Rural Community Development Click-by-Click. Processes and dynamics of digitally supported social innovations in peripheral rural areas

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Abstract

Even before the Covid-19 pandemic, residents in peripheral and structurally weak rural areas began to move into the digital age. Digital tools are being used and developed to address existing challenges in rural areas such as local communication, healthcare or mobility. Against the background of a conceptual framework of social and digital innovations from a process perspective, this paper asks how the processes and dynamics of digitally supported social innovations in rural areas can be understood and described. By analysing five villages in Germany, we show that the digital initiatives – despite their different contexts, contents and driving actors – develop over three phases: an inspiration phase, an emergence phase and a consolidation phase. This dynamic process can be interpreted as "linear-circular", because while overall a very targeted development of innovative problem solutions can be observed within the three-phase process, at the same time creative development loops and new inspirations exercise influence.

Ländliche Entwicklung Klick für Klick. Prozesse und Dynamiken digital unterstützter sozialer Innovationen in peripheren ländlichen Räumen

Zusammenfassung

Bereits vor der Covid-19 Pandemie begannen Bewohnerinnen und Bewohner auch in peripheren und strukturschwachen ländlichen Räumen, den Weg ins digitale Zeitalter zu gehen. Zunehmend werden digitale Werkzeuge genutzt und entwickelt, um bestehende Herausforderungen ländlicher Räume wie lokale Kommunikation, Gesundheitsversorgung oder Mobilität anzugehen. Vor dem Hintergrund eines konzeptionellen Rahmens zu sozialen und digitalen Innovationen aus einer Prozessperspektive fragt dieser Beitrag, wie Prozesse und Dynamiken digital unterstützter sozialer Innovationen in ländlichen Räumen verstanden und beschrieben werden können. Anhand der Analyse von fünf Dörfern in Deutschland wird aufgezeigt, dass sich die digitalen Initiativen – trotz ihrer unterschiedlichen Kontexte, Inhalte und treibenden Akteure – schwerpunktmäßig über drei Phasen entwickeln. Diese definieren wir als Inspirationsphase, Emergenzphase und Konsolidierungsphase. Dieser dynamische Prozess ist dabei als „linear-zirkulär" zu deuten, da zwar insgesamt eine zielgerichtete Entwicklung innovativer Problemlösungen im Rahmen des Drei-Phasen-Prozesses beobachtet werden kann, gleichzeitig aber auch kreative Entwicklungsschleifen und neue Inspirationen auf den weiteren Prozess einwirken.

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1 Introduction

The Covid-19 pandemic has reinforced the trend of digitalisation in rural areas, but even before the pandemic, villages had started to move into the digital age. Residents, particularly in peripheral and structurally weak rural areas, driven by specific problems in their regions, struggled to obtain broadband connections and other digital solutions. With the help of digital tools such as a "village talk app" or a "village emergency app", they have attempted to develop novel approaches to address existing challenges in local communication, care or mobility, to name but a few relevant fields. This is what we call digitally supported social innovations.

Since the 2010s there have been academic debates on the future of rural areas that include more than just discussions of rural exodus and downward spirals. Rather, the potentials of rural regions are considered, which opens up new opportunities for rural dwellers and offers city dwellers the possibility to live in rural areas as an alternative to city living. Such potentials include, for example, successful social innovations driven by the engagement of rural actors (Neumeier 2017; Christmann 2020) and new opportunities related to digitalisation such as broadband expansion and the development of new village apps (Cowie/Townsend/Salemink 2020; Sept 2020). Indeed, since the 2000s – and increasingly since the 2010s – digitalisation processes have taken place in rural regions worldwide, including in Germany. To this end, funding programmes have been launched and digitalisation strategies have been developed. In the last five years, the number of programmes and initiatives for smart villages has grown rapidly (Visvizi/Lytras/Mudri 2019). The number and variety of digital tools for rural areas has also increased sharply (Qiang/Kuek/Dymond et al. 2012; Thapa/Opiela/Rothe 2020).

