Digitalisation and just transition - Research article

Digitalisation in rural areas: exploring perspectives and main challenges ahead

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Abstract. This paper offers a comprehensive critical review on digitalisation in rural areas, drawing on international and EU policies, scientific and grey literature and real-life examples from two European H2020 research projects. In doing so, it aims at providing a basic conceptual framework encompassing three main intervention areas, with relative sub-themes, identified as relevant for rural areas, namely: the rural digital divide, the attractiveness of rural areas and opportunities for strengthening local governance. For each of these broad themes, the role of digital tools is explored and supported by case study examples providing valuable insights and real-life applications in rural settings.

Keywords: digitalisation, digital divide, rural areas, rural policy, governance.
JEL codes: Q0, R00.

HIGHLIGHTS

- Rural and remote areas hold great potential to realise the benefits of digital transformation.
- The essential conceptual framework is composed by three main areas of intervention: the digital divide, the attractiveness of rural areas, and rural governance.
- Careful reflection on these areas should accompany any consideration about, and processes of, rural digitalisation.

1. INTRODUCTION

Since the launch of the initiative on the Long-Term Vision for Rural Areas (LTVRA) by the European Commission, rural areas have been gaining momentum as a core component of the European society. Being home to 30% of the EU's population (i.e. about 137 million inhabitants) and extending over 80% of the EU's territory, rural areas are, in the words of President Von der Leyen "the fabric of our society and the heartbeat of our economy. The diversity of landscape, culture and heritage is one of Europe's most defining and remarkable features" (European Commission, 2021).

The heterogeneity of rural areas has been long acknowledged (OECD, 2006), and it is also recognised that rural areas overall have been changing profoundly in the past decades as a result of trends occurring at global level (Bock, 2016), such as urbanisation, globalisation, environmental and technological change, as well as social, political, economic and ideological pressures (OECD, 2019; Woods, 2019). Population decline and ageing are particularly significant phenomena in rural areas compared to cities and towns (European Commission, 2021a), and are further exacerbated in the most remote areas due to the outmigration of economically active people, and especially of young women (European Commission, 2021a).

Life in remote areas is in general characterised by a low level of well-being, due to limited or difficult access to basic services such as healthcare, education, and transport (Casini, 2019), and ensuing dependence on private cars for accessing quality essential services at a distance (European Commission, 2021). Further issues related to climate change, environmental damage and biodiversity loss pose additional, significant threats to the quality of life in rural areas, potentially undermining their capacity to recover and progress (European Commission, 2021). The risk is that, if no decisive action is taken, the current loss of attractiveness combines with multiple problems, and eventually strengthens a vicious circle of marginalisation leading to rural areas' ultimate decline (Bock, 2016). The public EU Long Term Vision consultation has identified inadequate or lacking infrastructures, scarce employment, and poor digital connectivity as the most pressing issues to be urgently addressed (European Commission, 2021). As the latter is concerned, the EU Commission observed that only 59% of households in rural areas are provided with next generation access broadband (>30Mbps), a much lower share compared to the average EU level (87%) (European Commission, 2021).

Despite many challenges, numerous opportunities have been identified for the future role of rural areas in the EU, ranging from development of the bioeconomy and management of natural assets to tourism and climate change mitigation: digital connectivity and technologies, it has been emphasised, are key enablers for all such activities and sectors (European Commission, 2021). In the last couple of years, the COVID-19 outbreak had a role of accelerator of the use of teleworking, remote learning, and e-services, opening opportunities for settling in rural villages and towns, which have become more attractive at the prospect of long commuting and chaotic containment measures in urban centres (OECD, 2020; ENRD, no date).

However, these changes did not come without issues: the hard circumstances experienced by large shares of vulnerable people, notably the elderly, living in rural areas with little or no healthcare services (OECD, 2020) were in some cases exacerbated by the phenomenon of "coronavirus holidays", i.e., the mass move to second homes observed, for instance, in the Welsh countryside (Goodwin-Hawkins, 2020).

