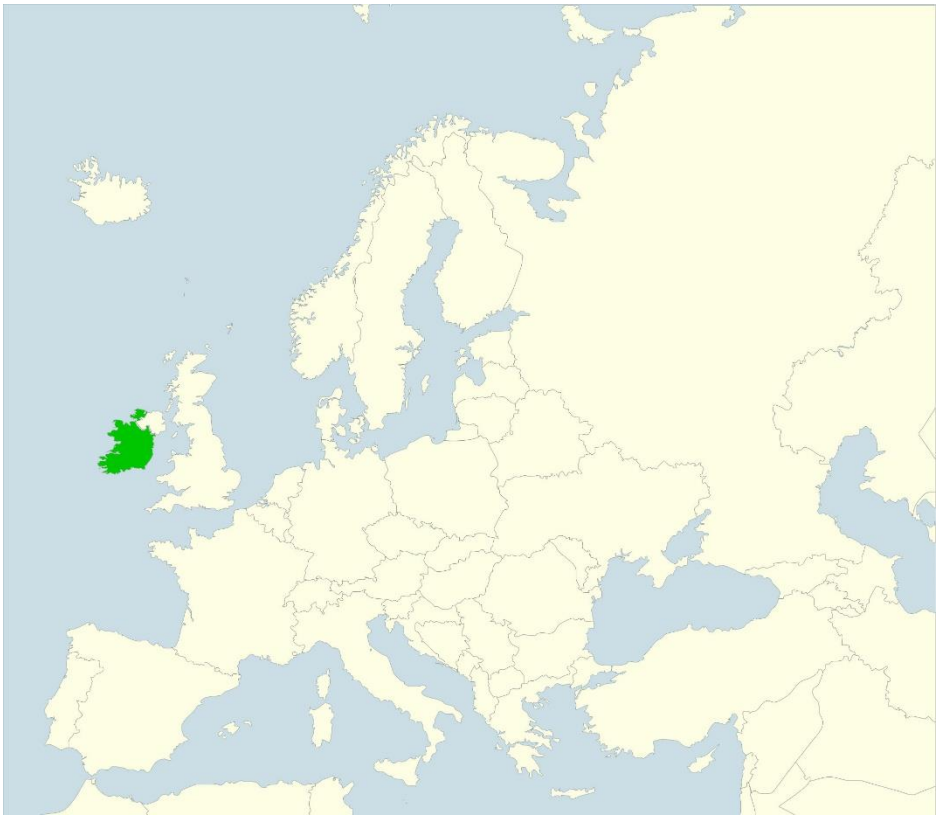
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RURAL TRANSFORMATION THROUGH DIGITALISATION? UNDERSTANDING THE DIGITAL IN THE CONTEXT OF RURAL CHANGE

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Abstract: This paper explores the challenges and potential of digitalisation in rural areas, particularly in the post-analogue era, where the digital divide is starkly evident. The refraction of digitalisation through the lens of rural space recasts the meaning ascribed to rural digitalisation to extend beyond broadband and high-speed connectivity. With a focus on Ireland, the paper aims to understand how rural communities perceive and adopt digitalisation by interviewing experts and practitioners in rural development and digital data. While digitalisation offers transformative potential, its success depends on community needs, capacity, and a co-produced approach. The research underscores the importance of local involvement and tailoring digital solutions to specific rural contexts.

Keywords: rural, digitalisation, digital data, community, Ireland

Highlights

- Digitalisation uptake is influenced by experts, policy makers and practitioners.
- Rural digitalisation is more than broadband and high-speed connectivity.
- Bottom-up approaches are central to effective rural digitalisation.
- Culture, behaviour, demographics, and capacity need to be considered.

1. Introduction

In a post-analogue era, the perceived lack of digital technologies in remote rural, peripheral and/or dispersed settings is a challenge for countryside communities (Roberts et al., 2017; Salemink et al., 2017). The global push for digitalisation highlights the tensions inherent in rural decline, transitions and urban-rural divides, as well as the impact of the digital divide itself. Moreover, the COVID-19 crisis highlighted the vulnerabilities of rural areas, particularly exposed because they have, among other things, poorer access to services, with lower accessibility to the internet (both in coverage and connection speed) when compared to urban or higher density places (OECD, 2020a). The crisis also generated greater demand for digital accessibility. With increased emphasis on the 'Smart Village' approach in European rural policy in particular, and together with a community-led, bottom-up philosophy, this paper seeks to explore the meaning of the digital and digitalisation in the rural context which is experiencing ongoing challenges associated with structural change, and often, decline.

While top-down policy perspectives identify digitalisation as an avenue through which transformation can occur, the question is whether rural communities have a similar perspective. Hence, this paper suggests there is a gap in understanding how digitalisation does or will work in reality, and indeed, what rural digitalisation actually is. The adoption of digitalisation within a rural context depends on the meanings ascribed to the phenomena by those for whom it is aimed. The uptake of digitalisation is also influenced by the experts, policy makers and practitioners who advocate for these within a rural context. Therefore, in the examination of rural digitalisation, it is equally important to investigate the meaning and outcomes identified by the experts and practitioners engaged with the process of rural development and digitalisation. We thus ask the question: can the rural fully embrace digitalisation? This question was positioned within the context of Ireland, which as a country only began to urbanise in the 1960s (Moren, et al., 2023), and continues to have a large rural population, which accounted for a third of the total population in its last census (Central Statistics Office, 2023a). Within the context of a wider study on rural digital data, we conducted a series of semi-structured interviews with nine practitioners and experts in the digitalisation and rural space to comprehend the reality of rural digitalisation. Albeit a relatively small sample, through in-depth interrogation, we endeavour to question the discourses within the rural digitalisation space as opposed to drawing general conclusions. The findings show that although digitalisation has the potential to transform rural communities and support just transitions, this transformation is dependent on a number of factors, such as how the agenda is shaped, a focus on

community in terms of their needs and demands, community capacity and access, and a co-produced approach. The paper is organised as follows: the next section presents a review of the literature and the theoretical framework; then the research data and methods are outlined; section four is an exploration of the findings; with a final discussion on the emergent themes.