The still limited number of social science studies that examine these developments are particularly concerned with the nature of these technologies, their user-friendliness and social acceptance, and the new inequalities arising due to the digital divide (e.g. Townsend/Wallace/Fairhurst 2015; Salemink/Strijker/Bosworth 2017; Hewitt/de Boer/Flacke 2020; Mettenberger/Zscherneck/Küpper 2021). Meanwhile, they focus on assessing the potential for prosperous rural development, e.g. due to smart solutions in the area of public services. In research and practice, however, how such social innovations arise and how they further develop in terms of content and spatial spread are still open questions.

The main objective of this paper is to take up a hitherto little researched subject in the broader field of rural digitalisation and social innovation. We focus on the processes, phases and dynamics of digitally supported, socially innovative initiatives in rural areas and contribute to a process perspective in innovation research. The paper is based on the results of an empirical research project on five villages in different rural areas in Germany. The project investigated the role of digitalisation and the development of novel solutions to existing challenges in rural regions. Against this background, the following research questions stand in the foreground:

– What are digitally supported, socially innovative initiatives (thematically) about?
– Which processes and phases can be distinguished in the development of novel solutions, i.e. how do innovation dynamics unfold?
– And more concretely, which dynamics for further development have been triggered by the initiatives? Do initiatives remain as individual community development initiatives or is there potential for broader rural development?

We start this article by first developing a conceptual framework of social and digital innovation in rural areas from a process perspective (Section 2). Afterwards, we briefly present our methodological approach and introduce the five researched villages and their digitally supported, socially innovative initiatives (Section 3). In Section 4, we present our findings by describing the characteristics of three phases that were identified in the observed courses of innovation and by highlighting the dynamics of the socially innovative initiatives. Finally, we conclude with a discussion of the findings and limitations of our research (Section 5).

2 Conceptual framework

Until recently, rural communities were rarely seen in the context of (social) innovation (Ehalt/Schulz 2000; Beetz 2004; Henkel 2004; Coronado/Acosta/Fernández 2008) and tended to have a reputation for being remote from innovation (Nell/Weiland 2014). However, it would be wrong to say that the countryside does not provide a breeding ground for innovation. Rural areas have always been used as experimental spaces for creativity development. Often it was, and still is, city dwellers, sometimes artists, creatives and others, who have retreated to the countryside individually or in groups to try out new things, often in connection with urban influences (e.g. Neumeier 2012; Faber/Oswalt 2013; Noack/Federwisch 2019). It has also been shown that innovative firms located in peripheral areas need to connect to

the outside and sometimes establish more formalised collaborations (e.g. Grillitsch/Nilsson 2015; Eder 2019).

Locals themselves can also break new ground. Recent empirical findings show that rural residents try out new things and develop them further (e.g. Jungsberg/Copus/Herslund et al. 2020; Noack/Federwisch 2020; Zerrer/Sept 2020). However, rural residents do not usually describe the novelty of their approaches as "innovative". They are primarily concerned with developing solutions to existing problems in the community, not with being innovative. Meanwhile, the literature on (social) innovations in rural and peripheral areas is also steadily growing (e.g. Bock 2016; Meili/Shearmur 2019; Castro-Arce/Vanclay 2020; de Fátima Ferreiro/Sousa/Sheikh et al. 2021; Tschumi/Winiger/Wirth et al. 2022).

One reason why rural regions are still rarely associated with innovation is that the term innovation has long been connected with technical or economic innovations, the expensive research laboratories of large companies, and economic development clusters in metropolitan areas. Nonetheless, especially in the field of economic geography, rural-peripheral regions are also being considered in connection with innovation. Here, however, the focus is predominantly on innovative companies and entrepreneurs related to agency, structures and framework conditions (e.g. Eder 2019; Döringer 2020; Grillitsch/Sotarauta 2020; Morisson/Mayer 2021). In the social sciences, on the other hand, social innovations are also considered alongside technical and economic ones (Popitz 1995; Dolata 2019).

Conceptually, we have adopted Rammert's (2010) approach of "innovation society" and "societal innovations", which emphasises the diversity of innovations and points out that innovative practices can be observed not only in business and technology, for example, but also in societal areas such as politics, education, science, art, culture and even everyday life (cf. Rammert/Windeler/Knoblauch et al. 2018). For social science innovation research, it is important to distinguish analytically between the different types of societal innovations, each of which may follow its own logic – even if they sometimes occur in combination. This is the only way to examine how the different types of innovation interact with each other, for example, how technical and social innovations come together.