In the agricultural sector, the fourth industrial revolution driven by digitalisation has been prompting the development of digital solutions designed for activities on-farm (e.g., field sensors, GPS guidance systems) and for the whole food value chain (e.g., e-commerce platforms, food traceability systems) (Rolandi *et al.*, 2021). Such instruments may contribute to alleviate the impacts of depopulation and abandonment in rural areas, e.g., by ensuring access to markets, creating economies of scale, providing new job opportunities, and reducing the physical burden of farm labour (Ferrari *et al.*, 2022; Rolandi *et al.*, 2021; Popescu *et al.*, 2020). Nonetheless, "digitalisation is a socio-technical process" (Brunori, 2022), that involves the adoption and integration of digital technologies into various aspects of our lives, societies and organisations. As such, it may generate many expected and unexpected impacts which can affect the social, environmental, economic and governance dimensions (or domains) of rural areas (Rolandi *et al.*, 2021; Rijswijk *et al.*, 2021). Therefore, scholars suggest that the complexity of digitalisation impacts be considered when such processes are involved (Brunori, 2022; Klerkx *et al.*, 2021; Rijswijk *et al.*, 2021). Issues such as social exclusion of vulnerable and less educated actors, disparities between large and small economic players, dependency on technology and loss of skills, detachment from nature, privacy, data security and ethical issues are among the negative and interconnected impacts which may potentially affect rural areas if unmanaged processes of digitalisation were to occur (Ferrari *et al.*, 2022; Rolandi *et al.*, 2021).

In consideration of all the above, the present paper aims at appraising available scientific and grey literature on the role of digitalisation processes in rural areas and at putting forward a basic conceptual framework based on a set of three main areas of intervention which cannot be disregarded in any rural strategy. These areas' identification draws also on the preliminary reflections made in the context of two European Horizon 2020 projects adopting multi-actor approaches to collect research needs from practice and inform policy and practice in turn.

The remaining part of the paper is structured as follows: Section 2 provides a short outline of the EU policy context in relation to digitalisation objectives in rural

areas. Section 3 illustrates the methodology used, while Section 4, 5 and 6 delineate the three intervention areas identified for supporting processes of digitalisation in rural areas, namely: the rural digital divide, the attractiveness of rural areas, and opportunities for strengthening local governance. Concluding remarks are given in Section 6, bringing the paper to a close.

2. THE POLICY CONTEXT

The Communication on the LTVRA (European Commission, 2021) has identified four primary areas of intervention with the goal of strengthening rural areas, with digitalisation acting as a cross-cutting factor. The first area of action is designated as "Stronger rural areas" and is meant to be the first step in achieving all other areas. Here, digital tools are to offer creative solutions for the delivery of services, opening the door to the possibility of developing rural communities that are desirable as a place to live. The second topic, "Connected Rural Areas", discusses the importance of digital infrastructure when it comes to the use of services like e-Health, home banking, digital administration-related services, and more services to promote the inclusion of women and vulnerable groups in rural areas. "Rural Digital Futures" is one of the nine flagship initiatives in this area of intervention. It aims at promoting rural areas' digital transformation by acting upon:

1. Digital connectivity, to bridge the gap between rural and urban areas and enable universal and affordable access to high-speed connectivity. To this purpose, a Broadband Competence Offices Network has been recently launched[1] to support EU countries in implementing broadband's rollout.
2. Digital technology, which refers to the digital innovation and new technologies that may contribute to the development of rural areas, through funding from Horizon Europe and Digital Europe Programme (DIGITAL).
3. People, by promoting the development of digital skills and entrepreneurship, so that everyone can benefit from the digital transition, through funding from the European Social Fund (ESF) and the European Agricultural Fund for Rural Development (EAFRD).
4. Measuring progress towards closing the digital gap, by rearranging existing indicators, and providing a Rural Digital Index (European Commission, 2021: 19).

The third intervention area outlined in the LTVRA focuses on developing "Resilient rural areas" that promote well-being. The primary objectives of this area are to preserve natural resources and create areas that are more resilient to natural hazards, climate change and economic crises. Digital tools are considered valuable instruments in achieving these goals, as the use of sensors can provide insight into soil characteristics and inform better decisions on potential interventions. In the fourth intervention area, "Prosperous rural areas", digital literacy plays a crucial role. The ability to use digital tools is considered essential for diversifying economic activities.

The LTVRA has identified nine flagships to guide its actions, which will be implemented through the Rural Pact and Rural Action Plan. The success of these plans will also depend on the involvement of the Rural Pact Community, who will contribute ideas and initiatives to help achieve the objectives of the LTVRA.