2. Literature Review

While there are as many perspectives on the dynamics of rural change as there are different types of rural areas, in this paper we chose to frame our interrogation of rural digitalisation through the perspective of decline, challenges and need. Undoubtedly, both in the literature and policy, issues around rural restructuring, development and transitions are highly complex (Hoggart and Paniagua, 2001; Csurgó, 2018). There has been a marked move in policy in recent years to examine rural places, as territories of opportunity, dependent on appropriate levels of targeted investment (see for example, OECD's *New Rural Paradigm* (2006) and *Geography of Well-being* (2020b)). A number of studies have highlighted that an 'opportunity perspective' as opposed to a focus on the negative, will address inequalities and other challenges more appropriately (Bernard, et al., 2023). Despite differing perspectives on rural change, and due to current policies in Ireland highlighting the potential of digitalisation as a means to halt decline (Government of Ireland, 2021), we explore decline and digitalisation in the following literature review.

2.1 Responses to rural decline and change

To interrogate what drives the need for the digital and digitalisation of the rural, we take a step back to consider one perspective of its genesis – rural decline. Much academic scholarship has argued that the rural is declining (Bell et al., 2010) and the decline of the rural is 'an undisputed fact' (Li et al., 2019, p. 135). Li et al. (2019) found that expressions such as rural decline, community destruction, "dying" rural communities, marginal community and "hollowing out" of the countryside were put forward successively to describe the downward spiral of decreasing employment, depopulation, economic depression and deteriorating quality of life in the countryside.

Bernard (2019) indicates that economic isolation and spatial factors play a role in the weakening of the rural socio-economy. While a peri-urban countryside, with a higher population density and good accessibility to cities, offers relatively easy participation into metropolitan labour markets due to the opportunity for commuting and being, de facto, their spatial extension, residents of peripheral, remote and sparsely populated parts of the country are excluded, and experience an increased risk of social and economic isolation and poverty in this respect (Bernard, 2019, p. 373). Komorowski and Stanny (2020) on the other hand allude to socio-economic development as shaped by demographic structures. The existing demographic structure affects the functioning of entire local communities in aspects such as education, the labour market, healthcare and other public services (Komorowski & Stanny, 2020, p. 4). Liu and Li (2017) reinforce this perspective, noting that when rural population numbers decrease, villages see labour shortages, recession and social degradation, local markets shrink, workshops and small businesses close and the young and educated are especially likely to leave. As people have left rural communities, services have been reduced, businesses have closed, social capital has diminished and so in these circumstances, the spiral of rural decline seems inevitable (Li et al., 2019). Nugin (2014) follows this same line of thought, arguing that the diminishing size of the rural population has led to the closing down of many vital social structures in some regions – along with shops, pharmacies, libraries and local pubs, schools have been closed. Many argue that the closing of schools in particular may result in the extinction of the rural population altogether, since young people will not come back to their home areas after studying elsewhere (Nugin, 2014, p. 51). Górecka et al. (2021) agree, citing depopulation as one of the consequences of rural underdevelopment but noting that depopulation can also be seen as one of the causes leading to gradual stagnation or regression of rural areas. There is also a financial component. In most cases, local government units primarily allocate funds to more developed areas for their further growth and development as well as for attracting more inhabitants (Górecka et al., 2021, p. 43).

The reversal of decline, as highlighted by much academic scholarship and policy-led interventions, implies a need for the regeneration of the rural. Rural digitalisation is one such response to decline and has emerged as a fundamental approach in rural development policy. Various definitions or understandings of what rural digitalisation actually is or means on the ground have been put forward. For example, the use of digital technologies to improve communal services of general interest and to support social interaction (Hanninger et al., 2021, p. 97); a combination of the development of service infrastructure and innovative rural activities combined with the building of ICT infrastructure and digital technologies (Pělucha, 2019, p. 588); and the enhancement of 'traditional and new networks and services through digital technologies, innovation, and better use of knowledge for the benefit of residents and businesses' (Bielska et al., 2021; Budziewicz-Guźlecka & Drożdż, 2022). Even though there is a strong focus on ICT, the internet and broadband, it can be argued that rural digitalisation moves beyond such foci to embrace the use of digital technologies and the enhancement of services through the employment of the digital. This is with the aim of improving social interaction and everyday life for citizens in challenging rural areas (Hanninger et al., 2021). It also serves to create rural areas where people can and want to live because innovative, digital solutions make their lives easy and comfortable (Vaishar & Šťastná, 2019). Hence, in alleviating the challenges of rural citizens' life and creating a blueprint containing best practices for rural communities with similar difficulties (Hanninger et al., 2021) rural areas would have the capacity to retain their local population and/or attract new inhabitants, which is of utmost importance for liveability (Anastasiou et al., 2021). The retention of local population and the attraction of new inhabitants can aid in the reversal of the vicious cycle described by Komorowski and Stanny (2020) of falling number of residents, fewer infrastructure projects, a poor labour market, the domination of retirees all leading to decline.

Apart from demographics, Liu and Li (2017) suggested that the driving forces of rural decline which researchers must understand are responses to globalisation and climate change. Moreover, there is the knowledge economy. As rural development becomes more dependent on cities, and villages are losing their relative importance in the emerging knowledge economy, rural decline in many places of the world turns out to be a predestined outcome (Li et al., 2019, p. 137). Furthermore, the vulnerabilities of rural, remote and peripheral areas emerged to a greater extent as a result of the COVID-19 pandemic, where factors such as working from home and the need for connectivity proved vital and the *sine qua non* is access to the internet (Komorowski & Stanny, 2020). In order to address decline and its consequences, Li et al. (2019, p. 136) suggested that it is important to investigate the potentials for various types of rural areas to develop and grow in the era of the knowledge economy. The question is through what means can growth/ transformation/ regeneration occur. Rural digitalisation has emerged as one such responses.

2.2 A rural need for a digital economy?

Rural areas are often seen as the antidote to technology, the place to get away from the always-connected world (Cowie et al., 2020, p. 170). However, as a starting point, even the definition of the rural is debatable. There is no formal or functional definition of rural nor is it feasible to agree to a single definition for the term 'rural' (Mitchell et al., 2008; Öztaş, 2021) and a "one-size fits all" approach is inappropriate and presents a challenge (Hawley et al., 2016; Miller, 2013). While on the one hand, the idea of the rural idyll imagines the rural to be a place of peace, tranquillity and simple virtue, contrasted with the bustle and brashness of the city (Woods, 2010) on the other, there is considerable confusion as to exactly what rural means (Hart et al., 2005, p. 1149). Within an Irish-specific context, the literature has not tended to deeply explore definitions of the rural, despite Ireland itself being viewed as 'a traditionally rural country' (Keaveney, 2009; Doyle et al., 2021). There is a dearth of substantial research on the meaning of the rural in Ireland, other than through a functional or quantitative lens which adopts an official definition as rural areas being areas with a population of less than 1,500 in a given geographic unit (Central Statistics Office, 2024). Arguably, in its most general sense, notions of what the rural actually is, are simply 'taken-for-granted' (Philo, 1992). Nonetheless, in spite of definition or lack thereof, Wolski (2019) maintains that not only have the functions of rural areas changed but also the primary function of these areas – agriculture – has evolved. On the contrary, Cowie et al. (2020, p. 174) argued that discourses such as the dominance of agriculture and primary production in the rural economy and the notion of the rural idyll are still very

present in today's debates around rural development policy. From whichever perspective, there is agreement on the position of the rural where the digital economy is concerned – that is, left behind. This is in terms of broadband and other digital connectivity, digital adoption and skills (Cowie et al., 2020). It is also due to access, socio-economic conditions, social structures, affordable broadband infrastructure, low density population, peripherality and distance to markets (Grimes, 2003; Malecki, 2003; Naldi et al., 2015).

