadband project is to gain momentum. This perpetuates the idea that, without added support from extra-local resources such as technical expertise being brought in, such activities will be confined to communities that have had past success with community-run schemes, and that have a large, diverse resource pool (i.e. already exhibit resilience traits), thus excluding other regions from realising the same success. Thinking directly in terms of networked agency, critical to resilience and discussed by Norris *et al.* (2008), it was felt that by following this grassroots approach, more individuals and groups took part in decision-making, and knowledge and skills were shared collectively, contributing to a community-scale resilience. However, there was a concern that the community groups and individuals participating and contributing to this networked agency were not wholly inclusive, and represented the 'usual suspects'. It would remain the case that some individuals would be left out of the process, ultimately detracting from individual level resilience.

This illustrates a concern discussed in theoretical terms by Walsh-Dilley *et al.* (2013). She argued that local capacity is 'privileged' above all else in resilience thinking and this lays all responsibility on local people. We argue that this paper draws our attention to the ways in which local adaptive capacities are constrained by a variety of power dynamics, structures and organisations. This highlights the advantage of identifying and utilising both extra-local and local resources to fully realise resilience dimensions. Engagement must be multi-scale to fully enhance community resilience, incorporating individual with varied skill sets, as well as small social networks, and other community-groups, and if possible, regional entities.

We continued to see these complex dimensions of participation and power emerge in both regions in the second phase of research. The B4RN community-led volunteer-based process continued to develop new social relationships, but its success was found to be contingent on demographic features, such as an active retired population, which enhances the resilience of those individuals, but does not always alter the resilience for those that do not engage so heavily. This malleability and reliance on key individuals continued to hinder adoption, and potential B4RN users were often left with little information or regular communication from the B4RN team, detracting from their individual resource diversity, agency and ability to engage with external networks or indeed broadband-enabled services (Sherrieb *et al.*, 2010). Finally, due to the concept that each settlement area (village or otherwise) is responsible for meeting the core route to obtain B4RN services, the installation environment was marked by competing village or settlement-level interests as each had differing structures, strategies and volunteer bases to engage with the process.

The challenges faced in B4GAL, which led to a lack of development by Phase II, contributed to the disintegration of community participation in the project.

> *"I know people, I have heard people saying 'what is happening with the broadband' because you know you think when we were doing the survey we were putting it out then, and within the year, and people don't know what's going on!" (B4GAL 10).*

These challenges to participation and action include a lack of appropriate governmental involvement, an existing regulatory framework for telecommunications that was not conducive to small, community-led processes, a lack of timely technical expertise and a lack of trust in dialogue between levels of governance. A positive aspect, although not one that has enabled B4GAL to overcome these challenges, is active networking amongst different community-led broadband initiatives, also explored below.

Phase II B4GAL interviewees reflected continuously on the role of government and public intervention for rural areas in the telecommunications sector. This inevitably highlighted the current programme of intervention being pursued at the national level, BDUK. It became clear through this research that the BDUK procurement and roll out process had an extremely negative effect on local community-led broadband processes. BDUK has met with criticism since its inception from both lobbyists and rural development groups themselves (Sutherland, 2015). Firstly, the design of the main programme failed to deliver intended competition for superfast broadband development. The bidding process resulted in British Telecom (BT), a major national telecommunications company, strengthening its already strong position in the market (e.g. Public Accounts Committee, 2013; Sutherland, 2015). Following the withdrawal of Fujitsu as a bidder for BDUK funds in March 2013, BT was the sole remaining bidder in the process and at that time was awarded 19 BDUK contracts (Ofcom, 2013a). This bidding process placed rural communities in competition with one another, which disempowers those without existing capacities and resources (Roberts and Anderson, 2013). Secondly, since the signing of contracts between BT and the relevant Local Authority administrations, multiple community-led infrastructure initiatives have experienced a swift demise, decreasing competition and alternative modes of broadband access (e.g. Wakefield, 2014). This sits in contrast to the aims of the broader digital policy landscape, which includes the place for bottom-up, community-led partnerships (BIS, 2010).