Rural areas' significance is also evident when considering other EU policies, such as the European Union's Green Deal and the current European Digital Strategy that falls under the digital agenda. For instance, rural areas are essential for achieving the EU Green Deal's objective of making Europe carbon-neutral by 2050 (European Commission, 2019). In addition, the circular and bio-economy development, the preservation of biodiversity, and renewable energy production offer numerous opportunities for rural areas. In these sectors, the EU assigns digitalisation a significant role in policy implementation.

The current digital agenda in Europe is centred on the digital transformation envisioned for the digital decade (2020-2030). As part of this vision, the European Commission set out the 2030 Digital Compass: the European way for the Digital Decade (European Commission, 2021b), confirming the role of rural areas in achieving the objectives of the EU Green Deal, the Farm to Fork and Biodiversity Strategies. However, to reach a level of efficiency capable of significantly improving the quality of life in rural and remote areas, actions are needed, and what needs to be primarily eradicated is the digital divide and consequent "digital poverty" (European Commission, 2021b).

As a component of the current digital agenda, the EU Commission has recently introduced a Declaration on digital rights and principles, the aim of which is to foster a digital transition shaped by European values. The proposed rights and principles are structured around six key values that are fundamental to promoting a sustainable and human-centric digital transformation, namely:

1. Putting people and their rights at the centre of the digital transformation.

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[1] Details are available at https://digital-strategy.ec.europa.eu/en/policies/bco-network

2. Supporting solidarity and inclusion.
3. Ensuring freedom of choice online.
4. Fostering participation in the digital public space.
5. Increasing safety, security and empowerment of individuals.
6. Promoting the sustainability of the digital future (European Declaration of Digital Right and Principles for the Digital Decade: 2-7).

In addition, the new Common Agricultural Policy (CAP) is one of the tools that will be used to implement the Farm to Fork and Biodiversity strategies in rural areas, as well as to promote knowledge and innovation. In the new CAP, Strategic Plans are demanded to each Member State to attain the specified targets through their National Digitalisation Strategies.

3. METHODOLOGY

The paper is structured as a critical literature review, and presents, analyses and synthesises material from diverse sources with the aim to develop a basic conceptual framework to support rural digitalisation processes. It therefore identifies a set of three main areas of intervention which should form the foundation of rural strategies.

Besides the appraised scientific literature and most recent EU policies in the field, the paper builds upon, and further expand, previous work carried out under the framework of two European Horizon 2020 projects, namely: DESIRA and SHERPA, in which the authors were actively involved, respectively as coordinators and partners.

DESIRA (Digitisation: Economic and Social Impacts in Rural Areas) involved 25 partner organisations (research institutes, NGOs and SMEs) coordinated by the University of Pisa and was completed in May 2023. It aimed to enhance the society and political bodies' capacity to effectively address the challenges arising from digitalisation in agriculture, forestry, and rural areas.

Sustainable Hub to Engage into Rural Policies with Actors (SHERPA) is a four-year project (2019-2023) with 17 partners. Approaching its final completion, SHERPA has been gathering knowledge to contribute to the formulation of recommendations for future policies relevant to EU rural areas. It has done so by creating a set of science-society-policy interfaces as a forum for two-way exchanges of ideas for co-learning and co-creation of knowledge at regional levels among a wide variety of rural actors.

By including cases from the two projects – namely: Multi-Actor Platforms (MAPs) and Living Labs operating at regional/national level for knowledge co-creation

and sharing on digitalisation in rural areas – the review acknowledges the contribution of multi-actor approaches in generating and integrating different kinds of knowledge through collaboration (Lawrence *et al.*, 2022; EIP-AGRI, S. P., 2017). After the literature review, the cases were therefore taken in consideration to prioritise and identify the areas that are the main objective of the present contribution. The main key points as critical review emerged from previous academic contributions.

4. ADDRESSING THE RURAL DIGITAL DIVIDE

COVID-19 has exposed the digital divide as never before (Aissaoui, 2022), revealing many contradictions of the digital era. Aware that the concept has a vague and extensive nature, which make it applicable to very different contexts, we here refer to the digital divide as the difference in access to, and use of, information and communication technologies (ICTs) between urban and rural areas, that remains despite many advances in recent years (OECD, 2018). Townsend *et al.* (2013) point out that the rural digital divide is a complex issue caused by persisting challenges of connecting remote areas and the characteristics of rural populations that may hinder the adoption of technology. Rural areas tend to have weaker infrastructures and less human capital, both constituting critical barriers for engaging with the next phases of technological innovation (Cowie *et al.*, 2020). As urban areas continue to improve technologically leaving rural areas further behind, the digital divide constitutes a new layer of spatial inequalities in our society (Dubois and Sielker, 2022).

