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From Africa to Dumfries and Galloway

Connectivity in a Rural Community

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This article shows how a small regional housing association is bridging the digital divide for its customers and their communities by bringing low cost internet connectivity solutions proven in Africa to Dumfries & Galloway through collaboration with a university. The key learning is that small and medium sized third sector organizations should actively engage with universities to work jointly on developing and implementing solutions to address both sector and local needs. The joint working gives the third sector organizations access to the global academic networks and funding to bring overseas learning to help create innovative and proven local solutions that can help transform service delivery for customers and communities. Dumfries & Galloway's Loreburn Housing Association (Loreburn) is working with Strathclyde University to pilot a social tariff broadband service for its customers using TV White Space/Dynamic Spectrum technology proven by Mawingu Networks in Africa.

- Connectivity
- White space
- Broadband
- Housing
- Integration
- Rural

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Scotland, in keeping with many parts of the United Kingdom and Western Europe, is experiencing a rapidly ageing population that is creating pressures on the housing, health and social care infrastructure.

The shared pressures impact across these sectors but historically it has been very difficult for small and medium sized third sector organizations, especially housing associations (HAs) providers, to engage with statutory health and social care agencies, such as the NHS, to develop joint solutions. Only 12% of housing associations have a close or very close relationship with the NHS/NHS Trusts (Wheatley, 2015, p. 19) and this low level of interaction between housing and health presents challenges to policy makers and practitioners. The lack of a joined-up approach can be “problematic at all operational levels, from strategic commitment to the work of the front-line practitioner” (Allen, 2005, pp. 157-158).

The challenges that are presented by agencies not working together has led to a greater focus in recent years by authorities in the UK on enabling this to happen. Within the devolved administrations of the UK different approaches have been taken to enabling this joint working to take place. In Scotland, the Public Bodies (Joint Working) (Scotland) Act 2014 was put in place to create a legal duty on housing, health and social care to work together. This legislative approach was adopted by the Scottish Government after it was shown that there was “limited evidence” (Audit Scotland, 2015, p. 7) that joint and integrated working between agencies was taking place on a voluntary basis despite “significant investment”.

By using statutory instruments the Scottish Government has laid out nine National Health and Wellbeing Outcomes covering expectations for joint working between agencies. Outcome 2 is particularly important for joint working relating to the provision of housing within the community which provides for those “who are frail, are able to live, as far as reasonably practicable, independently and at home or in a homely setting in their community” (SSI, 2014, p. 3). The harnessing of technological advances has been identified by the Scottish Government as key to achieving this aim. The Scottish Government has advocated the use of Technology Enabled Care Solutions (TECS) as a tool to be developed to help support people with the active self-management of long-term conditions, which underpins many of the key elements of the nine National Health and Wellbeing outcomes (Scottish Government, 2015). The Scottish Government is actively exploring the principle of universal access to TECS. The flaw in the eHealth Strategy is that it presupposes that home owners will have the internet connectivity through the internet service provider (ISP) broadband in their homes to support the deployment of connected TECS.

The “digital by default” approach by policy makers is creating a service delivery environment which is excluding the elderly, disabled and disadvantaged, who are the very target audience who would benefit most from low cost, barrier free internet connectivity via broadband, deployed as the fourth utility.

Research has highlighted key barriers to internet access for people in Dumfries and levels of participation in the use of digital services (Diffley *et al.*, 2015). If the pathway a person must take to gain internet access in the home via the fixed wire telephone system is charted, the barriers can clearly be identified. The best deals for internet connectivity via broadband are on line and to be able to access these the user would need to have internet access and have digital skills to operate their computer hardware and software. To secure an online contract agreement with an ISP an email address is required and passing the online credit reference check is also necessary. Many older people do not have a sufficient credit history to give them a suitable credit reference score. This is because they tend not to have credit agreements, do not have a mortgage and personal loans. The use of automated credit reference scoring and responses deprives the customer of redress or speaking to a person to explain their situation. If these barriers are surmounted, then the next event is the arrival at the user's home address, of a cardboard box containing a router, cables, a micro filter and an instruction booklet. The assumption made by the ISP is that the user has the skills, abilities and hardware to set up the router in the home. In addition, users are increasingly being advised not to allow devices to be connected to the internet with the factory and default settings and to set up their own unique strong passwords; this too assumes a level of digital skill that many users do not have. Once the user has an ISP contract then they are subject to the monthly subscription fees, even if they do not use the service. With the move to fibre broadband and package deals from the main ISPs such as BT and Sky, it is getting more difficult to secure a low cost basic internet connectivity contract.

