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POLICY DEBATES

Digitalization in sparsely populated areas: between place-based practices and the smart region agenda

Alexandre Dubois[a] and Franziska Sielker[b]

ABSTRACT

Based on evidence of a growing number of regions in Europe at risk of becoming sparsely populated, this article argues that further policy attention should be drawn to sparsely populated areas. We present experiences from case studies in the UK and Sweden asking how digitalization supported local actors in providing tools to promote collaborative planning for their communities. The article propounds the European added value of these experiences by raising the awareness of regional policymakers about future solutions for territorial planning and governance linked with the 'sparselization' of Europe, which we deem is the 'other side' of the continent's continuing urbanization.

KEYWORDS

sparsely populated areas; Cohesion Policy; shrinking regions; rurality; digitalization; smart regions

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INTRODUCTION

Sparsely populated areas (SPAs) entered the European policy sphere in the aftermath of the accession of Sweden and Finland to the European Union (EU) in 1995. During these negotiations, both countries, together with Norway, which later turned down accession in a referendum, made a point in emphasizing the historical legacy and potential contribution of these territories to the community project, not the least as these territories are endowed with natural resources (forest, ores, etc.) and energy sources (hydropower). The terminology coined in regional policy instruments, such as the European Regional Development Fund (ERDF), initially stressed the need to *overcome* the range of so-called *structural handicaps* inherent to their geographical specificity, which is thought to constrain socio-economic development (European Commission, 2008; Monfort, 2009).

In the context of unhinged depopulation trends across rural Europe, digitalization has become a 'hot' topic in the context of EU Cohesion Policy because it is believed to provide a viable alternative for delivering cost-effective 'face-to-face', yet remotely coordinated, public services in the most remote rural areas. Aspects of shrinkage have been considered in urban contexts (Wiechmann & Pallagst, 2012; Sousa & Pinho, 2015; Wiechmann & Bontje, 2015; Pallagst et al., 2014), as well as that the severe consequences have been recognized in rural research (Steinführer et al., 2014). However, the rollout of digital services may also be perceived by local populations and stakeholders as an institutionalization of the decommitment of the state and other public authorities in rural areas. Digitalization also highlights the disadvantage of vulnerable local populations, for example, the elderly, who are those most in need of seamless public services. Finally, the issue of data privacy, especially regarding healthcare, compliance with General Data Protection Regulation (GDPR) when using cloud solutions, increases the administrative burden of small local authorities which are already over-stretched and may not been able to keep up with the constant changes of standards in information and communication technology (ICT) (Sielker et al., 2019).

While one argument has been that digitalization, or movements towards smart villages more broadly, can be particularly beneficial to rural communities, research suggests at the same time that national efforts to support specific processes of digitalization may meet various barriers to uptaking in rural or urban communities alike. To give an example, in April 2016 the UK introduced the

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Building Information Modelling (BIM) Level 2 projects. BIM is a 3D model of a building, developed in a software such as Revit, MicroStation or Vectorworks to design and visualize a building, as well as to share the data model with all involved parties starting from planners to designers, to construction and maintenance companies. In essence, this means that public sector projects are required to develop a model of the projected building or construction on a BIM Level 2. In the example of BIM uptake, BIM can facilitate interactions of planners with project developers. Yet, in order to use BIM, capacity-building in local authorities is needed. Communities and public authorities with low population density may profit from such new digital ways of working, and save time. At the same time authorities have to address the challenge of providing adequate levels of digital proficiency for workers and citizens as well as reliable broadband infrastructure.

AIM OF THE PAPER

Against this background, this Policy Debate paper examines the caveats and potentials for implementing a 'smart' digitalization agenda for Europe's SPAs. We especially bring into light the impact of such an agenda for territorial planning as it needs to be translated into local practices that make sense for targeted communities. Digitalization has often been treated as a sectoral policy, despite its profound territorial implications. The 'digital divide', often monitored as the difference in access between urban and rural areas, has been outlined as a new layer of spatial inequalities.

The material presented in this paper principally comes from the collegial work in a pan-European project investigating new opportunities for territories with geographical specificity (ESPON BRIDGES and ESPON BRIDGES OUTREACH), but also from a study of the challenges of digitalization in planning (systems) (Sielker et al., 2019) as well as from the long-term engagement of the authors in arguing for a rescaling of policies and practices addressing geographically specific territories in general, and SPAs in particular, from a sectoral policy to a territorial governance standpoint. We especially give importance to future policy developments that aim at better *valuing remoteness* (Finke & Bosworth, 2016) through new types of interventions.

This enquiry thus addresses the following questions:

- What are common challenges of SPAs in going digital?
- To what extent can digitalization contribute to delivering better access to services in sparsely populated and peripheral settings?
- What systemic change does the process of 'going digital' incur in practice?
- What policy responses provide the most pertinent leverages for supporting digital transformation in SPAs?

We contextualize our enquiry by looking at how digital solutions have been implemented to address two distinct sectoral shortcomings in two different SPAs in Northern Europe in the examples of Scotland and Sweden.

CHARACTERIZING SPAs IN EUROPE

Gløersen (2012) exposed the repercussion and stakes of defining and delineating SPAs for policymaking purposes, and propounded that delineating territorial objects is an important part of the policymaking process and presupposes the translation of perceived and constructed categories of territories into measurable criteria. These geographical categories are contested and 'need to be reinvented at the European level' (p. 445) in order to fit the narrative and tools of European construction.