In this contribution, we understand the new approaches in rural areas primarily as social innovations because they are driven by rural actors and their social needs, even if they are supported by digital technologies. We refer to them accordingly as "digitally supported social innovations". In the conclusions (Section 5), we will come back to this and ground and justify it based upon our empirical analyses (especially in Section 4).

At least two streams of social innovation research have emerged in the past. Scholars in the first stream focus on how existing problems can be addressed through the development of more collaborative and cohesive social relations, citizen empowerment, the development of bottom-up initiatives and more democratic governance systems (Jessop/Moulaert/Hulgård et al. 2013). The other stream is more rooted in classical innovation research. There, social innovations are seen as novel social practices of actors, with researchers interested in the structures and processes of innovative action. They explore successful and unsuccessful initiatives in order to understand how social innovations work (Howaldt/Schwarz 2010; Christmann/Ibert/Jessen et al. 2020). We locate ourselves in this second stream of research.

What do we understand to be social innovations? We fully agree with Zapf (1989), who perceives social innovations as new social practices, as "new ways of achieving objectives, in particular, new forms of organisation, new modes of regulations, new lifestyles" (Zapf 1989: 177; authors' translation from German). A key criterion for innovations is thus novelty, which represents a break with common practice. However, Zapf does not specify how new a practice or a solution must be or how much it must deviate from the previous practice to qualify as a social innovation. Although a certain degree of novelty is a central feature of social innovation, we understand it, in agreement with Gillwald (2000: 11), not as something that has come into the world absolutely new for the first time, but rather as a "relative novelty" in the sense of a "novel combination" of already known elements (cf. Schumpeter 1911).

It has already become clear that novel ideas cannot remain merely as such but must be put into practice to be considered innovations. This is largely agreed upon in the innovation literature (cf. also Rammert/Windeler/Knoblauch et al. 2018). In addition, the practice must be taken up and imitated elsewhere, which means that it also has to spread spatially. Furthermore, it is important to keep in mind that a deviating practice only becomes an innovation when third parties perceive it as such and experience it as an improvement over the previous situation, as Braun-Thürmann (2005: 6) has pointed out. We therefore understand (social) innovations as social constructions in two respects: i) as the establishment of novel ways of acting by actors and ii) as the perception and naming of the new ways of acting as "novelty" or "innovation" by third parties.

For our contribution, it is central that we consider social innovations in their temporal structure or processuality, something that has been done only rarely. In alignment with Christmann, Ibert, Jessen et al. (2020: 501), we understand social innovations "as a complex and multi-layered 'social process'". Based on the findings of their studies, starting from observable innovations in the present, one can search

for the origin of the underlying ideas and reconstruct the processes of emergence, unfolding and consolidation of innovations.

In the past, there has been criticism of linear models of innovation processes for being deterministic and not doing justice to the complex matter in question (Balconi/Brusoni/Orsenigo 2010). Circular models seem to have replaced phase models because they better conceptualise the iterative and open-ended, never-ending nature of innovation processes (Kline/Rosenberg 1986). "Reconstructive social innovation cycles" have been described, using the example of women-led initiatives, also for rural areas (Sarkki/Dalla Torre/Fransala et al. 2021). Nevertheless, there are good reasons not to simply abandon the linearity model because, as Christmann, Ibert, Jessen et al. (2018: 254) argue, facts are established that cannot be ignored in the course of the innovation process. These facts can sometimes also be the existing local framework conditions, which sometimes stand at the beginning of an innovative process or hinder it, be they individual and collective needs or social and institutional conditions (Lukesch/Ludvig/Slee et al. 2020). It is therefore an open question as to how innovation processes can be adequately conceptualised and described. In this respect, Christmann, Ibert, Jessen et al. (2018: 254) suggest the following: "A phase model would be desirable that identifies such thresholds [...] and in this way takes into account that phases do not always proceed in a linear fashion but may also follow a spiral- or wave-like pattern until an innovation has been established". We have taken up this idea. Our approach can be described as a process perspective that considers individual phases, the overall process and the dynamic developments of empirically occurring innovations. Since interesting results are already available on the role of actors in innovation processes in rural areas (e.g. Lukesch/Ludvig/Slee et al. 2020; Zerrer/Sept 2020; Richter/Christmann 2021), we focus in this article on the temporal sequence with its phases and dynamics.