The escalating multi billion pound TV rights payments by ISPs such as Sky and BT (BBC, 2015) have moved the internet connectivity market by these providers far away from a low cost social tariff broadband model. While UK users are expected to pay around £20 per month for low cost non-fibre internet connectivity delivered via the telephone line, users of Mawingu Networks in Kenya can access the internet via Wi-Fi broadband for less than £1 per week. In addition, Mawingu Network customers do not have to grapple with the problems of router set up and connection. Mawingu Networks, which was introduced to Loreburn through Strathclyde University, is a fixed, wireless, internet access provider giving access to affordable internet in specific hotspots (Wi-Fi zones). They offer "high-performance low-cost wireless technology and solar power to build fast internet networks in rural areas" to enable users to "connect using Wi Fi" and their "unique application of open technologies enables a world-class scalable network, with open and secure roaming in a highly challenging geographical environment".¹ Strathclyde University engaged with Loreburn to understand the challenges faced by the Scottish social housing sector generally and within the context of Dumfries & Galloway. The challenges are detailed below to contextualize the need for internet connectivity via the low cost social tariff broadband model using TV White Space technology.

¹ <http://mawingunetworks.com>

Scottish social housing sector challenges

Sustaining tenancies

Supporting customers to sustain their tenancies is an important part of the social housing proposition. Customer churn results in loss of rental income through void periods and additional work and costs associated with tenancy termination and sign up. The residualization of the social housing sector has resulted in the customer base profile being skewed to elderly and disadvantaged groups. As the population ages and its associated long-term health conditions increase, there is a pressure on social housing providers to support customers to live safely and independently in their own homes for as long as possible, owing to the costs and shortages of residential care places and the need to prevent inadvertent hospital admissions.

The introduction of internet connected TECS to help support care and self-management in the home (as well as staff mobile working support) has created a disconnect between expectations of the statutory health providers and the home occupier/owner regarding internet connectivity. This void is falling to the social housing landlord to rectify.

Welfare reform and the move to digital applications

Welfare reform has created many challenges for social housing providers and one of the major challenges is the move by government to online benefits applications and processing, together with the reduction in local benefits office staff numbers.

As delays in benefits payments and benefit sanctions may directly or indirectly impact on the rental income of the landlord, many providers have had to take a proactive stance in supporting customers to develop basic digital skills and giving internet access so they can apply and manage their benefits payments.

The assumption by policy makers that possession of a smartphone gives sufficient connectivity and screen size to complete forms is fundamentally incorrect, as anyone who has tried to complete the online forms will attest. An appropriate size screen is required.

This is another area where social housing providers have had to fill the void of lack of internet connectivity and digital skills and hardware.

The need to support welfare benefit claimants to gain low cost internet access and digital skills has resulted in some national initiatives such as partnership between Microsoft and the digital inclusion charity Go ON UK to provide very low cost refurbished computers and internet connectivity (Itpro, 2013).

Employability initiatives

Together with welfare reform there has been government pressure on social housing providers to become more involved and active in addressing

worklessness in the social housing customer base. This has spawned employability initiatives throughout the sector.

As both employers and recruiters move to digital platforms to automate the recruitment, assessment and evaluation process, the need to both digitally upskill customers and provide internet connectivity and associated hardware, has again fallen to the social landlord to fulfil. Hand in glove with employability is education and training. These too have shifted to digital platforms with e-learning portals and massive online open courses (MOOCs.) The key to access these resources is affordable internet connectivity. Those without connectivity are disadvantaged by lack of access.