The digital economy is about a transformation of spatial relations, or at least the development of a new layer of spatial relations, which is determined by networks of interconnected nodes, with specific locations in space (Grimes, 2003). Digitalisation of rural areas in the EU thus corresponds with the provision of digital infrastructure and its quality, and the inclusion of different groups of people and the application they find for technologies (Wolski, 2019). Cowie et al. (2020) observed that history has shown the high hopes for rural digital connectivity have not been fulfilled. In spite of this, the EU's Long-Term Vision for Rural Areas identifies digital connectivity as essential for achieving stronger, connected, resilient and prosperous rural areas (European Commission, 2021). Some studies align with this trajectory on the transformation that the digital can bring to the rural. For instance, it is considered vital to the resilience of rural communities (Roberts et al., 2017), a strategic enabler towards sustainable growth at the social, economic and environmental level (Ferrari et al., 2022) and means of opening doors to the nearly unlimited possibilities to exchange information on a scale never before imagined (Malecki, 2003).

The achievement of the rural digital economy, Cowie et al. (2020) argues, implies working with local communities to develop appropriate pathways to the most desirable (or inclusive) outcomes, an approach particularly appropriate for exploring the impacts of digitalisation and supporting rural communities to benefit from these developments. Wolski (2019) also notes, albeit with reference to knowledge and learning about ICTs in particular, that it is a certain form of organisation of how rural communities acquire digital competence on the one hand and on the other, it is changing the mindset in these communities and the way they think about technologies, as well as making them aware of a (potential) role these technologies play in the life of an individual or groups of people. Grimes (2003) on the other hand stresses on the access to resources – participants in this new form of economy must have access to the skills, equipment and telecommunications infrastructure which connects particular nodes to these networks of opportunity (Grimes, 2003). Wolski (2019) agrees, noting that to make a digital future happen, it is relevant to increase the accessibility of ICTs via a high-quality digital infrastructure. Roberts et al. (2017) moved beyond access and resources to highlight the issue of participation. They noted that looking at the rural-digital agenda from EU to community scales, digital inclusion also revolves around discourses of 'participation' (Roberts et al., 2017).

The subject of broadband connectivity frequently emerges where the digital economy and the rural are concerned. Research shows it is associated with positive outcomes in rural areas and has the potential to influence nearly all aspects of rural life (Whitacre, 2021). In their systematic literature review on rural development in the digital age, one of the main themes extracted by Salemink et al. (2017) in a dataset of 157 papers was connectivity. Notably, their search was not restricted to economic development, after however they found that connectivity research strongly focused on this and the research on connectivity in rural areas mainly focused on the lack of digital connectivity (Salemink et al., 2017). Cowie et al. (2020) also observed that academics have argued for more than a decade that the availability of universal high-speed broadband is undoubtedly critical to rural development. Furthermore, this issue has not yet been adequately solved in most countries, with a few exceptions, including South Korea and some Nordic countries (Cowie et al., 2020, p. 169). In their research on Poland, Janc and Czapiewski (2013) concluded that ICT may be or is essential in the transformation processes of rural areas on many planes. The subject of broadband connectivity therefore arguably serves as a vital aspect when addressing the transformation of the rural through the digital.

Academic scholarship demonstrates that the digital economy creates benefits for the rural before and after however it also argues for the need to move beyond access, resources and broadband connectivity. Grimes (2003) observes that it is necessary to explore the range of transformations, which rural areas

must undergo before they can effectively exploit the new opportunities. Wolski (2019) stresses on taking into account the intricacies of the rural – consideration of any problem of rural development, including digitalisation or selected problems of digitalisation, needs to be accompanied by the awareness of the complexity of rural reality. In line with this, given the "no-one-size-fits-all" approach to the rural, there is the need for a more place based and integrated policy approach that takes into consideration the contextual and differential factors since rural areas need differential and appropriate strategies to digital diffusion and inclusion (Roberts et al., 2017). Thus, there is ultimately a rural need for a digital economy however the question is "what comes of it". Our research interrogates the "what comes of it" by examining whether the rural can fully embrace the digital. In so doing, we do not imply doubt, choice or alternatives but seek to investigate and shed light on the various discourses surrounding the diffusion of the digital economy within the rural space.

2.3 Theorising the Digital within the Rural

This paper is framed within the understanding that rural structural change drives the need to respond to contemporary challenges within rural settings, as well as identifying the opportunities that these challenges may bring. The need to respond to decline by providing for just transitions and more varied employment choices, the ability to live sustainably (economically, socially, and environmentally) within the rural setting, and the achievement of balanced regional development, all drive the emphasis on digitalisation. In exploring the meaning of the digital and digitalisation for this paper, we applied Halfacree's (2006) threefold framework of rural space, which was in turn drawn from Lefebvre's three-fold understanding of spatiality. In applying the threefold framework or "architecture" of rural space, we consider digital and digitalisation through:

- rural localities – whereby there are distinct spatial practices that define rural places and are linked to consumption or production activities
- formal representations – such as through official data and political discourse of the rural
- everyday lives – which give depth of insight into the lived experience of rural citizens (Halfacree, 2006).