Advocating the functional approach laid out by Gløersen, the authors participated in three successive European Observation Network for Territorial Development and Cohesion (ESPON) projects, GEOSPECS, BRIDGES and BRIDGES OUTREACH, that set out to operationalize a methodology tailored to define, delineate and analyse SPAs, as well as other territories with geographical specificities, in the context of EU regional policy. The ESPON projects used population potential, calculated as the actual number of persons living within a certain distance from any point, to operationalize and apprehend the 'sense of isolation', for both people and businesses, experienced by remote rural communities, that is, especially in terms of long distance to the main agglomerations and scattered settlement structure (Dubois & Roto, 2012). Pan-European local administrative unit (LAU)-2 population data (with grid cell data for the Nordic countries due to the large size of municipalities in those countries) were used to calculate population potential as the population found within 45-min isochrones of each point. Using an equivalent threshold to the one in the Nomenclature of Territorial Units for Statistics (NUTS) approach (Gløersen, 2012), three main areas with extensive SPA could be identified (Dubois & Roto, 2012): the northern and eastern part of the Nordic countries; the Scottish Highlands and Islands; and north-eastern areas of Spain (roughly within the Madrid–Barcelona–Valencia triangle). In other parts of Europe – for example, in France, Ireland, Bulgaria, Romania, the Balkans, Greece and Turkey – SPAs may be found, but in much more limited local patches. Given the state of rural-to-urban migration patterns that can be observed, for example, in Central and Eastern Europe, we expect more SPAs to develop across the continent. As a matter of consequence, it becomes evident that the 'sparsity debate' would gain from being 'rescaled' to a European policy issue.

The subsequent BRIDGES project used the same approach, but aimed at further characterizing the underlying socio-economic processes and demographic dynamics of SPAs. The project set to measure the change in population potential in Europe, and visualize these dynamics for two main categories of places: the SPAs, that is, areas with a population potential under 100,000 inhabitants, and areas with a population potential between

100,000 and 125,000 inhabitants. The latter are places with a low population potential that are just above the threshold set out in GEOSPECS. The demographic change in these places is particular pertinent to monitor: if faced with steady population decline, many of these areas will fall under the threshold in 10, 20 or 30 years. We labelled the latter category as 'areas at risk' of becoming sparsely populated.

The resulting mapping (Figure 1) indicates important territorial development trends associated with sparsity. First, most European SPAs are losing population (in red), which means that the challenges inherent to sparsity will likely become more pronounced in those areas. Second, there are nonetheless SPAs that witness a stabilization or even demographic increase (in orange). These areas, which can be mainly found in Norway, central Spain, Iceland and Turkey, can focus on consolidating their long-term attractivity strategy to retain new populations, in comparison with SPAs in decline (in red) that will need to adopt stricter coping strategies to accommodate 'orderly' shrinking. Third, the analysis of demographic trends for areas just above the sparsity threshold confirms the coexistence of processes of urbanization and thinning out in close vicinity taking place in Europe's northern periphery as well as some parts of Spain, Italy and the Balkans. Indeed, smaller urban centres in Norway, Sweden and Finland show a fairly good demographic dynamism (in green). These centres thus polarize the territorial structure of the NSPA. Finally, areas 'at risk of becoming sparsely populated areas' in many places across Europe (in purple). Should the loss of population continue steadily, these areas would eventually fall under the 'sparsity threshold' within a couple of generations. The 'normalization' of sparsity throughout Europe corroborates our understanding that sparsity is of high relevance for European policymaking and would necessitate a more coherent multilevel coordination of public interventions.

SPARSITY AND DIGITALIZATION: SOFT GOVERNANCE, HARD INVESTMENTS AND NEW CHALLENGES

Regional policy, despite its aspiration to foster place-based approaches, has not yet explicitly developed support strategies for territories with geographic specificities (TGS). Most recently, four initiatives mark the renewed focus on rural development and TGS: (1) the development of a long-term vision for rural areas; (2) the development of a staff working document on TGS (publication still unreleased by the Secretariat-General of the European Commission at the time of writing); (3) initiatives targeting islands, such as the clean energy for islands initiative; and (4) the smart islands initiative. In July 2020, a high-level conference by the Renew Europe Group highlighted the importance of rural areas in the recovery from Covid-19 in driving a transition to a greener and more resilient Europe. Sparsely populated regions are in our understanding different as traditional development challenges found in rural areas are both condensed in specific 'shrinking' localities and amplified to a spatially extended territory.

Although the interplay between demography and geography is the defining feature of SPAs, the role of institutional, cultural and economic processes in shaping these territories has been brought under the spotlight (Dubois & Roto, 2012; Gløersen, 2012). This means that the solutions that can be developed to mitigate the negative externalities inherent to remoteness and sparsity may also evolve and that the potential added-value of 'soft' interventions in creating improved social and economic conditions for territorial development in SPAs is worth examining (Gløersen, 2012). The Smart Villages for Rural Communities Intergroup of the European Parliament is an example of such a platform in which different stakeholders and networks such as Euromontana or the Southern SPA (SSPA) network are aiming to raise their needs.