Last but not least, it should be pointed out that innovations typically trigger social change. For Zapf (1989: 177), this aspect is an integral part of his definition. If we apply this idea to our subject matter, we can assume that social innovations – provided that they establish themselves on a larger scale, spread and become effective in the longer term – can fundamentally change life in the countryside, with consequences for community development and even rural development.

This is especially true for digitally supported social innovations, which in a sense drive the digitalisation of rural residents' actions. Digitalisation is considered to structure "many and diverse domains of social life around digital communication and media infrastructures" (Brennen/Kreiss 2016: 560). Concepts of mediatisation assume that the in-creasing everyday use of ever new digital media leads to changes in human actions – and that the changed modes of action, in turn, bring about changes in the organisation of social and physical worlds (Hepp/Hjarvard/Lundby 2015). In the face of very extensive digitalisation, Hepp (2020) even speaks of a "deep mediatisation", typified by all elements of our social world being closely connected to digital technologies and their underlying infrastructure. As already noted, there is increasing evidence that digitalised action may result in different experiences, forms of knowledge, ways of acting, social processes and possibly also in different perceptions and arrangements of spaces. Even though we were not able to explore this empirically within the framework of our time-limited research project, and at best only received initial indications of more recent developments in rural communities, this conceptual consideration should not go unmentioned.

3 Research design and description of the case studies

3.1 Research design

To identify phases and dynamics of the process of digitally supported social innovation in villages with different types of digital initiatives, we chose five villages in Germany that were discursively labelled as innovative either by the actors themselves or by third parties (cf. Hutter/Knoblauch/Rammert et al. 2018). During the case selection – that started at the beginning of 2019 with a mapping of 59 rural digital initiatives – we found a great heterogeneity of digital initiatives in rural areas in Germany.[1] In order to reflect the variety of different regions, the villages chosen are distributed in different federal states of Germany (see Section 3.2). For reasons of comparability, the individual villages are similar in size and also have common structural features, i.e. they are located in structurally weak[2] and peripheral rural regions[3] and they are characterised as "rather rural" or "very rural" with a "less good" socio-economic situation, according to the Thünen categories.[4] Furthermore, all of the villages have in common that they focus on community development issues. The difference between the cases is that they represent individual stand-alone

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[1] For a deeper insight into the process of case selection see Sept (2020).

[2] cf. https://tinyurl.com/2p8d72bx (05.05.2022).

[3] cf. https://www.bmvi.de/SharedDocs/DE/Artikel/G/regionalstatistische-raumtypologie.html (05.05.2022).

[4] https://www.landatlas.de (05.05.2022).

initiatives at the one end of the continuum and initiatives belonging to more or less large project networks at the other end (Sept 2020). Keeping the context stable while adjusting the variable of interest (the kind of digitally supported social innovation) allows us to explore the phenomenon in more detail and, in case there are any differences, to look for a cause that is not in the spatial structure of the villages. To guarantee the anonymity of our interlocutors, we use pseudonyms for them and for the names of the villages.

Methodologically, our research is based on a focused ethnography (cf. Knoblauch 2005), combining participant observations in the village communities, expert interviews (with local and external experts) and problem-centred interviews with local actors and residents, as well as document analysis. The fieldwork in the villages, including face-to-face interviews, was carried out between July 2019 and February 2020. Due to the Covid-19 pandemic, further interviews were conducted by telephone or as video conferences between March 2020 and February 2021. Next to the semi-structured, problem-centred interviews (cf. Witzel 2000), we conducted participant observations (cf. Atkinson/ Hammersley 1994) during local digitalisation courses and special events (such as a summer festival, the formal delivery of a shared village car and networking events). We took a "field-observer role" (cf. Knoblauch 2005) during our observations, with a focused approach over several short-term field visits during which we concentrated on observing digital practices, practices related to digitalisation and conversations about digital initiatives.