> *"They have been incredibly disappointing to be honest. We had seen the government as a vehicle for bringing together communities and sharing knowledge and experiences, and there has been none of that…" (B4GAL 11).*

This was exceedingly difficult to comprehend for the local organisers of B4GAL, as well as B4RN, because community-led broadband was originally set out within the BDUK framework to *complement* the primary roll out, and community organisations were thought to be supported at the regional and national government level. However, in practice, the lack of comprehensive or integrated approach from government bodies continued to frustrate and stall B4GAL as an initiative.

> *"So the whole joined up process from government down, and they did the thinking, and it got lost in implementation" (B4GAL 9).*

Community-led broadband, like many other types of community organisation, appears to be a relatively organic process, as described and developed in this section with regards to participation and volunteerism. All of the B4GAL Phase II interviewees, for example, reflected on the learning curve, the things they would have done differently if alternative knowledge or skills had been available. In effect, this organic process struggles to fit alongside the higher scale public intervention for broadband because it is fluid, less decisive, or deadline oriented, and the volunteer base means that there can be difficulty in responding adequately, using appropriate terminology in requests for information from higher scale bodies, such as governmental departments.

> *"It's been very frustrating, there have been times when we have had board meetings, and we have thought, that's it, it's finished, we can't do anything more…but we've come out of that, and we're still at it…but there is light now at the end of the tunnel" (B4GAL 9)*

B4GAL had conducted road shows throughout late 2012 and into 2013 to engage the community and promote their potential community-led superfast broadband network. However, due to the need to negotiate at length to determine provision alongside BDUK, they could not engage with the community to the same extent as time went on. This limited the information being circulated and detracted from additional community involvement or participation.

Within the dialogue of community-led broadband, the community initiatives are situated as being distinct from industry or publicly-subsidised roll out. B4GAL, and B4RN as reflected above, have

been situated as counterweights to the telecommunications industry, or responding 'in spite' of it. This point was expressed in Phase I, and continued to proliferate in the intervening period between Phase I and Phase II data collection. B4GAL, as a community-led initiative, is interested in matters beyond simply cost or profits, focussing on the community benefits that universal broadband access should bring. Therefore they do not trust national operators to consider the potential of such benefits when determining the roll out coverage.

> *"And that is all [the telecommunications industry] question, is it cost effective? Whereas we are interested in the benefits [of superfast broadband]. And that is the difference" (B4GAL 9).*

This dialogue of trust and lost trust between B4GAL and industry-led broadband installation serves to further diminish the potential for additional or productive interaction between the local and extra-local parties.

> *"It's really been horrible. I actually think that probably had we realised what it was going to be like; I actually think we wouldn't have done it. And in a way that we didn't realise how hard it was going to be because you know at least we are doing it" (B4GAL 11).*

B4GAL has also had to consider the trust developed or lost within their community. They were once hosting regular road shows and promoting their ability to deliver broadband. However, the stagnation of the project, in part due to the need to negotiate with the government, has diminished any trust that the community may have held for the project. The more time that passes, the less credibility B4GAL is seen to have, particularly if any evidence of alternative installation by national operators is present.

> *"We've actually not done as much information dissemination as I would like, but with good reason! What we found was that everything we said in the community was then feeding back to [the telecommunications industry] and being used against us in negotiations..." (B4GAL 11).*

Whilst the leaders, the digital champions, are still present, most community-level interest and participation has waned in the intervening years as development slowed, demonstrating the fluidity of proactive agency in their community.

Our analysis will now focus more closely on our second research question, discussing the role of 'digital champions' or leaders within the community-led broadband debate, and their role within provision.