This focus on soft processes is actually aligned with the shift of regional policy from a redistributive model, compensating certain regions on the basis of their identification as 'less favoured', to a growth-oriented model that seeks to increase regional competitiveness for all regions. This shift has induced a change of mindset by regional stakeholders in territories with geographical specificities in how they approach regional policy schemes. The fact that these constraints are not 'just' about physical obstacles indicates that a sole focus on compensating through hard infrastructure (e.g., transport) is not enough to promote sustainable territorial development. Worth examining is the potential added value of 'soft' interventions in creating improved social and economic conditions for territorial development in SPAs (Chilla et al., 2017; Gløersen, 2012). In the Nordic SPAs (i.e., Northern SPAs – NSPAs), more resources were committed to improving labour market conditions and internet rollout, instead of more classic 'hard' infrastructure projects such as transport (Giordano & Dubois, 2018). However, broadband rollout is as much an issue of hard infrastructure, for example, the construction of masts, the installation of antennas and the digging of fibre cable, as it is about developing soft skills, in terms of how actors connect to external markets. The recent Organisation for Economic Co-operation and Development (OECD) report on territorial development in the Nordic SPAs stressed the importance of continued investments at the regional level to improve the connectivity to markets through broadband as well as east–west linkages (OECD, 2017). Finally, recent research has emphasized the role of 'smart experimentation' as a way for stakeholders in less-favoured regional settings to incrementally adopt new practices aiming at solving persisting bottlenecks (Kristensen et al., 2018).

Manifold research has examined the realm of smart cities and the implications of digitalization, much of which can find consideration in designing digitalization processes in SPAs. Yet, the large majority of research on digitalization in local or regional development has been focused on urban experiences, with three overarching topics. First, researchers increasingly conceptualize urban developments under the influence of new technological influences, with, however, theoretical developments still being in their

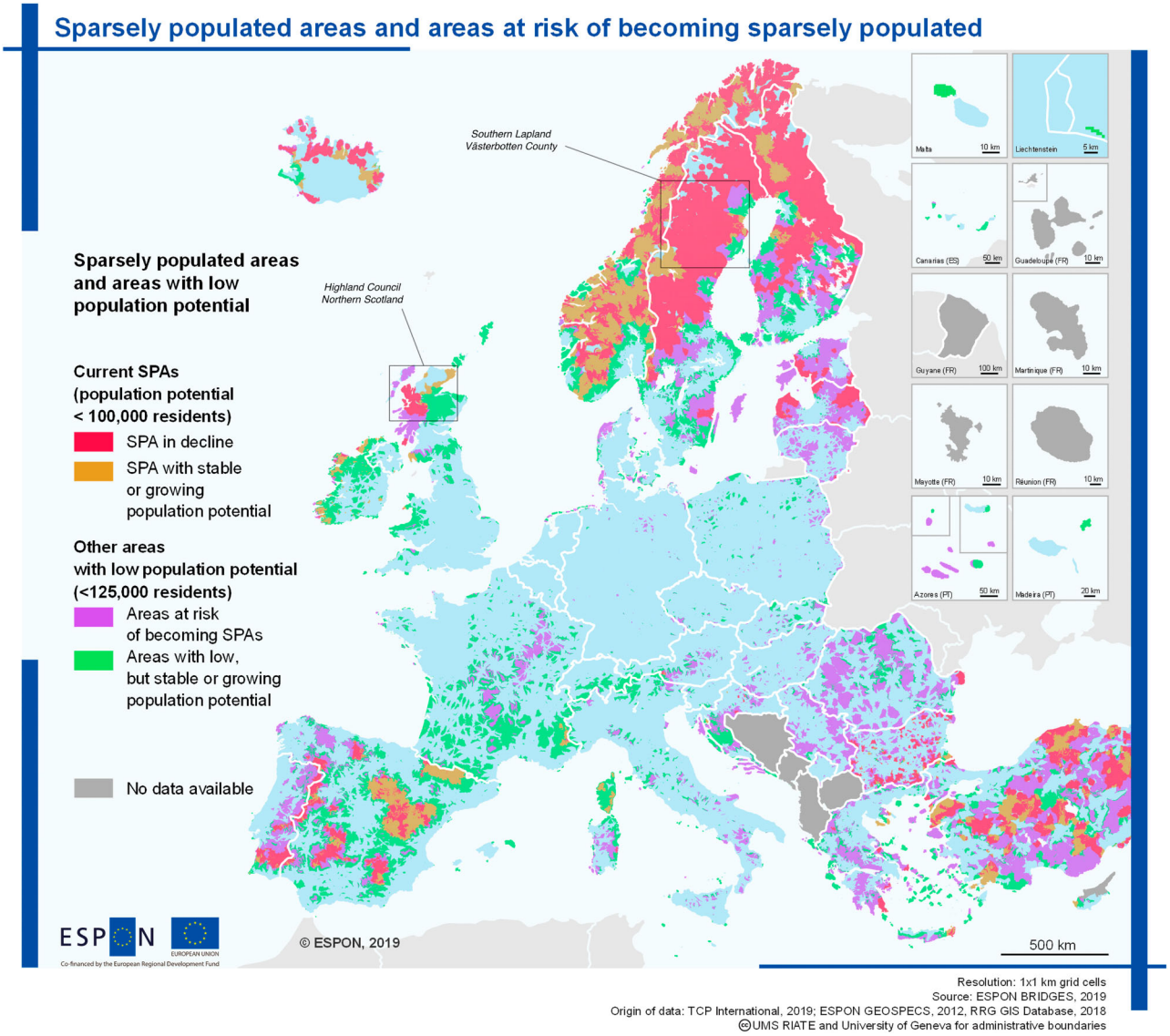

Figure 1. Evolution of the population potential between 2001 and 2017 in sparsely populated areas and areas at risk, with case study locations.

nascence. Rabari and Storper (2014), for example, speak about the digital skin the city is being coated with. Research on smart city development matured considerably in the last decade accompanied by the emergence of the smart village concept (Visvizi & Lytras, 2018; Zavratnik et al., 2018), a concept that has as well entered the EU policy sphere.