Altogether, the empirical material includes 63 interviews, 105 documents and 36 pages of observation protocols. For the data analysis, the material was subjected to grounded theory coding (cf. Strauss/Corbin 1997) in alignment with the research questions. Joint data sessions between the team members responsible for specific cases enabled a cross-case analysis and, at the same time, led to a deeper understanding of the individual cases.

3.2 Description of the five cases studied

In the following, the five villages selected are described in order to provide an insight into the challenges they face, the main actors involved, and particularly the socially innovative solutions developed (see Figure 1). In terms of our research questions, we answer the question of what digitally supported, socially innovative initiatives are about. In addition, we offer an impression of the dynamics that have unfolded concerning the issues addressed. It should also be noted in advance that in all chosen cases, the digitally supported, socially innovative initiatives started around 2016 and 2017. In some cases, initial approaches to socially in-

novative activities can also be observed beforehand, but these did not yet have a digital component.

In Blaurow, which stands for an individual village project in the region, the initiatives are mainly driven by a couple who moved to the village, bought the property of the former village shop, and transformed it into a public multi-use space with open Wi-Fi. They did this to create a meeting place for the residents and to address the challenge of very poor mobile internet access in the village. Gradually, they began to actively engage in the local community – in 2016 one of them became the new head of the village and the other became the chairperson of the village association. After a tip-off from a district employee, the village, represented by the village association and the village head, took part in the competition called "Our village has a future" at the district level. They surprisingly won and thus qualified for the village competition in the federal state of Brandenburg. Preparing for this level of the competition, the group started to really "think about the village, where is it going?" (D1_I02). Through their discussions, they recognised that "digitalisation is the opportunity par excellence for villages" (D1_I02), which is why they subsequently developed ideas on how to use digitalisation to further develop the village. This resulted in the creation of a digital strategy for Blaurow. They submitted the strategy to the Brandenburg-wide village competition and won a special award.

Little by little they started to implement their ideas for action and to apply for additional funding. Together with the district's adult education centre, a village digitalisation course was set up to prepare villagers to confidently and safely use computers, smartphones and apps, as this proved to be an important prerequisite for the introduction of digitally supported novel solutions to the challenges that existed in the village.