## 5.2. Digital champions and the push for better broadband

The presence of local leadership is important for any type of formal organisation, and is widely considered to contribute to growth of places (Beer, 2014). The critical need for leadership, or digital champions, within superfast community broadband initiatives was apparent throughout the Phase I data collection stage. These digital champions, individuals who seek to promote the community broadband agenda, play a key role in community-led broadband initiatives.

> *"Yes, Joe, well he's absolutely brilliant at running it, he obviously has all of the skills, the communication skills, the drive..." (B4RN 3).*

There were three core findings from the analysis of Phase I interviews relating to the emergence of leaders within the community-led initiative. Firstly many leaders adopted their role through a personal belief in their responsibility to the community and its future. These individuals, in some cases, had held posts of power or responsibility previously, such as being active in other community organisations, or because they were positioned in the community to know a majority of people. They had some level of 'power' or 'influence' in the community and believed that there was a need for their involvement.

> *"Being the owner of this shop [the only shop in the village], I almost feel as though I have a responsibility to something happening as a lot goes through here…and I have an IT background…so I felt as if I was the right person to get involved in it"* (B4GAL 5).

It was also these general feelings of responsibility to the community that resulted in overarching support and in some cases increased participation from other members of the community in the wider project.

> *"You know, the community, I mean, they've obviously chosen a difficult and big project, and I would think they need every little help and input they can"* (B4GAL 1).

Secondly, the recognition by community members of leaders' skill set availability often encouraged leaders into their roles. These skill sets were often known through word of mouth and local village history, and this identification and access to skills was able to push the project forward. We can therefore infer that leaders were critical in identifying other skills and assets in the community, often acting as conduits for individuals to network, participate and in turn become 'empowered'. This is reminiscent of the internal social capital identified by Wallace *et al.* (2015) in their study of community broadband.

> *"But on the digging side of things, the actual laying side of things, obviously Mary, she's in farming and knows lots of farmers and lots of people who do this sort of thing"* (B4RN 18).

Finally, past individual involvement with, or knowledge of, the leaders also encouraged participation by community members in the community-led broadband scheme. Those who were already connected to the leaders through social or economic means were likely to participate, often without requiring much encouragement or additional information. These participants occasionally took on responsibility themselves, in effect creating more strands of leadership and participation. Leaders then are more likely to emerge as those who already have extended local and extra-local social and economic networks in place to engage.

> *"…what I latched onto was that it was Matt running it…they were pioneers in that field…if anyone can deliver it, he can"* (B4RN 7).

These core findings about the emergence of leaders highlight that the governance practices within each of the community-led broadband case studies were largely informal. It appears that leaders' personal history with the villages and regions contributed to generating trust in the aims of the project and in the people delivering them, limiting the need for any formal mechanisms. This is perhaps reflective of what Woods *et al.* (2007) calls 'good citizen' communities, whereby communities are able to engage with endogenous resources and contribute to a strong history of securing funding for local projects. Here, the community-led broadband initiatives are clearly engaging with a historic trend of activism in their community to achieve superfast broadband. However, this was far more evident within the

B4RN interview data than in B4GAL, perhaps a reflection of the latter's relatively earlier stage of development at the time the interviews were conducted.

Sitting alongside these core findings are nuanced details that remain relevant to understanding the role of leadership within community-led broadband. The presence of leaders and the chosen method of 'community-led' practice, the very nature of both projects aiming to be 'for the community, by the community', also appeared to engender trust: trust in the leaders, in the service that would be provided, and trust that although there may be uncertainties, the aims outlined would be accomplished. It ultimately meant that some subscribers were not truly concerned with the timing of the broadband arrival. The lack of specified arrival of the new services was acceptable because it was a *local* community effort.