A second influential line of research focuses on the potentials and the role of big data that are produced in the urban (or rural) fabric, the role of augmented reality, 3D visualization and agent-based modelling, artificial intelligence, software developments and digital twins (e.g., Batty, 2013; Kitchin, 2014; Kitchin et al., 2018; Komninos, 2015). The introduction of sensors into homes and streets, however, has impacts on the human right to privacy and the ability to access public spaces without constraint. The multi-stakeholder relationships woven between citizen users, companies and government represent a nexus that is hard to govern (Komninos, 2015). This is even more relevant for rural developments, and in SPAs in particular, as information flows can be even more easily traced back to individuals.

A third line of research focuses on spatial, infrastructure and land-use planning, and digitalization in architecture, engineering and construction through information modelling. This indicates, paradoxically, that academics in planning and related fields are interested in smart cities, but have not yet focused on the technological tools capable of making cities, and to an even lesser extent rural regions, smart. Much of the literature from urban studies and regional planning on building information modelling (BIM), for example, is of a technical nature, looking at integrating different types of geospatial data (e.g., Tah et al., 2017).

As a result, we see that, at the European level and locally, soft strategies are developed to support digitalization processes, with governance supporting the extent and localization of hard investments. Yet, digitalization comes alongside new challenges around data privacy or ways of doing things. For rural communities,

digitalization promises more effective (and better) planning and coordination. Yet, the concrete implementation depends on the use case. For example, opportunities within tourism, heritage conservation and healthcare differ considerably. To take the example of planning, most planning authorities looking at digitalization are focused on linking up existing public datasets or digitizing existing data. Authorities on the cutting edge of digitalization are already considering ways to incorporate citizen data into their digital frameworks, for example, through the better coordination of transport flows. Digitalization is also primarily an issue of cost–benefit 'down-to-earth' infrastructure development (digging the trenches, laying cables, etc.). So even though the digitalization agenda is meant as a 'bridging' approach, it is faced with classic regional policy dilemmas: is it worth the investment?

CASE STUDIES

The goal of this section is therefore to scrutinize what digitalization has meant in its concrete implementation in the two examples of spatial planning and healthcare provision. What these cases highlight is the instrumental role of digital applications to reinforce the capacity of territorial authorities in the SPAs to design, organize and operate access to services despite scattered and thin population distribution.

Methodologically, the two case studies are built on desk research, document analysis as well as interviews and shadowing of local planners. Specifically, the Northern Scotland case study was conducted as part of the project Future Cities in the Making: Overcoming Barriers to Information Modelling in Socially Responsible Cities, funded by Innovate UK (cf. Sielker et al., 2019). The empirical analysis incorporated semi-structured interviews with 15 interviewees, mostly governmental officials from national and local administrations as well as representatives of governmental organizations such as Historic Environment Scotland (HES) or Future Scotland. The knowledge of challenges of SPA has been complemented by the ESPON BRIDGES case study of Wester Ross in the Northwest Highlands of Scotland. The ESPON BRIDGES case study gave further information about the specific challenges of depopulation and retention of skilled worker and poor road infrastructure through interviews and document analysis.

The Southern Lapland case study region corresponds to the inland and mountainous areas of the north Swedish county of Västerbotten. The case study material originates from the ESPON BRIDGES project and builds on document analysis and interviews. Interviews with five key informants, including the mayor of the Storuman Municipality, the leader of the Centre for Rural Medicine and a representative of the Region Västerbotten authority, were performed in order to validate the information collected through desk research and to delve deeper into the institutional context of the emergence of the Centre of Rural Medicine (CRM) as a driving force in digital heath experimentation in Sweden.

Northern Scotland: planning and digitalization in the Highland Council

Background to the region and policy issues

Recently, Scotland experienced a dynamic time for planning and digitalization with a rich array of projects and approaches to digitalization in planning and asset management emerging, These are, on the one hand, driven by a governmental push to move to more digitalization of the planning system and, on the other, by local authorities and public bodies such as HES which are rethinking their procedures and processes in planning through new digital opportunities. Digitalization is said to offer new opportunities for rural communities in Scotland in general. The Scottish case study shows that while some SPA have proven to be innovation leaders in digitalization, others were held back by financial and regulatory concerns. This case study exemplifies that profiting from the opportunities of digitalization requires a coordinated response across different governmental scales.

The following paragraphs will first introduce the challenges of SPAs in Northern Scotland, before discussing the push for digitalization in the field of planning as an example.