The UN-Habitat (2022) recognises that rural areas are affected by a 'triple digital divide', which encompasses broadband connectivity, skills, and uptake. Overcoming the rural digital divide will therefore depend on addressing the interaction among the following three determinants: connectivity, digital capital, and motivation.

4.1. Connectivity

An increasing number of daily activities and services, ranging from healthcare and education to work and social networking, are carried out online, making access to broadband "an essential tool for participation in modern society" (Townshend *et al.*, 2013). Although this is even more valid for remote rural areas, little information is available to measure the rural digital divide at the EU level. Among available data sources, the Digital Economy and Society Index (DESI; European Commission, 2022) analyses the state of digitalisation in Europe, and provides data on connectivity. According to the DESI report,

while the internet gap on broadband has decreased in recent years, this is not the case for the fixed very high-capacity network (VHCN), for which the gap between rural and other areas has increased. This confirms that the digital divide is a complex and dynamic phenomenon (Van Dijk and Hacker, 2003), and that proactive approaches are needed for addressing it. The connectivity gap is a case of market failure: in sparsely populated areas, the demand is not sufficient to recover the cost of infrastructure investment. This can lead to a digital divide problem, as a lack of infrastructure can hinder the demand for internet-based services and the lack of demand may discourage investment from internet providers, leaving rural areas underserved (Malecki, 2003). Moreover, the problem is constantly evolving as technology advances, requiring an upgrade of infrastructure (Salemink *et al.*, 2017). To address these market failures, public support is required, which can come from either the government or local municipalities and public-private partnerships. These partnerships can play a crucial role in promoting digitalisation (Gerli and Whalley, 2021; Randall *et al.*, 2020): for instance, bottom-up models to finance and deploy high-speed networks led by municipalities or community-run enterprises have proved successful in Sweden, where nearly 50% of local fibre networks are owned by such enterprises (ENRD, 2018). Different policies exist in OECD countries for addressing the digital divide, which include the imposition of regulation for coverage of rural areas by providers, financial support, planning and monitoring (OECD, 2018).

4.2. Digital capital

It has been emphasised that "digital infrastructure is a necessary, but not a sufficient, condition for economic development" (Tranos, 2012: 332). Individuals or households need specific resources to use digital technologies, which can be referred to as digital capital. Digital capital encompasses digital competences (such as information management, communication, safety, content creation, and problem solving) and technology (Ragnedda, 2018). Literature on digital exclusion points out to low-educated people with little or no experience in using ICTs as those more at risk of offline exclusion and marginalisation and in need of empowerment (Salemink *et al.*, 2017). However, empowerment processes must consider the general economic and social conditions (Salemink *et al.*, 2017), and rural incomes are on average lower than incomes in urban areas, raising issues related to affordability of digital equipment and high tariffs for internet services. The relevance of human capital retention and attraction in rural areas is recognised by the Centro Portugal

Multi-Actor Platform operating within the SHERPA project[2]. Here, the Strategic Plan for Innovation of the Municipality of Fundão, in place since 2013, has introduced computer programming in all municipal schools, starting from children aged six and upwards, with the aim of targeting digital literacy (Mendes and Santos, 2022).

4.3. Users' motivation

The users' motivation for using digital technologies is another key determinant of the rural digital divide. It has been highlighted that the attitude towards digital technologies, and people's aspiration and usefulness in relation to their usage, are what eventually determines the level of acceptance of ICTs (Salemink *et al.*, 2017). In general, rural areas are known for displaying a lower attitude towards digital technologies compared to urban areas. However, in the face of clear needs and with knowledge about the solutions at hand, uptake by rural dwellers can be high, and motivation to learn and to use digital technologies can increase sensibly (Slätmo and Löfving, 2022). The use of internet-based instant messages, for example, responds to the need of social interaction and enables people who live far away to communicate with relatives, friends, and colleagues; online platforms and meeting spaces make possible to take part to virtual communities of interest, access resources and information (Wallace *et al.*, 2017).