> *"I'm actually one of the founding shareholders…when it will reach here we don't know and it's possible it might not come via here" (B4RN 8).*

It was highlighted earlier that leaders acted as a resource, offering their skills, as well as being key conduits to networking and identifying skill sets within the community. B4RN benefitted from direct access to an experienced network mapper[7], and to others who had successful experience of preparing grant applications to funding bodies. There was also access to knowledgeable, tech savvy individuals willing to act as local recruiters to round out the skills set contained within the leadership structure and generate the required new local and extra-local networks needed to succeed in community broadband. B4GAL, while not having a network mapper within their community, found that by opening up the project to the community through public meetings, the leaders could hope to find and harness skills they did not realise existed amongst local residents. This represents another pathway to skill identification and development, standing apart from leaders accessing existing social networks or past history. However, this was very time intensive and required active leaders to remain in constant contact with their community.

> *"Before we officially started, when I talked to Michelle at B4RN, I said, it's all very well for you guys, you've got all these people on your board, you've got all these people living in your community with all of these skills, you know, and it's amazing, but we won't have that! And Michelle said, 'don't say that until you've talked to everybody in your area! You'll be surprised at who you've got'" (B4GAL 11).*

Interestingly, although specific skill sets were desirable (i.e. funding proposal writers, technical individuals) it was highlighted in both B4RN and B4GAL that the critical element was the leaders who were motivators; they sought volunteer involvement, kept enthusiasm for the project high, and were able to mobilise the community into action. In many cases, this was thought to come above and before the need for any other skill identification or development.

> *"And that's the other thing, not everybody's got a Jessica!…if we didn't have somebody like Jessica, we probably wouldn't have all…we wouldn't have pushed it so far, we would've wanted it, but not everybody would have had the knowledge…and that's the thing" (B4GAL 8).*

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[7] This refers to an individual or group of individuals who have technical expertise to conduct several critical steps to planning a broadband infrastructure project. These tasks include conducting a technical options review, determining the best service delivery options, and, critically, mapping how a physical network, cable-based or otherwise, could be built and actually function for consumers. These tasks then contribute to the capital and revenue financial projections (which are vital for business plans and grant applications), and set out what required permissions are needed for the infrastructure, such as planning approval and so on (CBS, 2013)

The leadership of community-led broadband initiatives must also reflect on its influence on general community participation and the associated development of a strong volunteer base. This was first introduced when considering leaders as 'conduits' to skill identification and development, and will be further detailed here. The role of leaders was firstly identified as potentially problematic. When asked about how potential leaders and other interviewees in the project were identified, interviewees mentioned that the use of pre-existing social and economic networks to encourage participation and disseminate knowledge about the project was potentially generating a cycle of the 'usual suspects' taking part. This has the knock-on effect of embedding existing social dynamics within the broadband initiative. While many interviewees supported the community-led process, some people thought that the leadership had entrenched existing social structures, which continued to leave certain community members out, feeling that they had no place for input.

> *"...Broadly it's for the community benefit, but there are certain people that are there who are going to run it wherever. And even if you had some input in a small way, they don't really want to know, they want to do it their own way. So I'm somewhat skeptical of the leadership..." (B4RN 9).*

> *"I mean, I'm slightly anxious about it, they've been very poor at providing information..." (B4GAL 2).*

This sentiment was expressed in relation to the viability and sustainability of projects such as the community broadband initiatives. With project leaders in relatively powerful positions, positioned there often of their own accord, and acting as conduits to individual participation, the future of the project without them was thought to be fraught with uncertainty.

> *"...when the dynamic figureheads like Mary have gone, and maybe Alan has moved on, I don't know...when they go, who is going to stop the whole thing from falling apart?" (B4RN 3).*

The potential for waning enthusiasm when moving from the early stages of the project into the future running of the community ISP on a daily basis also presented itself as a source of skepticism. It was discussed that perhaps these leaders, or digital champions, were relying too much on the enthusiasm of volunteers and that would diminish into the future. As both B4RN and B4GAL are fully volunteer-based organisations, the presence of engaged individuals was critical, and the potential waning of that enthusiasm presented new challenges for the process.