Later on, the village association successfully applied for funding to buy an e-car for village car-sharing in order to address mobility issues and to reduce the number of privately owned cars. Since 2020, the car can be booked and billed via a smartphone app. In 2020, funding started for another project called "Senior citizens and digital change" to buy a computer and a tablet that can be easily borrowed by elderly people. To improve communication in the village, which had also proved problematic in the past, the village head started a WhatsApp broadcast to quickly spread information in the village community, the village's website has been relaunched and the quarterly village magazine is now also available online. During the pandemic, the meetings of the village association were held online and elderly members also participated. In summary, one could say that Blaurow – having started from a small idea – is gradually developing into a digital village and is permanently driving digital transformation to strengthen the community.
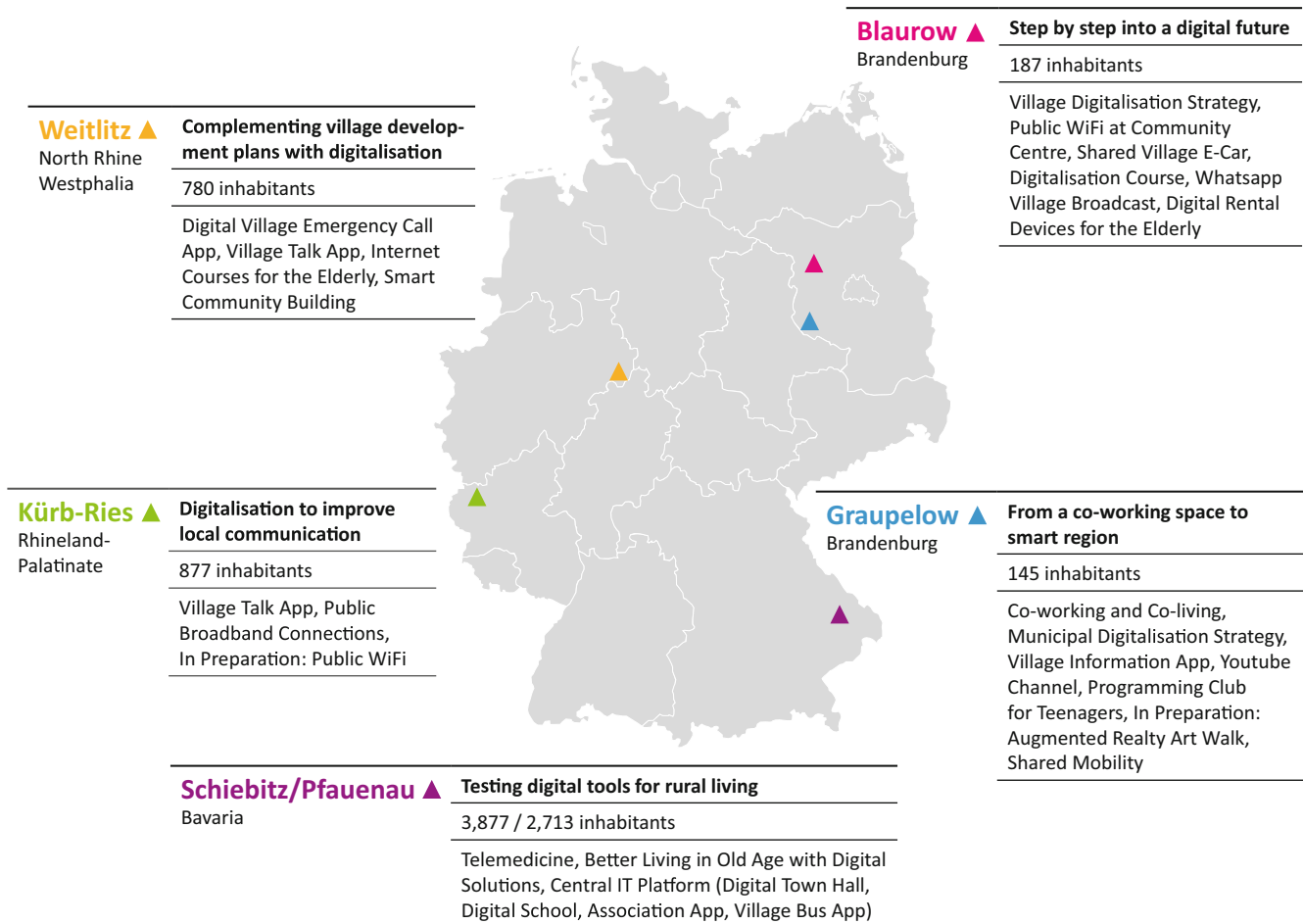
Blaurow ▲ Brandenburg — **Step by step into a digital future**
187 inhabitants
Village Digitalisation Strategy, Public WiFi at Community Centre, Shared Village E-Car, Digitalisation Course, Whatsapp Village Broadcast, Digital Rental Devices for the Elderly

Weitlitz ▲ North Rhine Westphalia — **Complementing village development plans with digitalisation**
780 inhabitants
Digital Village Emergency Call App, Village Talk App, Internet Courses for the Elderly, Smart Community Building

Kürb-Ries ▲ Rhineland-Palatinate — **Digitalisation to improve local communication**
877 inhabitants
Village Talk App, Public Broadband Connections, In Preparation: Public WiFi

Graupelow ▲ Brandenburg — **From a co-working space to smart region**
145 inhabitants
Co-working and Co-living, Municipal Digitalisation Strategy, Village Information App, Youtube Channel, Programming Club for Teenagers, In Preparation: Augmented Realty Art Walk, Shared Mobility

Schiebitz/Pfauenau ▲ Bavaria — **Testing digital tools for rural living**
3,877 / 2,713 inhabitants
Telemedicine, Better Living in Old Age with Digital Solutions, Central IT Platform (Digital Town Hall, Digital School, Association App, Village Bus App)