However, motivation is related to the potential rewards in using digital technologies. For example, COVID-19 has functioned as a driver of motivation, e.g., in the case of the Living Lab of the Scottish Crofting Community in western Scotland activated within the DESIRA project[3]. Since the broadband was installed just before the outset of the pandemic, the inhabitants of this remote rural area were motivated to take up the advantages of digital tools at a relatively faster pace, although the oldest members of this community are likely to be excluded from the digital transformation (Townsend and Duckett, 2022). Also, digital technology design could influence motivation: low-cost, easy-to-use, compatibility with users' lifeworld would encourage technology adoption.

5. DIGITALISATION AS A DRIVER FOR IMPROVING THE ATTRACTIVENESS OF RURAL AREAS

The LTVRA envisages that, by 2040, rural areas will be "attractive spaces, developed in harmonious ter-

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[2] https://rural-interfaces.eu_
[3] https://desira2020.eu

ritorial development, unlocking their specific potential, making them places of opportunity, and providing local solutions to help tackle the local effects of global challenges" (European Commission, 2021). One major challenge is therefore for rural areas to become places that are chosen to live, work, and visit, or all three. Four main components of rural attractiveness can be identified, and that digitalisation can support: the quality of the (rural) environment, the quality of social relations, the quality of work, and the quality of services.

5.1. Quality of the rural environment

The rural environment includes natural and cultural resources that offer a range of benefits to individuals such as clean air, water, biodiversity, and attractive landscapes. These qualities – which can be epitomised in the concept of the countryside capital – can be transformed into economic value through tourism and local products such as food (Willis *et al.*, 2015; Garrod *et al.*, 2006). Digital technologies can play a key role in promoting the rural environment by raising awareness and showcasing its offerings to a wider audience. For example, social media and geographical information systems can make the rural environment more visible and accessible to tourists, while virtual reality can create new experiences and support promotion strategies (Flores-Crespo *et al.*, 2022). Citizen science can also contribute to the accumulation of knowledge about the rural environment and encourage people's involvement in building a territorial identity (Tindale *et al.*, 2023).

On the other hand, rural areas are vulnerable to natural disasters, but digital technologies can aid in managing these challenges by providing real-time environmental information. This data can be used by public authorities, private businesses, and civil society to improve the management of natural resources and ensure their sustainability.

5.2. Quality of social relations

Rural areas may benefit from a strong sense of community (Townshend *et al.*, 2013), based on frequent face-to-face relationships, a reduced number of members of the community, and some shared "sense of belonging" they may attach to the place. However, this may be a limitation for some, and rural areas' physical isolation may turn into a set of challenges at the individual person, firms', and communities' level. ICTs can, on one hand, contribute to creating social capital within a community, reinforcing local social relationships; on the other, they can enable networking opportunities outside the local place of residence, especially for young people, those working remotely, commuters, and new residents (Zerrer and Sept, 2020; Wallace *et al.*, 2017).

One example comes from the case of Cloughjordan Ecovillage (Ireland) on which the DESIRA Living Lab[4] was based. Developed 10 years ago in an area with little employment opportunities ad low population density, this Ecovillage experienced significant positive impacts of digitalisation, including innovative projects, citizen-led innovation, reduction in travel to work, rural repopulation, and strengthening of local economies resulting in an improved quality of life (White, 2022).

5.3. Quality of work

The COVID-19 pandemic has prompted a re-evaluation of the role of rural areas in attracting working professionals who can work remotely. A study by McKinsey Global Institute (2020) found that more than 20% of the workforce can work remotely as effectively as they would in an office, which would result in a significant increase in the number of people working from home and have a major impact on urban economies, transportation, and consumer spending. Commuting has a relevant impact on rural economies, as it retains incomes and activates demand for goods and services (Andersson *et al.*, 2018) in areas traditionally characterised by a low users' base. Replacing commuting, especially in information-intensive work areas, with remote work would reduce carbon footprints (Bosworth *et al.*, 2023), lead to substantial savings in terms of time, energy, and improve the quality of life for workers (Adobati and Debernardi, 2022).

Significant improvements in digital platforms for real-time collaboration and communication and learning processes have contributed to reduce the productivity gap between working from a distance and working in person. However, to make rural areas attractive spaces for remote workers, both technological and non-technological factors are important: adequate connectivity is a prerequisite, and remote workers will decide to live in rural areas only if the quality and cost of living are competitive with other locations. The role of rural coworking spaces has been emphasised for its potential to increase rural areas' appeal. Bosworth *et al.* (2023) maintain that these spaces can play a role in creating rural-urban linkages and smart rural development as they combine local and extra-local networks, different sectors, and professions, with the help of social and digital infrastructures.