> *"...it's sort of the project management later that concerns me...I'm just wondering whether they've thought through the boring day-to-day admin that will happen in 10 years..." (B4RN 3).*

There also was a concern, consistent with the concern over the future running of such services, about more technical aspects of the community ISP such as the training and response rate to line breakage and failure once the system is in place. This stemmed from the informal leadership structure, reliance on volunteers and uncertainty about the availability of these individuals as a project resource once the service was fully developed.

> *"If a farmer ploughs through a cable or they get damaged, I know there's trained people to sort of repair and splice cables, but you know they might be busy, they might be harvesting, or on holiday..." (B4RN 3).*

Concern was expressed that if the project lost momentum, due to any number of factors including weather, loss of critical leaders, or lack of funding, the enthusiasm would be inherently difficult to

maintain and thus there may be unknown challenges into the future. This was an issue not simply for the physically involved volunteers or leaders, but also in terms of recruiting future subscribers to the ISP.

> *"There's a lot of people out there, thinking, 'oh this is never going to happen, oh it's taking forever'. And it's getting people to realise that it's a good idea to join in". (B4RN 15).*

The leadership structure of community-led broadband, as briefly discussed above, appears to be relatively informal, and although the practices enabled some different levels of participation, it also compounded concerns that there was often no official place to go for information. This highlighted for one interviewee the potential to exclude individuals who are not the 'usual suspects'.

> *"I mean, I don't know anything about the cost, I don't know about…can I keep my btinternet.com email address if I jumped ship and signed up with these guys?...What if I say I'm not signing up…can I come in at a later date? Will they say, 'sorry, the network's already in?' Nobody's telling me these things" (B4GAL 2).*

The heavy reliance on specific individuals in the initial phases of the development of both B4RN and B4GAL was also a concern for interviewees, and due to this voluntary, patchwork structure, many had experience of receiving incomplete information, or felt that there was a lack of consistency within the information being provided. This detracted from the ability and desire to participate or sign up for the superfast offering.

> *"Well…when we were trying to put the ducting through we did have some problems and I tried contacting them by email and got no response at all, but I think that was possibly because they were on holiday or something" (B4RN 17).*

A lack of guidance and a clear leadership structure, including notification of formal points of contact within the project team, was also problematic from a volunteer engagement perspective. Recruitment was less successful without concrete information and timescales, information that ultimately needed to be cascaded down from the project leaders.

> *"…we haven't been given enough guidance. We were a group of volunteers…and we had one page sheet which wasn't really, didn't really fit the bill" (B4RN 14).*

In summary, the emergence of leaders, in this context digital champions, often hinged upon feelings of responsibility to, or influence on, that community, the availability of an appropriate skill set (such as knowledge of technology), and the accessibility of existing social and economic networks. The presence of 'digital champions' lent the project credibility and traction, was critical to motivation and enthusiasm, and they were able to act as key conduits to networking and identifying skill sets within the community as a whole. Thinking directly in terms of individual 'agency', individual communities within each case study area appeared to benefit strongly from connected and pro-active individuals, leaders or digital champions. These individuals were integral to the broadband roll out and contributed to the creation of networked organisations within the community. Leadership practices also presented challenges to the community-led process, potentially entrenching social structures and creating fractured opinions through informality, both in terms of informal communication processes, and informal organisation structures. The role of these digital champions is more widely thought to hamper the potential replicability of community-led superfast broadband approaches.

In many cases, the community-led approach was seen to proliferate community-wide engagement including but not limited to broadband provision (i.e. once volunteers were involved in broadband

provision, other opportunities arose). Digital champions, or leaders within the broadband roll out, are part of this, and act as a critical component to the lifecycle of community broadband initiatives. Their skill sets and enthusiasm for the projects have encouraged participation and engagement, which in turn has assisted in creating new social networks and local linkages. Leaders lending their individual resources to the project can increase the skills of others in the community through the desire to 'cascade' down knowledge of how to fund, build and run a broadband network, enhancing the overall individuals' and related community's resilience. The relevant role of leaders in resilience enhancement is discussed by Roberts and Townsend (2015). They identified the relevance of "community leaders who are able to identify funding source, mobilise and network (for) the community" (p. 5) for the development of rural community adaptive capacity.