Digital by default

The drive by the public sector to channel shift and deliver services as digital by default without giving sufficient support to that sector of the population without internet connectivity has created a digitally disadvantaged cohort who are becoming increasingly marginalized and unrepresented. E-government, e-health and e-learning are now the preserves of those with internet connectivity.

The pressure to channel shift

The social housing sector is experiencing pressure to channel shift to harvest transaction cost savings as part of the value for money agenda which is being driven in part by the Scottish Housing Regulator (SHR). Without giving affordable and safe internet access and digital skills support to those customers not online, the sector will create a further internal residualization of its customer profile, to those with and without internet connectivity and the skills and resources to access it.

The collective pressures on the social housing sector to address internet connectivity are driving two main schools of response. First, internet connectivity is to be treated like other utilities such as energy and water; it is a customer responsibility and should not involve the landlord. Second, the sector should be drawing all the utilities together as an element of the rent, or as an all-inclusive service charge to help address affordability, fuel poverty and tenancy sustainment issues. The first approach does not help solve the increasing digital exclusion and the associated financial exclusion of the elderly, frail, disabled and disadvantaged.

The second approach sits uncomfortably with the regulatory landscape regarding customer choice, service charges, data protection, and value for money, customer empowerment and control over their affairs issues. The recent legal cases around the Water Resale Order 2006 involving Southwark Council (*Jones v London Borough of Southwark* (2016) EWHC 457 (CH)) and Rochdale Boroughwide Housing (*Rochdale Boroughwide Housing Ltd v Izevbigie* (2017) EWHC 790 (CH)) give a flavour of the issues faced by

social landlords. As Paul Whatley, counsel, Rochdale Boroughwide Housing stated, “Utility debt is a real issue for households with limited incomes” (Inside Housing, 2017, p. 19).

For far too many social landlords the default response to internet connectivity has been to defer to BT, and not to seek out innovative, alternative and cost-effective solutions. For Loreburn, the first approach would result in a potential internet connectivity subscription burden of £600,000 per annum for its customers to pay at commercial rates, which is not sustainable given the high level of benefit claimants among the social housing population. The second innovative approach was investigated with Our Power Energy, a new breed of energy company formed as a social enterprise by a group of Scottish HAs to challenge the status quo of the big six energy companies and in particular their treatment of the prepaid customer market.

It was by taking a view regarding the second approach that resulted in Loreburn working with Strathclyde University and its Centre for White Space Communications.

Loreburn’s motivation must be viewed within the context of the Dumfries & Galloway regional profile and challenges:

- t A rapidly ageing population, particularly of the over 65s with a net outflow of young, working age people
- t Full-time workers receiving the lowest average weekly pay levels in Scotland
- t A low level of qualifications among the working age population creating shortages of appropriately skilled workforce to recruit from
- t A very highly level of rurality with 22% of the region classed as rural or remote rural
- t High levels of deprivation
- t Over 20% of households do not have access to private transport
- t Some parts of the region do not get good quality mobile coverage from network operators, or do not get any coverage at all (Dumfries & Galloway Council, 2016)

According to Go ON UK, Dumfries & Galloway has one of the highest levels of digital exclusion in the UK, with more than one in five adults never being online. As well as a high level of digital exclusion there is also a poor take up of household broadband connectivity (66%) and low broadband speeds (Crichton Institute, 2014).

It is predicted that in Dumfries & Galloway to support the rapidly ageing population the “proportion of the low paid workforce required by care at home services and care homes will increase from 41% currently to 101% in 2031” and inevitably the “care sector will face greater competition to secure the workforce it needs” (Dumfries & Galloway, 2012).

It was against this backdrop that Strathclyde University and Loreburn’s collaboration took place and the potential of applying learning from Mawingu Networks’ African experience using TV White Space technology was explored.

What is White Space?

The definition from the Strathclyde University Centre for White Space Communications:

The term “White Space” refers to portions of licensed radio spectrum that licensees do not use all of the time or in all geographical locations. Several regulators around the world are moving towards allowing unlicensed access to these frequencies, subject to the proviso that licensed transmissions are not adversely affected. By allowing access to these White Space frequencies, more effective and efficient use of the radio spectrum is envisaged (<http://www.wirelesswhitespace.org>).