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[4] *Ibidem.*

The potential of remote working hubs and location-independent work and study have been at the centre of Finnish and Swedish public debates in recent years. Initiatives promoted by national and regional authorities have been highlighted by the MAPs involved in the SHERPA project[5], ranging from the creation of networks of remote working hubs in Finland (Stjernberg, M., Salonen, 2022) to investments made in data storage, data mining and energy in the Swedish remote area of Norrbotten (Slätmo and Löfving, 2022).

Digitalisation plays a role also in traditional sectors, such as agriculture. In a whole range of activities, ranging from farm, crop and livestock management to the various stages of the supply chain and operations related to soil and water management, digital technologies can contribute to relieve the workforce and make agriculture more attractive (Brunori, 2022).

5.4. Quality of services

It is well-acknowledged that rural communities tend to face unfavourable living conditions, compared to urban centres, due to limited economic productivity, poor job prospects, and inadequate services and infrastructures. The closure of essential facilities such as schools, post offices, grocery stores, and healthcare services, often only available with extended travel times, has led to a decline in rural populations, especially of young and skilled individuals (Zerrer and Sept, 2020; O'Shaughnessy *et al.*, 2022).

Digitalisation is intended as a viable alternative for delivering cost-effective, remotely coordinated, public services in the most remote rural areas (Dubois and Sielker, 2022) and is gradually alleviating some of the traditional deficiencies, as e-commerce, home banking, and home entertainment provide access to commodities and services otherwise unavailable. Digital services provided by public administrations are reducing the need for in-person visits, and distant learning can be used to provide supplementary skills to children. Sharing models with app-based solutions, for instance, may contribute to address the lack of mobility services (SMARTA, 2019). E-Health can help bridge the gap between rural populations and the healthcare system, enabling self-monitoring and offering feedback to patients, if not considered just in terms of a reduction of costs. However, the perception of a lower quality of basic digital services may raise issues of territorial inequalities, if such services are compared to those available to urban dwellers: a sense of "reduced citizenship" and "less deserving" communities has been referred to by older adults experiencing digital healthcare (Lindberg and Lundgren, 2022). Likewise, digital services may benefit those segments of population with higher education and income level, who are more likely to benefit from ICTs, exacerbating existing inequalities.

One example of application of digital tools to provide specific services to vulnerable rural residents is the case of elderly care in Tamási, Hungary[6]. This small town implemented a sensor system to monitor the conditions of the most disadvantaged households and alert social workers if their homes are not heated. In this way, the municipality gained valuable knowledge about heating habits, which facilitates the planning of the social supply of firewood in winter (Gaál and Bálint, 2022).

6. STRENGTHENING LOCAL GOVERNANCE THROUGH DIGITALISATION

The LTVRA includes an area focused on improving the capacity of local actors to align their goals around strategic areas. On this purpose, one of the nine flagship initiatives included in the Rural Action Plan is «a rural revitalisation platform ... as a one-stop shop for rural communities, rural project holders and local authorities alike to collaborate», which should be especially targeting remote rural areas (European Commission, 2021).

Various sectors are impacted by processes of (rural) digitalisation, including infrastructure, education, data, healthcare, across multi-level and sectoral policies. It is therefore crucial to consider this interdependence the other way around, too: policies and programmes affecting rural digitalisation may go beyond the initiatives explicitly targeting digitalisation objectives, and include sectoral legislations, policies and funds which may go overlooked in the definition of strategies.

It is therefore valid also for digitalisation that traditional governance patterns that rely on sectoral specialisation, and hierarchical relationships are no longer sufficient for addressing cross-sectoral challenges (Gkartzios and Lowe, 2019). Instead, adaptive governance models are necessary, enabling the integration of knowledge from policy, civil society, and science, and fostering innovation while balancing power (Brunori *et al.*, 2021). Such *ad hoc* governance arrangements should acknowledge and value the contribution of all actors, as is the case with civil society organisations which, often informally, commit to bring fast broadband and digital solutions in underserved areas of Sweden, in the absence of

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[5] https://rural-interfaces.eu

[6] A detailed account of the initiative is available at http://okosvaros.lechnerkozpont.hu/en/node/674

adequate responses from the public and private sector (Slätmo and Löfving, 2022).