Drawing on this work, we perceive that the setting for communities to harness digital technologies and data begins with the rural. We concede that we have no set definition for the rural and indeed much academic literature acknowledges that there is no "one-size-fits-all" definition (e.g., Hawley et al., 2016; Miller, 2013; Mitchell et al., 2008; Öztaş, 2021). Rural will have different meanings in different regions or places. This research mainly engaged within the Irish context, but for these high-level interviews, included international perspectives. Hence, we are dealing with the meaning of the rural in its broadest sense, and as can be seen from the analysis of the interviews, definition arose. Despite this, the framing of the rural as a starting point is important because such a setting casts the light on the particular lens through which the rural is viewed. The framing of the rural affords the opportunity to explore the character and status of rural space in order to acquire a better understanding. Space does not somehow "just exist", waiting passively to be discovered and mapped, but is something created in a whole series of forms and at a whole series of scales by social individuals (Halfacree, 2006). A comprehension of the space can cast the light on the state of the rural, an anticipation of the future, the direction in which it needs to head and the reasons for such direction. In so doing, incorporating change into the rural can be assessed from whether or why it is necessary and more importantly, how it should be achieved to align with the character and status of rural space. Therefore, an examination of the digital within the rural implies an "invasion" of the digital into the rural space – essentially how digitalisation diffuses into rural localities, formal representations and everyday lives. Thus, the question is how does this play out, that is, what is the outcome of the digital economy when refracted through the lens of the rural space? We recognise a multi-faceted rural and thus explore the phenomenon of digitalisation through the lens of these three facets.

3. Research Data and Methods

3.1 Case Study

The case study for this paper was Ireland and constitutes part of a wider research project called 'Citizen Rural: Digital Data for Participatory Democracy in Remote Places[5]', which focused on a municipality in the west of the country. Ireland in many ways exhibits, at times, contradictory dynamics of rural change. With a national population of over five million, and a relatively small land mass, superficially it could be concluded that there is low isolation in the country, with high proximity and access to urban spaces. However, Ireland's settlement pattern, urban and rural, is characterised by low density housing, with networks of towns and villages that rarely have delineated boundaries (Moren, et al., 2023), giving rise to challenges in the distribution of infrastructure and digital technologies. Geographically, the population decreases in size and density in the west and northwest of the country (Keaveney, 2009). It is areas to the west that have proportionately higher rural populations, and that suffer from lower investment, higher out-migration, and declining services, with this region suffering most from the effects of decline (Northern and Western Regional Assembly, 2020; Western Development Commission, 2024). Two key national policies have been adopted in recent years by the national government that have strong rural implications, namely, *Our Rural Future* (Government of Ireland, 2021) and *the National Planning Framework* (Government of Ireland, 2018). These policies call for scaling of digitalisation, and the need to support balance regional development to take pressure off the more populated regions to the east and south. Moreover, within the Irish context, the Government announced the launch of a pilot 'Smart Communities' Initiative, which aimed to minimise the digital divide in Ireland (Doyle et al., 2021). Thus, the Irish context presented the state of the rural on the one hand and the emerging focus on and incorporation of the digital as the way forward which therefore made for a suitable case for examination.

3.2 Interview Data and Methods

The research comprised a qualitative study with the aim of exploring the rural through the lens of digitalisation. The qualitative approach fostered this exploration given that qualitative research is often exploratory and hence inductive (Schutt, 2009) and the inductive design allowed for the important analysis dimensions to emerge from patterns found (Patton, 2002). Within qualitative methods, interviews were adopted because of the desire to engage in-depth and in detail with the particular topics.

The study sought to elicit the understandings of the rural in terms of digitalisation adoption from the perspectives of experts and practitioners in the rural space. Hence, through purposive sampling, and as part of a wider project on bottom-up approaches to digital data, nine key informants were identified who could provide comprehensive insight into data and digitalisation from a rural perspective. Via the review of the literature on rural decline and rural digitalisation, a number of broad overarching areas emerged. These were centred on the definition of the rural; the meaning/framing of rural digitalisation; the participatory approach and the existence or impact of the rural–urban digital divide. The in-depth semi-structured interviews were based on these overarching areas. The interviews did not provide any definitions whatsoever for overarching phenomena under discussion such as the rural, rural digitalisation or 'full' digitalisation. All definitions and framings were elicited from the perspectives of the experts in order to cast light on the various comprehensions of the terms. A total of nine experts – four data experts and five rural development experts – were interviewed. The experts had a varied and extensive knowledge and experience range for example rural policy, smart villages, big data, digital data, statistics and rural development. The choice of the experts was based on their backgrounds and experience within these spaces i.e., data, rural policy, rural development, rural digitalisation, LEADER[6] and Smart Villages. Two of the interviewees were women and seven were men. Two of the experts were international, and seven from Ireland. Interviewing the non-Irish experts served to provide broader insight into the concept of the rural and digitalisation from external perspectives. The interviews were conducted

[5] http://www.ucd.ie/citizenrural

[6] *Liaison Entre Actions de Développement de l'Économie Rurale* – The European Union's Rural Development Programme under the Common Agricultural Policy.

between November 2022 and February 2023. The views of the data and rural development experts analysed in this research cast light on the perceptions of a significant group of key figures. These experts brought to bear perceptions from the government, practitioner and rural (i.e., top down and bottom up) levels thus providing clear perspectives of digitalisation adoption by the rural from different angles.

3.3 Data Analysis

The analysis of the data took place through the phases of thematic analysis (Braun & Clarke, 2006). The data was organised. Answers to each question from interviewees were grouped together under the particular question. The researchers then immersed themselves in the data through reading and re-reading in order to gain an extensive comprehension of the data. Secondly, coding was undertaken. The codes were not predefined but rather they were extracted from the data. The codes were categorised following which sub and overarching themes were elicited. The following common broad themes emerged – community; data; digitalisation; connectivity, broadband, infrastructure; training, education, skills, capacity; culture, behaviour, demographics; and top-down versus bottom-up. A thematic analysis was undertaken to explore digitalisation and its meaning within rural contexts and the findings contrasted with the literature.

4. Findings and Discussion

The findings that developed from the overarching interview question areas and the emergent themes were organised thematically and then presented along two major lines of enquiry – "what does rural digitalisation mean" and "what does rural digitalisation require"? (Table 1).