In the North of Scotland, the Highland county is an example of a forerunner for digitalization, and the change of processes based in the opportunities offered by digitalization. Geographically, Highland is the largest local authority in the UK and at 25,657 km^2 it represents over 11% of the UK. Figure 1 shows the population change with current SPAs and areas at risk of becoming SPAs. At nine people per km^2 in 2012, Highland is about as densely populated as Russia. The majority of Highland residents are living in settlements that are village sized or smaller. Wester Ross, researched in the ESPON BRIDGES project, is a local community in the region of the Highlands and Islands in North Scotland, representative of rural communities in Highland. North Scotland is characterized by small communities, each with a strong sense of community cohesion supported by a culture of voluntary work, but often without strong links to communities in the next valley, which may be some distance away over a mountain pass. The area attracts around 70,000 visitors each year, yet there is a low density of road infrastructure between regional centres, often with single-track roads. Northern Scotland is also characterized by topographical limitations, such as mountains and lochs, which leads to long travelling times between settlements. For services such as hospitals, larger businesses or colleges, residents often must travel to Inverness, the main regional town, which from many settlements amounts to a four-hour round trip by car. As a result, an insufficient number of skilled workers becomes a bottleneck, with high house prices fostered by secondary homes, increasing pressures on retention of skills. In addition, the poor quality of the road network as well as low provision of mobile and broadband services hinder further digitalization, which, for

instance, would limit the need to travel to Inverness to access services. The Highland Council was an example for using e-planning portals early and for moving to digital teams, which would allow planners across the territory of Highland to work flexibly. Their efforts are now meeting a more general push to go digital in planning in Scotland.

Policy developments and experiences

In 2016, a review of the planning system highlighted opportunities for digitalization to help improve planning and, as a result, a digital task force was formed to give Scotland a first-rate planning system enabled by digitalization. At the same time, the 2017 Scottish Building Information Mandate brought a focus to using digital tools for infrastructure management across the Scottish government, which was in the process of redesigning the planning system through a new planning bill. The Planning Act 2019 was passed by the Scottish Parliament in June 2019, with the Scottish government focusing on creating a digital planning service striving to become 'world-leading'. At present, they have several initiatives in this area, creating prototypes that visualize planning data in different ways to reveal investment patterns and development trends, for example. The Scottish government's digital planning team is working to deliver on the digital taskforce's agenda. It seeks to redesign planning's user interface to make submitting a planning application a user-friendly experience, and facilitate public engagement, and experiment with interactive 3D visualization that enable users to see proposed development in context, and allows users to track and comment on planned changes for areas they select.

A topic that played a major role in Scotland was the importance of rejuvenating the role of planning. Planning can play a strategic role, spatially aligning resources with needs for the present and future. Planning can also be a facilitator, convening different parts of government, responsible for delivering services such as education and roads, to collaboratively create a vision and a capital resource plan to support the future of communities. Digital tools can support these strategic purposes, giving planners better data to use when making professional judgements, and making public engagement easier and more meaningful. However, planning must be seen as more than a tick-box exercise, and communication between departments and across levels of government is of paramount importance. While the long-term impact of the 2019 new Scottish planning bill remains to be seen, hope was expressed by stakeholders that the bill can help planning assume this more strategic, forward-looking role involving local authorities and allowing responses to different local conditions. There may not be consensus on exactly what the Scottish government should do to digitalize the planning system, or on the role that technology providers should play in the country's digitalization processes. Preliminary analysis suggests that more joined-up approaches to planning, with fewer divisions in decision-making competencies and responsibilities, facilitate the kind of cross-disciplinary coordination that transforms planning from a rote exercise to a strategic tool.

Further examples of digitalization efforts are taken forward by non-governmental organizations and governmental organizations: spurred on by the UK government's BIM mandate, HES has embarked on an ambitious BIM programme. For, example HES explores how BIM and 3D modelling can serve conservation efforts through monitoring dampness. National parks, such as Loch Lomond and the Trossachs, which are at the same time a planning authority, developed an app to monitor and guide visitor streams. Scottish Futures Trust (SFT) is also actively engaged in preparing the country for a digital future. Aware that organizations and local authorities need a good business case to start using BIM, SFT has created an online tool to help understand the upfront outlay BIM requires and the return on investment. The point of return of investment, however, differs between more and less populated regions. Rural regions need a governmental awareness, of, for example, the financial implications of going digital.

Speaking with local planners in Highland county covering extensive rural parts of the country highlighted how geography plays a role in driving digitalization. Having the duty to cover such a large territory drove Highland to be a leader in adopting digital, mobile ways of working. A major policy response by Highland was the establishment of digital teams that work from across the region. In practice this means that planning applications are handled based on the capacity of staff across the Highland headquarters and field offices, not based on where the application was mad. This enables a more efficient use of human resource and required a change in the use of the specific e-planning software. When Highland adopted new digital processes, and most crucially started thinking in digital teams, they also embarked on a change process that fundamentally altered the way they operated and shared work across their field offices, as opposed to just making digital what was once done in analogue. This underscores the difference between digitization and digitalization. Highland reported previously moving physical files between offices by car in boxes. However, following a digitalization effort, the council moved to allocating work and sharing files electronically. This supported the pursuit for more mobile ways of working, to save the time and money required for planners to shuttle back and forth between sites and back offices.

Conversations with Scottish local authorities also highlighted the importance of having fit-for-purpose software systems that integrate with one another. For example, although building standards may function separately from the local development plan management processes, information collected through the building standards system, including building starts and completions, can directly inform future local development plans. A major challenge to overcome in order to build on digital tools for the planning as well the delivery of services is the facilitation of data sharing between interlinked processes and departments to deliver true value and

efficiency. Smaller authorities also highlighted that while moving to more digital ways of working creates efficiencies and cost-saving benefits, storing data itself is not cost neutral: local authorities may pay around £30 per gigabyte of data, and often do not know where their data are stored when they opt for hosted solutions. As the UK moves towards greater digitalization in planning and has new dependencies and rules post-Brexit, questions about the cost and location of data hosting will become increasingly important, which provides an additional challenge to SPAs.