From the perspective of the broadband installation, B4RN benefited from access to leaders with technical expertise within the community which facilitated planning of a technically robust fibre broadband network. This reflects the 'technological capital' identified as relevant for community broadband by Wallace *et al.* (2015). This technical expertise in B4RN also contributed to an efficient and realistic installation plan that afforded the project credibility when attempts were made to secure funding from the community. B4RN also had a community comprising of individuals with the ability to contribute funding to the initiative, which made up for shortfalls in grant applications.

In B4GAL, again due to setbacks, there remained a committed core volunteer group of digital champions, albeit smaller than initially. The current volunteer Board remains focussed on achieving improved broadband accessibility in their region.

> *"Now it's pretty intense, but there has definitely been a change! And there is no social aspect at all to the board meetings anymore. They are very very business-like; we all take our duties as Directors very seriously. And we all know each other very well now" (B4GAL 9).*

As a volunteer run initiative, B4GAL is still contending with issues considered in Phase I, namely those of maintaining motivation and enthusiasm in the community, and being able to have the time from its volunteers to adequately work together and make progress.

> *"We have all taken time off work, and other schedules and we have been working through the business plan…" (B4GAL 9).*

Through the process of leading and participating in the community superfast broadband projects, interviewees in both B4RN and B4GAL reported that they felt more comfortable exercising their individual agency. There was a clear ability by strong leaders to strategise and anticipate and cope with future change. Leaders' past involvement in community activities provided them with wide social networks through which to invite and encourage participation, which Keck and Sakdapolrak (2013) term the ability for social actors to craft institutions and foster individual welfare. However, this can entrench a cycle of 'usual suspects' and divisions within the wider region. Both case study areas experienced problems with the 'usual suspects', with B4RN experiencing it through individuals with community organisation experience, and B4GAL with individuals who had past experience with broadband technology. These groupings potentially 'disempowered' users from participating and the perceived lack of readily available information continued to reinforce this issue, thereby diminishing potential for individual resilience.

## 6. Discussion

This research has contributed to the discussion between resilience thinking and participation processes within rural communities. We have theoretically developed resilience and highlighted the place for

capitals, proactive agency and 'sense of place' within the context of the pre-existing resilience literature. We sought to answer a) whether pursuing a participatory community-led model for broadband deployment plays a role in enhancing rural community resilience and b) how leadership and informal digital champions are positioned and perceived in the community and their relationship with resilience.

The first question we posed was about the relevance of the participatory nature of community-led broadband. Community-led broadband processes, considered in wider, more theoretical terms, are initially reflective of Hildreth's (2011) model of community localism, where power is decentralised from the central or local state to the people and their local communities. The presence of the Rural Community Broadband Fund and other bodies, including Community Broadband Scotland, exemplify national government's role in directing responsibility for rural broadband from themselves and commercial providers to the local communities. In this context of localism, Shucksmith and Talbot (2015) have more recently discussed types of rural development that come directly from local people, but place the state in a minor role in terms of stimulating the action. Community-led broadband initiatives have, largely, come from local people, and we argue that they are indeed an example of Shucksmith and Talbot's (2015) understanding of community localism. Firstly, community-led broadband interestingly stands as an example of community localism as the community itself is directing local broadband development.  Secondly, community-led broadband is a *result*, not necessarily of direct government devolution of responsibility for broadband, but of ongoing national government ideology which places the 'responsibility' for rural development at the local level. The neoliberal ideology that underpins the telecommunications industry has resulted in lower commercial investment across rural communities as time has passed (Simpson, 2010; Sutherland, 2015). This overarching mentality has pushed some rural communities to begin to build broadband networks, as a method of 'staying connected' and ensuring their own social and economic resilience as individuals and communities. However, national government has rarely acted as an 'initiator' to this process, as noted in Wallace *et al.* (2015).  The reliance on self-sufficient individuals and groups can lead to success for one community, but can create conflict for others unable to participate and yet being held responsible for their failure to gain infrastructure and resources from a national government perspective. Therefore, the participatory nature of community-led broadband can be both a resilient trait as well as a vulnerability to the community.