Tab 1. Major Lines of Enquiry. Source: Authors

Overarching interview question area	**Major themes elicited from interview**	**Sub-themes**	**Line of Enquiry**
Rural digitalisation meaning Definition of the rural	Digitalisation	The definition of digitalisation The facets of digitalisation The shaping of the digital within the rural Engaging with the digital within the rural Understanding rural areas	What does rural digitalisation mean?
Digital data and rural digitalisation – helping rural places be better understood; address rural issues; what prevents full digitalisation; skills knowledge infrastructure required Rural – urban digital divide	Community	Understanding community Co-design, input, decision-making	What does rural digitalisation require?
	Accessibility	Connectivity Broadband Infrastructure	
	The cultural, thebehavioural and the demographic	Location Culture, behaviour, demographics	
	Training, skills and capacity	Training, Education Capacity building Skills Digital literacy	

4.1 What does rural digitalisation mean?

The major theme that emerged under this line of enquiry was *Digitalisation* under which there were subthemes of the definition of digitalisation, the facets of digitalisation, the shaping of the digital within the rural, engaging with the digital within the rural and understanding rural areas (Table 1). In the quest to appreciate the digital within the rural, the phenomenon referred to as digitalisation needed to be understood. In turn, understanding digitalisation required considering various aspects that converged to provide clearer insight. Thus, firstly, the definition of digitalisation and the definition of the rural needed to be delineated within the particular context. The findings revealed that digitalisation was not "in a silo" but there were various components or facets to it. Hence, it should be considered from various perspectives, which linked back to the issue of definitions and the particular context for such. Exploring digitalisation also meant probing the use of and engagement with the phenomenon. Appreciation of this was necessary because of the ways in which different facets/components within digitalisation may interact where use or engagement was concerned. Understanding of such interaction in turn implied as a first step, the need for understanding of rural areas. The rural area needed to be understood because rural areas differed and there were various aspects to the rural. Understanding was also required to be able to achieve the desired outcomes of digitalisation within the rural. Furthermore, such comprehension created space for shaping to be achieved – shaping in terms of how digitalisation should be modelled given the particular rural context.

Academic literature ascribes various meanings to rural digitalisation. According to Hanninger et al. (2021) it is the use of digital technologies to improve communal services of general interest and to support social interaction. Rural digitalisation is to a large extent, synonymous with broadband and high-speed connectivity. For instance, the Declaration of 2016, entitled "A Better Life in Rural Areas'' emphasises that particular attention must be paid to developing the opportunities offered by better network connectivity and digitization in rural areas (Satoła & Milewska, 2022). It has emerged as a means of addressing rural decline and regeneration and is deemed critical to the development of the rural. Impact to quality of life is another aspect of rural digitalisation. There is the improvement in the quality of life through the adoption and utilisation of digital technologies, advanced techniques and innovations (Budziewicz-Guźlecka & Drożdż, 2022; Komorowski & Stanny, 2020). Rural digitalisation also means bridging the digital divide, essentially rural areas lagging behind or being left behind their urban counterparts in the availability and adoption of broadband (Cowie et al., 2020; Whitacre, 2021). Furthermore, it can be viewed as having access to broadband and digital technologies given that rural areas have an image of being spaces that are devoid of broadband.

Refracting the meaning of rural digitalisation through Halfacree's (2006) threefold model of rural space however allows for scope to ascribe broader meaning to the phenomenon which in turn is important for understanding and applying the digital to the rural. As well observed by the literature, rural digitalisation does concern improving on the quality of community lives through their access to technology. However, rural digitalisation also implies doing what was already being done albeit by incorporating the digital into the everyday lives of the rural community; hence not "re-inventing the wheel" but bringing alongside a different feature to achieve an improved result. As observed by one respondent,

> *"How do you use technology to do the things that you're already doing in rural areas? It's not about how do you start the latest software Development company in this village? The digital economy in rural areas is…..if you have a general store in the middle of nowhere is there some way you can use the digital economy to expand into online sales or online marketing and promotion? So the digital economy is 'how do you use the latest technology to do a better job of what you're doing?" (Interviewee HLIN_5).*

This therefore means that rural localities need to be at the centre of the discourse. Rural places would have distinct spatial practices that define them (Halfacree, 2006) and given that rural areas differ on various levels, specific activities in terms of consumption or production will vary. Hence in determining the meaning of rural digitalisation it is essential to comprehend the particular spatial practices characterised within the specific locality because such will inform on how the digital could/should be incorporated. Essentially, the questions that need to be considered are what are the spatial practices that

define the particular rural area and correspondingly, how can the digital be incorporated within such spaces? Answering such questions casts light on the different meanings and applications that the digital can have within the rural in addition to presenting an appreciation of the varied communities and the diverse facets within each.

A deeper meaning of rural digitalisation can be identified through the lens of formal representations. The rural is broad, encompasses numerous aspects and can be represented from a number of perspectives. As observed by one interviewee,

> *"A rural community is a cluster of things. Its shops, its businesses, its schools, its everything. So the digitalisation bucket has to have different components; that feeds all of the things that are in the community tailored to them, tailored to what they need. Everyone needs it in a different way, in reality it's all of those elements, but it's been tailored to different entities that exist within the rural community" (Interviewee HLIN_1).*

After hence even though no single definition exists, such diverse portrayals illuminate and provide information on the rural in terms of the varied communities and different facets within them. This in turn can inform on how the digital can be embedded in the rural on the basis of the diversity in the rural.

The employment of official data aids in casting the light on the diverse facets within community and the different communities. This is because official datasets will provide the information on a community that will consequently inform on its status quo in terms, between of and for example, demographics, economic activities, literacy rates and broadband penetration. Such information can provide guidance on the way forward in embedding the digital within the rural. Furthermore, the institution of the digital economy requires the contribution from/influence of the political arena in terms between of and for example, the policy and the infrastructure. Additionally, for digitalisation to have meaning for communities, it needs to be tailored to their needs and the input from the official data and the political discourse will be an essential contribution. Thus, rural digitalisation means taking on board official data (the formal representations) to be able to access the components that comprise the rural. It implies engaging with the political discourse to address existing narratives on the rural so that the digital can be embedded in and shaped to the rural.

On another note, the digital within the rural requires an understanding of rural areas and a tailoring or shaping of the digital to suit the rural. After hence the everyday lives of the rural need to be put under the spotlight. Individual community members will access and make use of the digital and as such on the one hand, the lived experiences of the rural are important to inform on how to incorporate the digital. On the other hand, communities need to understand the full scope of the digital within their space to take advantage of its full potential and to maximise access. As explained by one expert,

> *"Again it could be that someone is using it in one way but they're not using it in another way, so they may be using it to do anything to sign letters electronically, or to do all these things, but they want to go to the grocery store…….not shop online.*
>
> *You would have to look at what parts of it are not being used…….is that full digitalisation service being used in a way that you'd like to be? ……..It could be that that customer is happy, because now they can watch Netflix, and that's all they wanted*
>
> *It's not enough to say this is available……how it should be used and what it should be used for, and the community needs to know that so they can access it properly…..If the community doesn't understand those elements just making it available won't move the needle in any way" (Interviewee HLIN_1).*

Understanding the lived experiences of the rural and maximizing the potential of the digital means an appreciation of rural dynamics. This is in terms of their perceptions of the digital economy within their space. One interviewee observed that

> *"it's a difference between the services and the actual…. the reality is – is there a demand for this? ……do we just think that digitalisation is good for everyone? ….we need to understand what's going on in some of these very rural areas, we gotta[sic] see whether this is needed or required,….we*

just need to be careful on what we invest in and where we put things in….is it benefiting some a lot more than others; there are certain cohorts that they're just of an age or generation where they won't be able to link in with this sort of digitalisation of services"

(Interviewee HLIN_9).