Summary

The research showed that, as is often the case, individual leadership and transformative vision are necessary to jumpstart any change processes. There is appetite for developing pilot cases, amending procedures, testing software and learning about how digital tools, such as BIM, can support planning and building standards. However, interviewees also pointed to a need for further guidance documents. Engagements with local authorities in Scotland highlighted the need for a strong business case to be made before new technology is adopted. Current technological solutions are enabling more digital ways of working, but there is significant concern around where data are stored and how much data storage costs, as is covered in more detail in the barriers section below. Local authorities need to have a clear business case in mind to get funding for digital interventions. This is even more relevant for rural communities. This makes SFT's engagement around business cases intriguing. They have built out a website that enables users to analyse their own business case for utilizing BIM. Creating such a tool for adopting information modelling in planning will be helpful to eventually catalyse its broader rollout.

Like other nations, Scotland faces a variety of resource constraints. However, these constraints have not prevented government, at either the local or national levels, from pursuing a digital agenda. Yet, it is obvious that the needs of cities such as Edinburgh and Glasgow differ from SPAs, and the exact tools needed from software, therefore, as well. However, smaller communities, with less revenue for software providers such as Idox, may find it more difficult to ask for the amendment of software to cater their needs.

Southern Lapland: digitalization of healthcare and telemedicine in the far North

Background to the region and policy issues

The inland areas of Västerbotten have experienced a thinning out process (Figure 1). This process can be deemed as asymmetric as depopulation engenders in return an increased proportion of the local population belonging to certain cohorts. This is the case for the elderly whose proportion is expected to increase from 25% to more than 30% at the Horizon 2030. Currently, some inland communities already have more than 10% of their population older than 80 (Berggren & Holmkvist-Parkström, 2014). These populations are less mobile, which makes accessibility to medical facilities already a challenge and requires community coordination and intervention, increasing the cost of healthcare provision. The long distances from the inland to the regional hospital in Umeå, equipped for emergency and specialized healthcare, or to the daily care facilities located in municipal capitals create a geographical barrier for fast access to care. The personnel in the smaller community hospital need to be all-rounders rather than specialists, requiring both a broad and a deep medical knowledge, which is known as 'extended generalism' in Canada (Berggren & Holmkvist-Parkström, 2014).

In this use case, we focus on the transition to telemedicine in the southern Lapland area. As in the rest of Sweden, healthcare provision is the duty of the regional level. However, municipal services are in charge of primary care, as well as daily care for youth and elderly. Previous studies have highlighted that improvements in healthcare access in the region often focus on elderly care, overlooking the importance of youth access to care (Goicolea et al., 2018). As an interviewed elected official from an inland municipality noted, a key challenge for organizing healthcare there is the difficulty to recruit and keep skilled staff, both doctors and nurses. The latter has been a driving force for the promotion by the regional authorities of innovative solutions and technologies, for example, in telemedicine, to palliate to this labour force shortage. However, similar difficulties are found nowadays even in urban centres, although the shortage is less substantial than in remote communities (VLL, 2016).

Policy developments and experiences

A key actor emerged during the last decade, steering the transition to telemedicine, namely the Centre of Rural Medicine (CRM) located in Storuman, a municipality along the Norwegian border. The CRM aims to develop and mainstream techniques and practices that combine high-quality healthcare provision and cost-efficiency thanks to digital technologies (Berggren & Holmkvist-Parkström, 2014). It is involved in many aspects of such developments via research strategies, education planning and professional collaborations in the domain of rural health. The CRM has also become an cooperation interface between regional authorities and rural communities by many aspects of the healthcare system: providing higher quality medical care using scarce resources, developing remote styles of primary care (e.g., extended generalism), promoting distance-bridging technologies, better understanding health factors for the Indigenous Sami People, better educating rural doctors and nurses to provide medical care in sparsely populated settings, and facilitating the recruitment and retention of qualified staff (Berggren, 2012). The CRM has also engaged in multiple collaboration initiatives, for example, with the Norwegian Centre for Rural Medicine (NSDM) in Tromsö (Norway), Vasa University Finland, the Technical University in Skövde (Sweden) and Hospital of Southern Jutland Sønderborg (Denmark/Greenland). But it is the operationalization of distance-bridging technologies that has raised most interest from medical technics companies and territorial

authorities alike, for example, county and municipalities, and has been identified as the primary vector of healthcare digitalization with the potential for wider international applications (Berggren & Holmkvist-Parkström, 2014).

A concrete initiative implemented by the CRM was virtual health rooms (VHRs). A VHR is a room located in a public building equipped with state-of-the-art connected medical instruments. In the VHR, patients are directly participating in the medical act by being directed by a general practitioner through video call. Although this is not designed to eventually replace all occasions for face-to-face patient–doctor interactions, it seeks to optimize both the patient's and the doctor's time by reducing these interactions to the most necessary ones. A pilot project was undertaken in Slussfors, a community in the municipality of Storuman, in 2014–15. The VHR concept uses internet and medical technologies to provide some basic primary health services in locations where there is no or limited local access to a general practitioner (Näverlo et al., 2016). In the Slussfors case, the VHR is located at the local primary school facility. The goal is to establish such VHRs in about 20 small inland communities (Berggren & Holmkvist-Parkström, 2014). However, it becomes clear that the rollout of such solutions depends greatly on 'hard' investments made in broadband technologies for developing distance-bridging alternatives.

