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EDITORIAL

The Rural Digital Economy

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Contributions to this special issue, *The Rural Digital Economy*, are concerned with the impacts of digital technologies upon various aspects of rural life (Woods 2009) and geography (Kitchen & Dodge 2011) in the UK. Society has, in recent decades, been transformed by the introduction of new digital technologies, many associated with the Internet, and this has created a changing and uneven sense of geography in their adoption (Pick & Sarkar 2009). These technologies provide opportunities and pose challenges. There is considerable potential for digital technology to support economic development, promote social inclusion and develop and sustain resilient communities (Skerratt 2006; Wallace 2012; Townsend *et al.* 2013). Many rural areas in the UK and elsewhere have specific characteristics that create challenges around issues such as quality of life and wealth creation. These include, for example, small, often dispersed populations; narrow and uneven channels of information flow; rapid change in population structures and economic activity bases; restricted access to digital infrastructure and in a very lived sense, the impacts of physical geography. On their own and in combination these challenges can make it difficult for rural areas to fully exploit the opportunities new digital technologies offer. However, there is considerable potential for digital technologies to support rural areas to become more economically, socially and environmentally sustainable.

The Research Councils UK Digital Economy theme has, since 2008, invested over £138m on research which has explored the transformational impact of digital technologies on community life, cultural experiences, future society and the economy. The dot.rural Digital Economy Hub at the University of Aberdeen was one of three research hubs funded by the Digital Economy theme and the only one to focus explicitly on the rural digital economy. A team of over 60 researchers from a range of academic disciplines in the social, natural and physical sciences have, through the dot.rural Hub, conducted research organized around nine challenges: Digital Society, Enterprise & Culture, Healthcare, Intelligent Information Infrastructures, Intelligent Mobility, Internet Engineering, Natural Language Generation and Communication, Natural Resources Conservation and Social Media. The papers contained in this special issue present findings from research led by social scientists, many of whom are geographers, that address many of the often cross-cutting dot.rural Hub challenges. More details about the dot.rural Hub and the research projects it has supported can be found at <http://www.dotrural.ac.uk>.

The initial two papers in this special issue are concerned with digital infrastructure and the impacts of poor connectivity in rural areas. 'Two-speed' Scotland: patterns and implications of the digital divide in contemporary Scotland' by Philip, Cottrill and Farrington identifies a stark urban–rural digital divide in an analysis of mobile telecommunications and broadband infrastructure data published by the UK telecommunications regulator, Ofcom. The implications of a 'two-speed' Scotland for individuals who live in, and businesses that operate within, rural areas are considered and current UK government policy which, at best, will only improve digital connectivity for 'the majority' with the minority, predominantly those in remote rural areas, being left with inadequate infrastructure to support digital lives in the twenty-first century is critiqued. The importance of broadband for remote rural areas is highlighted in Townsend, Wallace and Fairhurst's contribution 'Stuck out here: the critical role of broadband for remote rural places'. The importance of broadband to the economic and social sustainability of remote rural communities was identified in research undertaken with small rural businesses that explored how the Internet was used in the development of their business activities, how being online contributed to various aspects of their personal and family lives and how connectivity influenced their ability to remain living and working in a remote rural community.

Challenges of peripherality, lack of economies of scale and difficulties in recruiting and retaining professional staff (BMA 2005; Wilson *et al.* 2009) are particular challenges facing rural healthcare in the UK and elsewhere. Health and social care in rural communities could be improved by supporting individuals and communities to manage aspects of their own health and through reconfiguring how patients and professionals interact. eHealth has a role to play in supporting and improving health and social care systems in rural communities. In 'Technology for older adults: maximising personal and social interaction (TOPS): exploring opportunities for eHealth to support the older rural population with chronic pain', Philip, Roberts, Currie and Mort explore the roles of technology in supporting the health and social needs of older adults living with chronic pain in rural Scotland. eHealth technologies have considerable potential to support the healthcare needs of older rural residents, enabling them to live independently in their own homes for longer. The paper reports that rural older adults with chronic pain are receptive to using digital technologies in their personal and medicalized lives, but do not want in-person interactions with their care providers to be substituted entirely by eHealth technologies, a view supported by health and social care providers working in remote rural Scotland. The authors caution that technologies need to be designed with the needs of older and physically impaired users in mind and, of course, the local technological infrastructure needs to be capable of supporting any eHealth technologies deployed in the community (cf. Philip *et al.* 2015 and Townsend *et al.* 2015).

Physical distance means that it often takes emergency services longer to arrive at the scene of an emergency in rural areas than would be the case in urban areas. Trained volunteers across rural Scotland provide assistance¹ during medical emergencies from the time a 999 call is received until the arrival of an ambulance and paramedics. The development and deployment of a new digital technology to assist community-based first responders during emergency call-outs is described in 'Using technology to enhance rural resilience in pre-hospital emergencies' by Schneider, Mort, Kindness, Mellish, Reiter and Wilson. A device that captures patient data, including physiological parameters, has been developed from which community first responders can automatically generate patient handover reports for paramedics which provide more detailed and accurate information than might

be delivered during a verbal handover. There is considerable potential for this eHealth technology to save lives and to improve the outcomes of those who experience a medical emergency in a remote, rural area.