After hence rural digitalisation also means exploring the demand for the digital within the rural from communities as opposed to a blanket assumption that it is beneficial. It implies that the dynamics within the rural through everyday lives can illuminate and reconcile the perspective of the rural on what they deem as important or helpful for their lives as against community enlightenment and potentials that could but are not being taken advantage of with the digital.

4.2 What does rural digitalisation require?

The meaning ascribed to rural digitalisation ultimately led to the question what then would it require? Hence the second line of enquiry which elicited a number of themes (Table 1) – *community*; *accessibility*; *the cultural, the behavioural and the demographic; training, skills and capacity*. The requirements implied obvious mandatory aspects such as connectivity, broadband and the associated infrastructure without which rural digitalisation simply could not be physically achieved. However notably, rural digitalisation also required reflection on and respect for the culture, behaviour and demographics of the rural as well as consideration of training, education, skills and capacity within the rural. Culture, behaviour and demographics affected how the digital played out within the rural in terms of uptake and extent of use, hence taking account of these allowed for the adoption of digitalisation to be shaped and maximised. Additionally, whether the full potential of the digital was realised within the rural depended on the level of skill and capacity of communities to engage with the digital. Therefore, maximising the digital implied the need to acknowledge the skills and capacity levels and address gaps in knowledge through training and education.

4.2.1 Community

In rural localities, community is a focal point. Accordingly, rural digitalisation requires the presence of community and additionally but also more importantly, the input of community. The involvement and participation of people on matters concerning them is necessary not only because they are affected by the issue at stake (Lopolito et al., 2015) but also because understanding of local actors' perspectives and problems (Gullino et al., 2018) is valuable. Furthermore, involvement and participation give communities opportunity to express opinions on issues related to their daily lives (Hajdarowicz, 2022), hence produces better solutions due to the integration of different kinds of knowledge (Enengel et al., 2014). However, the outcome of participation depends very much on how people take up and use what is on offer (Müller et al., 2020, p. 224). Adoption and utilisation depend on the mode of presentation. Thus, presentation should be in a manner that the rural community appreciates or values in order to maximize uptake and use. However, research concludes time and time again that collaboration, participation and community engagement often occur in a way that makes little sense to communities and fails to meet their real needs (Eversole, 2011; Lønning, 2018, p. 520). Moreover, the question, seen from inside the institutions of government, is how to reach communities, engage them, work with them and encourage their participation (Eversole, 2011).

The lens of Halfacree (2006)'s threefold model of rural space allows for a more comprehensive perspective to the issue. This is because it casts light on the approach to community. Rural localities concern communities and to involve them, their practices, that is, how they are and between behave and need to be understood. This is because they are complex, comprising many systems – demographic, behavioural, cultural, economic and social to name a few. As observed by one respondent, "*Communities are the ultimate in complex systems; So we need to understand that complexity" (Interviewee HLIN_2).* After therefore the [rural] space and all its facets need to be understood to illuminate on the best approach to connecting with them. How is understanding achieved? Appreciating the complexity of the community can be realized by engaging with the community and perceiving the rural through their eyes whilst still

bearing in mind the heterogeneity of each community. Furthermore, "*a lot of those things hinge on people going into rural, learning about rural" (Interviewee HLIN_1).* Hence for rural digitalisation, understanding the community means appreciating how they grasp the concept and learning what it means for them from them. Secondly, involvement of the community means they need to be a part of the decision-making process on the issues that affect them. One interviewee noted that *"But then you need to accompany that with good governance where you have decentralized decision making at sub county level, much smaller units where people can get more involved, and our structures are too big, too centralized, too uniform" (Interviewee HLIN_4).* Such therefore requires a revisit of where and at which level decisions are taken, the extent to which they are taken (whether with much, little or no community input) and the trickle-down effects to communities. It also requires a re-consideration of how decisions are made and the extent to which some form of decentralisation needs to be in place.

After thirdly there must be co-design with community. As observed by one respondent, *"So yes, you have new tools but it doesn't automatically mean people are gonna [sic] use them. So the opportunities of co-designing it with them to get buy-in early; the co-design piece helps with the buy-in" (Interviewee HLIN_1)*. Co-design means bringing communities on board early on in decision and design processes, hearing from them and gleaning what they want. Co-design thus adds value because of early acceptance by the community, a sense of ownership due to being involved in the process from commencement/early on and therefore a sense of empowerment for the rural citizen. To this end, to approach the digitalisation of the rural through community requires that they are understood and that they in turn understand. It further requires assisting them to engage with digitalisation. In essence, *"it really is about empowering people to do the things they want at the times they want using the skills that they have'' (Interviewee HLIN_2).*

4.2.2 Accessibility

Undoubtedly, connectivity plays a major role where digitalisation is concerned. Hence the extent to which connectivity, broadband and infrastructure are available within the rural have implications for the level of digital potential. Academic scholarship stresses such importance, noting that improved ICT infrastructure, such as high-speed internet, is a crucial factor for rural regions (Naldi et al., 2015) and the usefulness of the digital depends on availability and quality of the internet (Komorowski & Stanny, 2020). Broadband has the potential to influence nearly all aspects of rural life (Whitacre, 2021), however the outermost location of rural areas, as well as the insufficient level of development in transport infrastructure, prevent them from fully participating in this progress (Satoła & Milewska, 2022).

In terms of what rural digitalisation requires, connectivity, broadband and infrastructure can be viewed through the lens of official data and political discourse. This is because the data and the discourse cast the light on the level of the connectivity, broadband and infrastructure within the rural. In so doing, the state of the rural is illuminated and this in turn informs on the direction that should be taken. So what is the state? The 2022 Census for Ireland for instance noted that in 2022, 94% of all households had internet access (Central Statistics Office, 2023b). However, respondents noted that for connectivity and infrastructure,

''the infrastructure point is a big stumbling block'' (Interviewee HLIN_9)

"it's just poor connectivity……the central problem is still there of connectivity, just the physical connectivity…….particular infrastructure needs to be in rural areas to help them become more digitalised'' (Interviewee HLIN_1).