To demonstrate this, let us consider the two case studies in direct relation to our conceptual framework of social resilience (Figure 1). Simplistically, B4RN had high levels of individual *agency* in its volunteering structure that were able to engage with *resources* effectively, and through key individuals acting as leaders with *strong technological and human capital*, build a broadband network. This confirms the need for 'technological capital', identified as relevant for community broadband by Wallace *et al.* (2015). We believe that this presents an argument for the interdependency between agency and resources within social resilience theory. With respect to the other dimensions, within B4RN there was a strong *sense of place*, particularly about specific villages which propelled the building process. The strong sentiment across the region to get rural areas 'caught up' to urban areas technologically represented the focus on increasing *equity* across the UK with respect to broadband resources. Applying these features to our illustration of developing resilience, we believe B4RN to have positive, active features of each dimension, leading it to be strongly resilient. However, the reliance on such individuals with agency and specific capitals is also a vulnerability to such projects. We can see this more clearly when we review the comparative case of B4GAL.

B4GAL has similar features which must be understood in their context to reflect on the ultimately different outcomes that were present during this research. B4GAL does have active *agents* acting as digital champions with high levels of motivation and intentions for equitable access to broadband. However, there was a *lack of technological knowledge and capital* within the B4GAL team, which slowed progress as external parties needed to be consulted (representing an alternative pathway to

broadband development). This lack of technical expertise in B4GAL, considered a vulnerability, was a hindrance and the initiative needed to re-evaluate their project plans after both the expense of fibre cabling and the difficulties of reaching all households in a timely manner were recognised. This early set-back had knock-on effects: technological and cost uncertainties meant a business plan has not been finalised, and limited the ability to make funding and grant applications. Taken in comparison to B4RN, this lack of technological capital could not be made up for by being resilient in other aspects of the project. Therefore, such capital remains both a resilient and vulnerable aspect to community-led broadband. This demonstrates a critical challenge facing community-led broadband initiatives as a replicable model in the UK.

It also illustrates the relevance of integrated approaches to broadband development, incorporating local and extra-local policy bodies and the telecommunications sector at the outset. B4GAL has explicitly experienced degraded trust in the public bodies contributing to the digital strategies, and this has further detracted from any meaningful collaboration. This highlights that internal resilience is not always the only component required to interact with higher scale government and industry; the state, and other related external groups such as industry, must play a larger, more integrated, role to actually develop resilient community broadband projects (a feature of resilience theorised by Keck and Sakdapolrak, 2013). Having high levels of participation within a community was shown to be beneficial, but its influence on developing resilience is limited due to the interdependency between agency and the capitals available, not only within the community, but at intersecting nested scales.

Reflecting directly on our second question, focusing on the role of leaders - digital champions, within the broadband movement - we emphasise that these digital champions present one critical component to the momentum behind a community-led broadband organisational development and adoption. They are succeeding in getting a message of digital inclusion into communities. However, that is not to say that it is a 'rural-proof' method for broadband development that can and should be replicated across rural UK. Both B4RN and B4GAL are community-led, *voluntary* initiatives which were established by interested individuals and leaders. These individuals have the potential to entrench existing social structures and ideals of rural self-sufficiency. This can limit the agency of other individuals in that community and limit the potential such individuals have to contribute to the community-led initiatives. B4RN's specific limitations as a replicable model include its reliance on local resources (such as motivated individuals and financial capital identified as also relevant for community-led broadband success by Wallace *et al.*, 2015), and its lack of a working relationship with higher levels of government. The latter point, emphasised by Salemink and Bosworth (2014) as relevant for community broadband development, undermines the replicable potential of B4RN. Ultimately, there was a lack of successful networking in B4RN between the local community and the wider regional and national government, which is needed when considering 'networked rural development' on a wider scale (Shucksmith and Talbot, 2015).