Summary

The work of the CRM has been instrumental in testing new medical techniques, new ways of organizing labour and new processes in a territorial setting i.e. likely to become a reality in many other parts of Europe and the world. The CRM could act as an interface between the growing medico-technical sector and the public sector (region and municipalities) to promote the diffusion and consolidation of new practices (Berggren & Holmkvist-Parkström, 2014). From the various interviews performed, it appeared that a key success factor to how the CRM has managed to grow and develop was the culture of collaboration and experimentation induced by a handful of local doctors in the hope to provide primary care to the local population.

The CRM has been very active in participating in international collaborations, and especially in Interreg projects, which is a central instrument in EU Cohesion Policy. This has allowed them to establish their competences within international networks, but also to palliate the lack of investment of regional authorities in addressing the specific needs of remote communities with respect to healthcare provision. An interviewee pointed out that regional institutional actors were late in recognizing the added value of the work developed at the CRM. Relying on external partners has thus been an advantage for the CRM in the early stages because it left more room for manoeuvre to experiment and test new solutions. By working within international networks, both European (especially the Northern Periphery programme) and globally (in Canada and Australia for the most part), doctors and researchers in rural health were able to mobilize external knowledge that was essential to bring novelty and improve the ability to undertake innovative solutions in the region.

The good level of access to ICT infrastructure in Sweden, even in its more SPAs (Dubois & Roto, 2012), has been a critical factor for facilitating the rollout of new generations of healthcare services, but also created a lasting culture grounded on entrepreneurial behaviour, innovation and public–private cooperation (Region Västerbotten, 2014). The CRM experience showed the importance of having an embedded actor steering this process, as opposed to having a more institutionally and geographically distant actor do it. The implementation of VHR also led to some scepticism, and in some cases serious concerns, by the local population as it was perceived as some kind of validation of the physical disengagement of authorities in those places.

DISCUSSION AND POLICY IMPLICATIONS

The cases presented above provide an in-depth exploration of the potential impact of digitalization on territorial development in SPAs. Although these experiences may not be replicated as such in other locales, they nonetheless raise key learning points about the added value of policy experimentations in order to make the best of technology rollout in such unfavourable places. Table 1 identifies four domains of learning and synthesizes how the cases inform us on them.

European policymaking

The results of the ESPON BRIDGES projects and interviews conducted as well as the two cases studies presented highlight a need at a European level to provide more institutional support for the implementation of digitalization strategies in member states. The new programming period for cohesion and regional policy has thus provided more financial support for 'SMART' initiatives. Smart Villages has gained moment as a main tool for rural development, which helps bring closer the objectives and means of cohesion and rural development (CAP Pillar 2) policies.

The European Commission is also currently investigating the possibility to develop an overarching European strategy for addressing the negative impact of sparsity. Digitalization will likely play an important role as a lever for achieving higher territorial development levels in those areas. As sparsity has long been treated as an issue for territorial planning, it has mostly been under the prerogative of individual member states. However, the continued depopulation of the most thinly populated and remote rural areas across Europe (Figure 1), the perceived decommitment of the state on funding sustainable social infrastructure and the democratic deficit these engender has progressively led to an understanding that sparsity needs to be addressed from a holistic perspective, especially in terms of fair access to services and job opportunities. Under this new light, digitalization needs to be more widely adapted to the needs of peripheral regions.

Table 1. Case study synthesis.

	Case 1: Northern Scotland	Case 2: Southern Lapland
Geography	• Large territory • Thinly populated areas, with challenging accessibility due to mountain ranges, islands and fjords; most urban centres are on the coast • Capital of Highland Council is Inverness	• Thinly populated, inland • Small, scattered and shrinking settlements with an ageing population and marginalized groups (e.g., Sami, asylum seekers) • Approximately three to four hours' drive to the main regional healthcare facility (Umeå hospital)
Challenges	• Large territory, requires move to digital teams • Moving from paper to digital requires a change of working modes and patterns, as well as making sure that citizens are informed about new planning procedures, and changes in software used for planning procedures • New challenges for data protection and financial implications of going digital • Need for a strong business case to be made before new technology is adopted	• Less mobile, more isolated population in greater need of primary and emergency care • Extended generalism: local doctors need to acquire a wider range of skills and expertise with fewer resources • Recruiting and retaining skilled staff for longer periods of time, both doctors and nurses, is challenging
Funding scheme and networks	• A total of 32 local authorities and national governments meet regularly • Local authorities' funding needs to reflect the extra payments cloud-based solutions require as well as training for human resources	• Interregional practice-oriented projects (e.g., Interreg) • International research and development (R&D) collaboration (e.g., Framework Programmes) • Lack of interest, trust and funding from the regional healthcare system to the general medical council
Drivers of innovation	• Review of the planning system and ambition to develop a digital planning service with customer interfaces prototyping a planning system platform that would enable the public to see proposed developments in 3D	• Telemedicine • Virtual health rooms • Cottage hospital model
Institutional/ systemic change	• Planning (Scotland) Act 2019 sets out the structure of a modernized planning system • New digital transformation of the planning system and the development of platforms for customers and local authorities (five-year programme that will implement Transforming Places Together: A Digital Strategy for Planning) • Communication around new performance criteria for local authorities • New requirements for planning permission applications • Lack of human resources and stripped-down planning departments • Role of planning itself has been reduced over the years leading to a bad reputation of planning as a discipline • Different needs of local authorities of different sizes need to be further considered	• Rural medicine as a specific medical specialty in education • Emergence of a new locally embedded actor, that is, Centre for Rural Medicine, promotes new governance approaches in regional healthcare • Testing and adapting available technologies and techniques to local conditions • Raising the acceptance for telemedicine in the local population • Reluctance by locals to fully embrace change • Fear that distance-bridging technologies might become the new norm in other key services (e.g., schools) • Lack of early support by national and regional institutional actors