Hence from the respondent perspective, there is an issue with the adequacy of facilities and structures within the rural and it reveals the differing views on broadband and infrastructure provision. Furthermore, as noted by one respondent, *'it's not just the physical infrastructure. It's the know-how……it also requires possibly the removal of any legal impediments' (Interviewee HLIN_4).* Additionally, rural digitalisation moves beyond connectivity, broadband and infrastructure since *"a connection does not equal digitization" (Interviewee HLIN_1).* Thus, good connectivity and infrastructure aid in the digitalisation process however apart from the level of sufficiency, go beyond these to encompass the question of the implications, that

is, "*with new connectivity, with improved connections, what does that mean for your rural community?" (Interviewee HLIN_1).*

4.2.3 The cultural, the behavioural and the demographic

Engaging with the rural necessitates an understanding into how they live. Through the lens of the everyday lives of the rural, opportunity is provided to explore digitalisation vis-à-vis the lived experience of rural citizens. To this end, how is the lived experience of the rural viewed? The research findings elicited that digitalisation within the rural implied taking cognisance of the cultural, behavioural and demographic aspects. Culture consists of ideas, norms and material dimensions and can reflect either a homogenous environment where the characteristics of the few are presented, or a more heterogeneous structure bringing together the characteristics of a diverse locality (Brennan et al., 2009). But does culture pervade the rural? Muilu and Rusanen (2004, p. 1501) suggest that rural areas have been defined as cultural or social constructs, the idea being that "rural" is not just a physical or statistical category but is produced and constructed through discourses of various kinds: for example, speeches, acts, and figments of the imagination. If rural areas can be characterised as cultural constructs, then culture could be viewed as a significant part of the rural implying it needs to be taken into account when considering the rural. Notably, the traditions embodied in cultures, particularly those related to resources, values, guides to action and patrimony, together with the social structure and relationships aspects of culture, are potentially important components of sustainable rural development (Jenkins, 2000, p. 310). However, light is not often cast on the importance of culture when it comes to the rural. Empirical research has also largely failed to consider the role of local culture in fostering a more complete understanding of community development (Brennan et al., 2009, p. 97). Nevertheless the digitalisation of the rural requires an appreciation of the culture because people's values, knowledge and experience impact on their level of acceptance and usage. One respondent observed that "*a lot…. comes down to the culture and the nature of that rural community" (Interviewee HLIN_1).* Another also noted that the uptake of digitalisation within the rural was *"a cultural question"* and *"an evidence-based decision-making cultural issue" (Interviewee HLIN_5),* both illuminating the necessity of the cultural. This aligns with Brennan et al. who note that the cultural "can condition or explain local development responses or their lack and is an essential consideration for understanding local community development options, community actions and citizen responses to a variety of conditions" (Brennan et al., 2009). So what is the culture of the rural community? The formation and development of rural culture cannot be separated from residents' daily life (Ye et al., 2020, p. 3). Therefore, to access the culture implies engaging with a wide range of local community members, to learn about the rural culture (Atkočiūnienė & Vaznonienė, 2019). Accomplishing such can then inform on the manner in which the digital can successfully be embedded within and permeate the rural. Additionally, given that culture provides belonging and an arena in which residents can make a difference (Brennan et al., 2009, p. 99) its significance should be taken into account when considering rural digitalisation. Moving further still, the culture of a place will impact behaviour. Daily life, expressed through norms, values, knowledge and experience will ultimately determine processes of interaction and such processes will influence behaviour. Hence for rural digitalisation, behaviour is significant. If people think that they live in a rural area and have preconceived ideas about what rural life should be like, it can influence their attitudes and behaviour (Woods, 2005). Consequently, the level of uptake and acceptance of digitalisation can be influenced by the type of behaviours expressed. Additionally, given the heterogeneous nature of the rural, it follows that behaviour will vary from one rural space to another. Hence rural digitalisation will require an appreciation of the particular rural that is being addressed spatially and temporally. Accordingly, as noted by one interviewee, "*we also have to look at the behavioural patterns. They cannot be overlooked. The behavioural patterns of the community will drive how it's used, and then who's to say that it's not being used well?" (Interviewee HLIN_1).*

Apart from culture and behaviour, a significant lens through which to view the lived experience is the demographic. Komorowski and Stanny (2020, p. 4) observe that demographic processes which shape the demographic and social/occupational structure of the rural population today are key factors determining the socioeconomic development of a given area. The existing demographic structure affects the functioning of entire local communities in aspects such as education, the labour market, healthcare

and other public services (Komorowski & Stanny, 2020, p. 4). Young generations of today do not gain those digital competencies so much through formal education, but more through constant exposure to the technologies, the usage of which shapes their way of thinking, as well as the rationale of seeking, moulding and consuming information (Turkalj et al., 2015, p. 43). On the other end of the spectrum, Zhang's study of the rural elderly illustrated that at the parallel stage of digitalisation and ageing society, the more digitally literate the rural elderly are, the more diversified their digital use will be, and the more likely they will be to fully utilise the rich resources on the Internet to meet their needs and gain real benefits (Zhang, 2023, p. 9512). Refracting the demographic through the lens of the everyday rural life parallels the literature but also highlights how the various cohorts interact with the digital which in turn illuminates how maximum acceptance can be achieved. One respondent observed that *"that's not going to be of interest to a lot of people you know…..not of interest to everyone at all; obviously younger cohorts, younger people, younger kids are far more adaptive and into this" (Interviewee HLIN_9).* The ability to embrace the digital will be affected by the demographics – age, generation or social positioning and this could be exacerbated in more remote or peripheral locations. As noted by another interviewee "*you have to have some kind of capacity as a citizen to engage with whatever it is, and by and large, I think younger people have quite good capacity. But obviously, as people get older, their capacity is more limited, and they haven't grown up in a digital age, and so on" (Interviewee HLIN_6).* The nature of the underlying demographic therefore implies that rural digitalisation will benefit some as opposed to others – *"there are certain cohorts that they're just of an age or generation where they won't be able to link in with this sort of digitalisation of services" (Interviewee HLIN_9).* Hence looping back to the previous discussion on community, the appreciation of the complexity of the community and how to engage with them is necessitated, in addition to training, skill and building of capacity to which the findings and discussion turn next.