Figure 1 Location, key features and digital measures of the observed cases

The digital initiative in Kürb-Ries started with a conference on the future of the village that was organised by the municipal mayor in April 2017. The two-day workshop was considered to be particularly successful as more than 100 people from the village community participated in order to identify problems and opportunities and to develop measures for the future of the village. The participants identified, among other things, a lack of meeting places and poor communication in the village as their main problems. To improve the situation, some residents founded the working group "communication and information". Their big question was how to improve communication in the village without opening a new physical meeting place. "And since we are now in the digital age here, my idea was directly, we have to get something digital," explains one member of the group (D4_I10). After researching a variety of digital tools on the internet, the group contacted a research institute that had been developing a village talk app since 2015 as part of a pilot project. The group's wish to use this app, with some specific adaptations, was met with open ears. At the end of 2018, the slightly adapted village talk app was made available in Kürb-Ries. According to our interview partners, information and communication on everyday issues of village life have definitely been improved, and the app also offers new topics for spontaneous conversations on the street.

The largest social innovation case is a joint initiative by Schiebitz and Pfauenau. Schiebitz/Pfauenau is part of the pilot project "Digital Village" that took place between 2016 and 2021, and was financed by the Bavarian Ministry of Economics, with the involvement of other departments. The project management, development, programming and implementation of the applications is handled by a technology campus, which also came up with the idea for the project. The goal of the "Digital Village" is "to address the question of how digital solutions can be helpful to face challenges of rural areas, and how they can be a part of the public welfare and service" (D5_I06). Within three consecutive phases of realisation, the pilot communities little by little tried out measures across 12 different fields of action,

such as demographic change, mobility and migration. The results of the projects are used to test and improve digital measures, with the goal of disseminating the most successful ones over the whole of Bavaria in the future. For the joint initiative of Schiebitz/Pfauenau, the mayor of Schiebitz has taken on a central role. He combines his motivation to present his village as modern and forward thinking with his former experience in the field of digitalisation and in writing applications. Together with the mayor of Pfauenau and experts from the fields of administration and digitalisation, he authored a professionally written 80-page application to become a pilot for the "Digital Village" project. In the application they described their ideas about fields of action for digital measures and specific digital apps to improve village life. When their application was successful, Schiebitz/Pfauenau became one of the "Digital Village" pilots. The measures included, but were not limited to, digital medical counselling, a digital village bus app, a digital platform for information and administrative purposes, digital literacy courses for elderly people, digital neighbourhood assistance and a rural co-working space.

Weitlitz is one of 16 villages that were selected to take part in the "Digital Countryside" project between 2016 and 2019. "Digital Countryside" took place in two districts of North Rhine-Westphalia, financed by the EU and the federal state. The project aimed to "bring the benefits of digitalisation into the rural areas. [...]he villages especially struggle with demographic change, migration flow towards the cities and many villages are isolated in terms of mobility. Therefore, the goal of DC is to use digitalisation for new opportunities to make the rural areas fit for the future" (D3_I02).

In Weitlitz, a combination of circumstances led to involvement in "Digital Countryside". In 2017, volunteers from the so-called village workshop developed a plan called "Weitlitz 2020" that addressed topics like tourism, demographic change and infrastructure. In the same year, Weitlitz's internet connection was upgraded. At the same time, the very committed local historian and head of the village workshop retired and was able to engage even more. During the same period, the mayor of the municipality announced the invitation for participation in the "Digital Countryside" project. The village workshop then modified its original "Weitlitz 2020" plan, envisaged digital measures for the previously defined fields of action and developed an application for the joint project "Digital Countryside". The measures that were developed and realised in Weitlitz are part of the action fields of "demographic change" and "digital infrastructure". Against this background, a village emergency app for elderly people living alone was developed and implemented in cooperation with a small tech start-up. Internet courses for the elderly were organised by

villagers, for villagers. Furthermore, a village talk app, programmed by an institute for applied research, was adapted to the needs and requirements of the villagers. The community building was equipped with smart home technology, Wi-Fi and hardware for the internet courses. The experience gained has led to a spatial dissemination of components of the project, with the most successful measures now being implemented in several other villages in the federal state.