Territorial actors from peripheral regions may also have an important role to play in European policymaking by federating their perspectives and bringing a constructive, united voice to support policy developments at European levels. The Nordic network NSPA has proven that such initiatives may be the way to go. The

SSPA network that comprises regional actors from SPAs in southern EU members (Spain, Croatia and Greece) attempts to replicate this success story. Although a larger actor network may increase the leverage of SPAs regions to influence European institutions, it may as well dilute their message that such groupings may bring because SPAs are, by nature, highly heterogenous. In addition, the increased attention paid to 'places that do not matter' at the European level should also take account of the disadvantages of SPAs and further interregional governance support platforms should be instrumental.

National and macro-regional

What our case studies show is that digitalization needs to be understood in the context of devolution of prerogatives within the national state, and most specifically the necessary alignment between devolved duties and the financial means to achieve them. In both Sweden and Scotland, territorial authorities have extensive duties with regard to planning and service provision. However, with the emergence of austerity measures as in most European countries, the resources allocated by small territorial authorities is not aligned with the extensiveness and scope of the issues that need to be addressed, both short and long term. As a matter of consequence, territorial authorities do not have the means to narrow the gap with larger urban authorities.

Although currently largely in the making, the macro-regional level may emerge as an intriguing new institutional arena to bring together regional forces in order to implement a realistic digitalization agenda for SPAs. Indeed, macro-regional strategies have proven to be effective in rescaling the regional development debates out of the national sphere and into the European one, albeit in territorial 'patches'. Although the financial means and strategic objectives of digitalization need to be addressed as a dialogue between European and national institutions, macro-regional strategies, with their stronger regional anchoring, may provide an adequate level at which to plan and steer the balanced implementation of such agendas. One such example is the potential of the Danube Region macro-region, which took up digitalization as a strategic cross-cutting goal, to support vocational training and to support training programmes in support of skills development.

Regional, cross-border and interregional

The European Commission is currently pushing for the mainstreaming of territorial strategies as a way for regions to address their local development issues in a long-term and integrated manner. As seen in our case studies, digitalization may be integrated in multiple aspect of local and regional planning. However, this implies, besides a continued rollout of ICT infrastructure, for territorial authorities to upgrade the skills and competences of their administrative staff. While such knowledge acquisition is not an issue for larger authorities, which can afford having a wide pool of experts, for smaller ones, such as the ones in peripheral regions, this put an extra strain on the coping capacity of their administration due to their limited human resources. Besides needing to maintain knowledge in a wider range of fields, administrative staff may as well need to become more proficient in handling such digitalized processes. In the end, this may end up widening the digital gap between large authorities and smaller one. Knowledge-learning and bottom-up initiatives remain key opportunities for making SPAs' voices heard, as illustrated by the emergence of soft governance platforms such as the SSPA network introduced above.

CONCLUSIONS AND SUMMARY

We started our paper by stating that although we believe digital solutions may in early stages of adoption alleviate some substantial bottlenecks in service provision in remote rural settings, they may ultimately create a systemic rift regarding what can be expected as 'good' or 'fair' level of service provision in these areas. The examples presented show that indeed going digital can lead to the same quality of delivering public services. However, examples such as the VHR raise questions about whether the level of service provision is fair. This remains to be observed. Another major rift that we observe is the fact that rural areas are almost systematically disadvantaged to meet the minimum criteria for profitable business cases, and subsequently will almost always need additional support by governments to be able to develop tailor-made digital solutions. This is even more relevant as digital planning processes rely on external service providers. However, at the same time by going digital the Highland example showed that access to service provision becomes more equal. First, working in remote teams allows the assignment of tasks depending on workload, allowing for other field officers to help areas that at one point in time may have an increased workload. Second, by supporting digital e-planning portals and moving away from paper files allows all inhabitants an easier access.

Overall, going digital necessarily means to move from connectivity to connectedness, that is, from building a hard infrastructure to developing the social use of this infrastructure. This is central to reduce the digital divide between urban and rural areas. The Scottish case study showed that transforming to digital planning processes meant for local citizens to stop submitting paperwork, a process that was easier taken on by younger citizens. The cases presented show that tailor-made solutions for the delivery of public services are needed. Yet, the two cases indicated that a digital journey can enable a better delivery. Knowledge exchange at the European level can help SPAs to jumpstart on a digital journey, raising the question of how regional policy regulation at the EU level allows the development of such projects. While solutions to shrinking need to be locally embedded, its territorial governance experienced a rescaling towards the European level due to its increased knowledge exchange platforms and agenda-setting activities through the networks. This is an experience that has also been found in other territorial rescaling endeavours, such as through

macro-regions or corridor platforms (Sielker & Stead, 2019). Further research is needed to identify which forms of coordination across governmental scales are needed to tackle different development concerns, such as health or planning.

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