Information and communication play a key role in improved governance, opening new ways for policymaking throughout the policy cycle, from problem definition to policy evaluation. At the problem setting stage, for instance, providing detailed information can change the way governments engage with citizens. The latter can take informed choices, raise issues in public debates and encourage administrators to act, while also providing feedback on plans and policies in development.

To effectively harness the potential of data, a strong coordination effort is needed to create a shared and integrated data space for public usage, wherein administrative, environmental, business, statistical and citizens-generated databases are made interoperable. Although requiring ad hoc governance arrangements – with clear rules and allocation of responsibilities, technical capacities, and specific data protection regulations – such integrated data systems would increase the value of single databases (World Bank, 2021).

The Living Lab GeoDesign in Rural Poland provides one example of how digitalisation has the capacity to potentially enhance participation in spatial planning processes, and eventually improve their transparency (Grzyś, 2022). However, the success of such process will depend upon digital skills of the stakeholders involved and the awareness of local authorities, who are to imagine new ways in which a community can become a partner in the planning process.

The role of participatory approaches and multi-actor platforms has been particularly emphasised in the SHERPA H2020 project, to reduce the gap and build trust between local actors and public authorities at higher level, but also to bring into view the specific needs of highly different rural contexts (Slätmo et al., 2021).

7. CONCLUDING REMARKS

The image and public discourse about rural areas have been oscillating between that of a "rural idyll" (Bell, 2006), an idealised place where proximity to nature automatically translates as well-being and quality of life, and that of traditional places away from the vitality and innovation of their urban counterparts, which risks making it a self-fulfilling prophecy and feeding a vicious cycle of marginalisation (Bock, 2016).

Neither interpretation is real or desirable, nor is there an established path or instrument to address all the issues that affect rural areas. Recent years have shown that rural and remote areas hold great poten-

tial to realise the benefits of digital transformation and be no longer isolated thanks to the availability of digital tools (ENRD, 2021). However, it cannot be assumed that digital technologies alone will lead rural areas (and the agriculture and forestry sector) to a desirable outcome (Brunori et al., 2021), and a growing body of literature raises concerns over the potential impacts – both positive and negative – of digitalisation, urging to move away from simplistic approaches (Rolandi et al., 2021; Rijswijk et al., 2021; Salemink et al., 2017). In this awareness, Brunori et al. (2021) suggest a set of guiding principles for digitalisation processes in agriculture, forestry and rural areas, assuming as a starting point that digitalisation is no more than a means to an end.

Although significant efforts are being put forth to attain digitalisation objectives in European rural areas, unanswered questions remain about how digitalisation can function as a tool and a driver of transformation, and whether the envisaged "twin transition" will occur (Brunori, 2022). In addition, numerous policies may have indirect impacts on digitalisation processes in rural areas, extending beyond the specific initiatives that receive more attention in digital strategies, and should also be scrutinised (Arcuri, 2023).

In this paper, we proposed a simple and essential conceptual framework to accompany any reflection about, and processes of, rural digitalisation. It starts from acknowledging the role assigned (e.g., by policy) to digitalisation in revitalising rural areas, and assumes this role as always instrumental in achieving broader objectives. The available evidence emphasises the importance of recognising both the potential benefits of digital transformation and the critical need to address the risk of digital exclusion and exacerbation of the digital divide, especially among low-skilled and vulnerable groups. While exploring opportunities, it is therefore crucial to pay special attention to ensuring equitable access and opportunities for all individuals, within and beyond rural areas.

The main implication of the proposed framework is to give priority to strengthening strategic capacity for digitalisation, which, first of all, should be based on a diagnosis of the need of rural communities, an assessment of the digital readiness of the actors, the design of technological solutions appropriate and affordable, and the assessment of their potential impact on rural communities.

The role of public authorities is critical to ensure this strategic capacity, that is able to provide suitable infrastructures and essential services to rural residents. Coordination and cooperation among civil society, policymakers, businesses, and researchers is to be encouraged. Further inquiry will be necessary to address these con-

cerns, as much is yet to be done to make sure that rural communities can leverage the benefits, and prevent the risks, deriving from digitalisation.

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