4.2.4 Training, skills and capacity

Digital technologies play an important role in providing insights into people's activities, opinions, health and everyday lives (Radovanović et al., 2020, p. 152) but along with technology is the matter of the needed skill. The diverse demographics and the varying levels of (or lack of) engagement with the digital within the rural suggest that the subject of training, skill and capacity building needs attention when considering the rural digitalisation. It is increasingly acknowledged that rural citizens, governments, and businesses need to develop skills and motivations to use technologies, not merely possess them (Kelly et al., 2023, p. 487). Research shows that access alone will not guarantee usage or benefits of broadband (Kelly et al., 2023). But what is the view through the everyday lives of the rural? Digital skills are critical to rural communities (Kelly et al., 2023, p. 487) and digital literacy presents a crucial empowering agent as work and personal lives become increasingly technologized (Radovanović et al., 2020, p. 152). The findings however showed generally lower levels of skill, digital literacy and the understanding around the utilisation of the digital. This further cast the light on the necessity for education, training and building of capacity around digital literacy, both of which parallel the literature. The lens of everyday lives provides a snapshot of the reason for the lack in terms of rural digital literacy, skill, training and capacity.

"Rural communities sometimes tend to be more undereducated, underresourced, under……"(Interviewee HLIN_1).

"there are a lot of people who don't have digital literacy skills" (Interviewee HLIN_4).

"*it's the education around what's possible; especially in rural areas, there's a lot less of an understanding…… .it's understanding and knowing that it is there for one, and how and what it can be used for" (Interviewee HLIN_7).*

Thus, there are issues around the level of education, the skill and the training without which rural digitalisation cannot be tapped into to the maximum. Even though a significant aspect of rural digitalisation concerns the engagement of the community, it however moves beyond this to also require skill and the building of capacity because "*it's not enough to digitalise without bringing the training on what rural communities can do with this new kind of…..access to... digital" (Interviewee HLIN_1).* Training,

education, skills and building capacity for the rural concerns *"what access they can get to, and within that, what are the skills that they need to work within what they have*" *(Interviewee HLIN_1).* Accordingly, as highlighted by one respondent "*that's a piece that's missing……we talk about data, and we talk about infrastructure, but we don't talk about the education of what you can do with that" (Interviewee HLIN_7)* and as echoed and answered by another, *"how can somebody like that be brought into the digital world and have these connections? So it's an education piece….. it's trying to give people the tools and the skills to interact with that" (Interviewee HLIN_9).* Thus albeit the understanding, engagement, co-design with the rural and provision of the infrastructure are important, without the digital skills, rural digitalisation cannot be fully achieved. Hence parallel investments are needed in knowledge and capacity building as well as the need for committed and digitally skilled volunteers to serve as mentors and champions (Kelly et al., 2023).

5. Conclusion

This paper examined digitalisation through the lens of the rural. We enquired whether the rural can fully embrace the digital from a position seeking to cast light on the narratives around the diffusion of the digital in the rural space. In so doing, we drew on Halfacree's (2006) threefold framework or "architecture" of rural space, to examine digitalisation vis-à-vis the rural through rural localities, formal representations and everyday lives. The literature suggests that although there is no "one-size-fits-all" definition for the rural, many rural areas are in decline due to a number of factors such as economic isolation, demographic structures, decreased social structures and diminished allocation of funds for development, to name a few. Hence, digitalisation has emerged as a response albeit, similar to the definition (or lack of) for the rural, there is no one definition for the phenomenon. Even so, with regards to regeneration of the rural, the literature points to digitalisation and a strong focus on ICT, the internet and broadband. Thus the diffusion of the digital into the rural space throws up the question "what comes of it?". Our examination results in a number of lines of enquiry, essentially "what does rural digitalisation mean" and "what does rural digitalisation require"?

An investigation into the meaning of rural digitalisation shows that the definitions of digitalisation and the rural need to be delineated and understood within the particular lens through which they are being viewed. This allows for an appreciation of the components of digitalisation. It also allows for the various aspects of the rural to be considered. From such, digitalisation can be shaped given the particular rural context and the desired outcomes of digitalisation within the rural can emerge.

The exploration indicates that meaning moves beyond the use of digital technologies, bridging the digital divide, access to broadband and highspeed connectivity. Broader meaning can be ascribed to rural digitalisation. This is in terms of incorporating the digital into the rural with the aim of addition of value. To achieve this, the rural needs to be at the centre of the discourse. Furthermore, the different types of rurality, facets within them, and ensuing spatial practices, characterised within specific localities need to be considered. Additionally, rural digitalisation implies engaging with official data and the political discourse in order to shape the digital within the rural. Shaping of the digital also suggests the need for an understanding of rural lives and dynamics since the perception of the digital within the rural space will impact adoption and the extent of need thereof. Thus, can the rural fully embrace the digital? The analysis from this study suggests the affirmative but the questions that need to be considered are what are the spatial practices defining the rural locality, what discourses surround it and how can the digital be shaped and embedded given the diversity and the narratives.

The study findings cast light on the requirements of rural digitalisation. We take into account obvious mandatory pre-requisites such as connectivity, broadband and the associated infrastructure. These play a major role where rural digitalisation is concerned and as opposed to them being simply available, the actual state of the connectivity, broadband and the associated infrastructure need to be considered. The analysis also finds that digitalisation goes beyond the presence of infrastructure and connectivity. The question is what the available infrastructure and improved connectivity mean for the rural community, which allows for the research to highlight in addition, the importance of community, accessibility, culture, behaviour and demographics as well as training, education, skills and capacity. Rural

digitalisation requires the involvement and participation of people on matters concerning them and this is important since outcomes can depend on these. Analysis from the study suggests that for the rural that, given its complexity, it is necessary to move beyond participation to engender an understanding of the community through engagement. Furthermore, it is necessary to bring citizens on board in co-design because of the added value early acceptance and a sense of ownership creates. The complexity of and therefore engagement with the rural casts light on the importance of considering the cultural, behavioural and demographic aspects when examining the diffusion of the digital into the rural. An understanding of the culture can help cultivate an appreciation of the specific localities. Moreover, people's values, knowledge and experience will have an effect on the extent to which they will embrace digitalisation. Behavioural patterns too can be influenced based on the culture. The demographic is crucial because demographic compositions can determine whether and how the digital can be embraced and maximum acceptance achieved. Diverse demographics and associated levels of engagement with the digital also draws attention to the place of training, skill and capacity building. The findings elicited generally lower levels of digital literacy. This implies the need for the building of capacity because access to the digital requires skill. Hence, rural digitalisation requires an appreciation of the particular rural context in totality because of the possible influence on the extent to which adoption of the digital within the rural can occur.

Thus, fully embracing the digital means considering the spatial practices and narratives defining the rural and assessing how, on the basis of such, the digital can be shaped and embedded within the rural. It also requires assessing what infrastructure and connectivity mean for the rural community and what skill is required which signals the need for an appreciation of rural dynamics and capacity building.

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