The key advantages of TV White Space are:

- t Excellent range and wide area coverage
- t Obstacle penetration characteristics

During mid-to-late 2016 a proposal was developed to pilot a social tariff broadband model using TV White Space technology at two locations in Upper Nithsdale: the first at Loreburn’s development, Stevenson Court Sanquhar, and the second at Loreburn’s Williamson Way Kelloholm. The profile of the developments is detailed below:

Stevenson Court, Sanquhar	Williamson Way, Kelloholm
Property type: Amenity & general needs	Property type: Amenity & general needs
10 x 2 person/1 bedroom amenity flats	16 x 1 bedroom houses
16 x 2 person/1 bedroom flats	2 x 2 bedroom amenity houses

The survey work and initial installation proposal was carried out by installation specialists Broadway Partners² and presented in August 2016. Further work was done and Loreburn’s Management Committee approved a proposal together with seedcorn funding in November 2016. Detailed planning then took place between November 2016 and March 2017. This involved funding submissions and legal agreements between the various parties. Final legal agreement was signed off in early 2017 to start the installation of equipment and transmission over the two sites and the process of customer engagement using a “show and tell” approach with active transmission and access by customers of the Wi-Fi broadband internet connectivity and the benefits that may be harvested.

² <http://broadwaypartners.co.uk>

Each of Loreburn's developments will have a central aerial transmitter with Wi-Fi access points (APs) throughout the developments. The Wi-Fi broadband will be transmitted to an area with a radius of 1 km.

The transmission spectrum will be divided into quadrants in the following manner:

- t Quadrant 1: For Loreburn customers to use in their own homes and locality
- t Quadrant 2: For the deployment of Technology Enabled Care Solutions (TECS), energy smart meters and various smart devices and technology
- t Quadrant 3: For Loreburn staff to facilitate mobile working, lone working and health and safety issues
- t Quadrant 4: Available for an access fee to partner organizations to help support allied health professionals, nursing staff and carers to deliver services to Loreburn customers to support their independent living needs and sustain their tenancies

The service to customers in Quadrant 1 will be on three tiered levels:

- t Level 1: This will be internet connectivity "essentials" and will be a low bandwidth basic provision which will be universally available (a sign up will be required) and free
- t Level 2: This will give additional bandwidth above level 1 and will be a subscription service
- t Level 3: This will give the highest level of bandwidth of the three levels and will be a subscription service

The bandwidth allocations, the service levels and the subscription rates will be determined as part of the pilot in Upper Nithsdale. The more support from health and social care partners and other agencies that can be achieved the more the financial modelling can take place to assess the scalability of the social tariff broadband service model.

A key part of the pilot will be the scalability assessments as Loreburn's aspiration is to deploy the service across all its 2,500 homes in Dumfries & Galloway. In addition, the pilot will be used to develop the portability and transferability of the social tariff broadband service so that other social landlords across Scotland can have the opportunity to deploy the solution for their customers. Our Power and its membership will be actively engaged during the pilot to assess the key learning as will Age UK West Cumbria.

Age UK West Cumbria's aspiration is to secure a pilot with Strathclyde University in selected rural locations in its operational area to help address the digital exclusion of older people and help with the deployment of connected TECS to support independent living.

From the equipment deployment and transmission in June 2017 the pilot will run for 12 months. The pilot programme involves very high levels of customer, community and agency engagement. The very high levels of investment in customer and community engagement are based on Loreburn's

experiences during the analogue to digital TV switchover during 2009, welfare reform changes, the current energy smart meter installation programme and the Galloway Gateway Social Enterprise initiative.

Loreburn has found that sustained, repeated and active customer engagement in the lead up to the change or event, followed by engagement during and after the change or event is essential for success. It is the application of this engagement learning that is essential to Loreburn's channel shift strategy. It is also the key for the effective deployment of connected TECS and smart devices to support independent living for customers. In addition to the lack of connectivity flaw in the Scottish Government's eHealth strategy, the absence of resources for sustained customer engagement and, in particular, for vulnerable groups is another defect.

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