In both cases, B4RN and B4GAL, the communities are being 'privileged' in the sense that they are being made responsible for their broadband at a local level (Walsh-Dilley *et al.* 2013). We argue that this responsibility cannot realistically be realised in every rural area. Relying solely on the participatory capacity of internal individuals and networks is not viable. Extra-local resources are needed for rural communities to succeed, reflecting the ethos of networked rural development. Due to the problematic nature of extra-local interaction for community-led broadband as it is situated within broadband development now, community-led broadband initiatives have been what Shucksmith and Talbot (2015) call 'significantly damaged'.

## 7. Conclusions and Future Research

It is argued that broadband rollout in the UK is best served by a joined-up approach which supports participation at multiple levels, including these local approaches. Current community-led organisations wherein high resource levels, including technological capital, and varied skill sets, exist will gain momentum more quickly than others, demonstrating that community broadband initiatives are another example of uneven development (what Skerratt (2011) terms, "Darwinian outcomes of development where those with local capacity and extra-local resources survive and thrive. In contrast, those locations where such resources do not exist continue in stasis" (p. 107)). Community-led broadband has further strengthened concepts of local identity, and also developed new spatial understandings of community identity, which can enhance a sense of community and shared culture. This sense of 'community', be it at different scales, can contribute to resilience of that community through social memory building and the development of equitable interests. The outcome of locally run services increases personal and collective capacities of communities and demonstrates and increases the ability to be proactive and be 'proud' of their locale.

We have demonstrated that the social resilience analytical framework can unearth nuanced understandings of community development opportunities (as theorised by Scott, 2013) that would not have been identified and discussed otherwise. This was particularly relevant when analysing the relative success of B4RN and the presence of resilience characteristics on an individual and community scale in comparison to B4GAL. We have been able to identify unique interdependencies between agency and resources, the sensitivity of resilience development to a strong sense of place and critical components for resilience development in the context of broadband (technological knowledge and capitals).

Considering social resilience theory more broadly and for future research, it should continue to be explored as the theory could provide a nuanced understanding to a wide range of rural development challenges. For example, resilience theory could be used to characterise rural economic development processes, identifying any problematic or effective features for social resilience. The ability to identify the impact of policy strategies and scalar relationships on community industries and organisations is a beneficial feature of using a social resilience framework. From the literature reviewed in earlier sections of this paper, it is clear that social resilience theory can act as a tool for communities to understand and enhance their development, as well as an analytical tool for academic researchers across a wide range of sectors to underscore pathways to rural community development.

This paper has not aimed to provide generalisable results in relation to the influence of superfast broadband connectivity due to its qualitative, exploratory methods. However, in future, a more generalisable study would be able to capture a more equal gender split, and also target younger participants to obtain better demographic representation and learn more about such differences in relation to technology use (if they exist). Quantifiable studies, such as wide-scale surveys, could be pursued to achieve such generalisable results across the UK, underpinned by the conceptual framework of social resilience. This would be a suitable future avenue of research. Alongside this, additional studies with multiple methods (such as a combination of surveys, interviews, ethnographic research and so on), to continue to robustly reflect on the social resilience framework, would prove beneficial.

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Figure Captions:


**Figure 1** Dimensions of social resilience


**Figure 2** Processes for Community-led Broadband
Source: Created by Authors with information from CBS (2013); DCMS (2011); Forde (2013), INCA (2012); and Rural Broadband Partnership (2015).


**Figure 3** Map of case study locations in the United Kingdom
Source: Created by Authors with information from B4RN and B4GAL. *B4RN information*: Forde (2013). *B4GAL information*: B4GAL (2014).