The cultural sector is thriving in many rural communities, encompassing a diverse range of activities, events and groupings of people. One of the dot.rural projects worked with community heritage groups and explored how digital technologies could be used in the creation and preservation of heritage archives. The focus of Beel, Wallace, Webster and Nguyen's paper, 'The geographies of community history digital archives in rural Scotland' is largely theoretical, offering reflections on the co-production of sustainable solutions for the production of heritage archives. At a time when some community heritage groups have been converting their 'analogue' collections into 'digital' forms, this paper argues that this move might change the positionality of the archive and how historical materials are presented back to a wider audience via digital, web-based archives.

In common with the development of web archives, the Internet has supported the development of new modes of communication and social interaction that have been exploited by millions of people worldwide. Communications technologies that support social networking can help overcome geographical barriers and enable those who live in dispersed and isolated communities to interact easily with those who live at a distance. Wilson, Wallace and Farrington's paper, 'A virtual geography of the Scottish islands', explores how islanders make use of digital connectivity and interact with other islanders and those based further afield. An analysis of the postings of 350 bloggers who lived on one of Scotland's many inhabited islands showed that digital communications are being used to support and develop local interaction as well as interaction with the wider world.

Support for rural enterprise is an important element of rural development, supporting efforts to attract new populations to rural areas and helping to retain existing populations. van der Loo, Chen, Edwards, Holden, Karamperidis, Kollingbaum, Marqui, Nelson, Norman, Piecyk and Pignotti's contribution, 'Development of a digital tool to overcome the challenges of rural food SMEs' reports on a study that, utilizing user engagement activities, identified issues rural small and medium sized enterprises (SMEs) in the food and drink sector producers face when distributing their products to market. Successful SMEs are essential to the economic well-being of many rural communities and thus a digital solution to distribution challenges could help businesses grow and overcome barriers to expansion. Small rural shops provide employment, act as community hubs and focal points for social interaction and provide shopping facilities. Digital technologies have changed consumer behaviour in recent years, with online shopping now ubiquitous. Physical retail outlets are under pressure to adapt to this changing retail landscape, challenges now being faced by many small, independent retailers in rural areas. 'Local shops vs. online retailers: competition or synergy' by Schiffing, Karamperidis and Nelson considers how retail outlets in small island communities in Scotland are responding to online competition which can offer rural consumers superior product availability, variety and lower priced goods. Stocking local produce, co-locating services such as a post office in the retail outlet and being able to respond to customer's requests ensure continued patronage by local residents, despite online shopping being very common on all the islands included in the study. In the future a balance between online and local shopping activities would be most beneficial for consumers and those who own and are employed by local retail outlets.

As society places ever higher demands on the natural resources that sustain and influence human life, there is a growing realization that new approaches to natural resource

conservation are needed, including web-based approaches (Siddharthan *et al.* 2012). Within dot.rural attempts have been made to explore how digital technologies can help communities transform the ways in which they manage, use and conserve natural resources. Work with citizen science programmes has been particularly fruitful, with methods of providing relevant and automated feedback to volunteers having been successfully developed and deployed. For example, technology developed at dot.rural is now deployed online at the *Blogging Birds* and *Bee Watch* websites (<http://redkite.abdn.ac.uk/> and <http://homepages.abdn.ac.uk/wpn003/beewatch/index.php?r=user/auth>, respectively). dot.rural researchers have also worked with public sector agencies, exploring how these bodies can adopt practices suitable to the dynamics of a digital society. Arts, Ioris, MacLeod, Han, Sripada, Braga and van der Wal, in 'Supply of online environmental information to unknown demands: the importance of interpretation and liability related to a national network of river level data', examine a situation where public authorities who collect and collate environmental data provide public access to information without knowing who will make use of the data and for what purpose. They find that making environmental data publically available raises two key issues: liability for the consistency and quality of that data and discrepancies between the interpretation of that data by the general public and scientific experts.

The last two papers in this special issue consider how digital engagement is related to, and can be supportive of, resilience. Roberts, Farrington and Skerrat's paper, 'Evaluating new digital technologies through a framework of resilience', proposes that digital access, adoption and inclusion may be explored using an evaluative framework of resilience in which the 'social geographies of resilience' may be explored. In 'Superfast broadband and rural community resilience: examining the rural need for speed', Ashmore, Farrington and Skerratt examine how improvements to broadband services change the relationship between those who live in rural areas and Internet technology. Their exploration of community broadband schemes questioned whether the introduction of superfast broadband can enhance rural community resilience. It was found that superfast broadband access is associated with increased control over everyday life, and the need for speed is positioned in relation to service reliability for users. These findings highlight the complex nature of the relationship between superfast broadband, rural users and potential individual and community resilience.

Taken together, the papers in this special issue present an introduction to digital economy research being carried out across the UK. They illustrate how many areas of life are affected by new technologies, including work, health, leisure, the natural environment and the sustainability of local businesses. They provide evidence of the ways in which access to digital technologies supports these areas and, in turn, impacts upon the sustainability of life in rural areas. Importantly, many of the papers highlight areas of inequality resulting from unequal access to technologies, showing that the urban–rural digital divide needs further attention – not just from academics but from local and national government and others who influence and deliver policy and are in a position to direct real change. The research reported in this special issue has opened up many fruitful avenues for social science and interdisciplinary research to pursue further. The contributions represent the ways in which different aspects of rural life are now more and more sewn into interactions with digital technologies and this has profound impacts upon notions of spatiality, place and geography. They also showcase a deeply interdisciplinary series of projects, showing the ways in which, despite deep epistemological disciplinary differences, how strong, impactful and socially relevant

action research can be delivered via university institutions through collaboration with a wide range of non-academic partners.

Note

¹ Known as 'First Responders'.

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