Graupelow is a small village belonging to a rural municipality that has won several awards and funding projects since 2018, such as being recognised as a "smart community" in Brandenburg and a "smart region" at the federal level. However, everything started in Graupelow with the arrival of a group of young social entrepreneurs. In 2017 they bought the former manor house and transformed it into a centre for co-working and (temporary) co-living. Their main idea was that rural Brandenburg can provide an attractive escape for stressed urbanites and (international) digital nomads working remotely. Graupelow not only offered an attractive building for their activities but also high-speed internet, which was a major locational advantage. To buy the building they had to convince the municipality of their concept, and thus from the beginning were in direct contact with the municipal administration and local politicians. According to the municipality's newly established digitalisation commissioner, the opening of the place is "the root of all things here around digitalisation" (D2_I02). In addition to their own business activities, the social entrepreneurs supported the municipality with an application for a "smart community competition", developing a vision to become a smart and digitally supported rural region. After winning this competition, several digital projects were carried out, such as the implementation of a village app and a YouTube channel for improving local information, and a programming club for teenagers. The village app was considered especially useful, also by the federal state, and has now been adopted by other municipalities. Under the umbrella of subsequently acquired national funding as a "smart region", an expansion of digital projects has been pushed forward, focusing on the areas of health and mobility but also on tourism and culture. For instance, an augmented reality art walk around Graupelow is currently being developed. These later activities are, at the same time, national pilot projects testing new digital measures which may also be disseminated to other rural regions if they prove successful. The social entrepreneurs recognised the opportunity and need for action, met with two open-minded mayors, and in collaboration started digitalisation projects, first in the village of Graupelow and then throughout the whole region.

All in all, while Weitlitz and Schiebitz/Pfauenau started as professionally managed digitalisation projects with an overarching action concept, the other three villages devel-

oped one (Kürb-Ries) or even several digitally supported innovative initiatives step by step and with different funding programmes. In Graupelow, this led to the village becoming part of professional digitalisation projects in the region and even beyond at a later stage.

With regard to our research questions, our study shows that there are commonalities between some of the initiatives in terms of the challenges addressed (topics like internet access, digital competence, village communication and demographic change). Most of the rural communities, however, tackled a very broad range of different challenges (see Figure 1). Initially, the challenges addressed were those that were considered most urgent by the local actors. In the course of their work, other issues were added. It turned out that working on a solution for one problem often triggered the development of further approaches for other thematically related problems. It can thus already be seen here that such processes often involve very dynamic, thematically expanding project development.

4 From inspiration to consolidation: processes and dynamics of novel initiatives

In this section, we pursue our research questions on the processes through which novel digital solutions for peripheral rural regions are typically developed in the initiatives studied (Sections 4.1 to 4.3). We also delve deeper into the extent to which innovation dynamics unfold (Section 4.2) and whether they remain individual community development initiatives or whether there is potential for spatial spread and broader rural development (Section 4.3).

Our analyses of the processes by which rural actors advanced the novel, digitally supported solutions revealed – and this is already an answer to the question about the processes – that they can be described in three phases. We refer to these three phases as: i) the inspiration phase, characterised by the problematisation of challenges and idea generation for solutions; ii) the emergence phase, in which solutions are concretely planned and realised; and iii) the consolidation phase, characterised by constant adaptation, along with an expansion of content and/or spatial spread. The initiatives had these phases in common, although their contexts, conditions and content-related topics differed.[5]

At the beginning of the process, an initiative is set in

motion by three circumstances that usually come together favourably: i) pressure to address specific challenges in village life and the emergence of a will to change something, ii) very often also new actor constellations, and iii) particularly a window of opportunity. They form the inception impulse of an initiative.

4.1 Inspiration phase: taking up urgent challenges, forming driving actors and using windows of opportunities

During the inspiration phase, this inception impulse is taken up. In the village communities, existing local problems are typically discussed and prioritised against the background of an opening window of opportunity. The various challenges that the five communities have brought to the fore have already been named above (to repeat just a few: problems with internet access, stunted village communication, the low digital competences of residents, mobility issues, healthcare, ageing of the population; see Section 3.2 and Figure 1).

Additionally, it has become clear that new constellations of actors could often be observed at the beginning of the initiatives: in Blaurow a couple moved into the village and played an important role, in Schiebitz/Pfauenau it was external actors from a research institute who helped to push things forward, in Weitlitz the village chronicler had more time at his disposal due to his retirement, and in Graupelow young social entrepreneurs came to the area and became very active together with local actors. The initiatives benefited greatly from these core groups of actors who took on responsibilities and also managed the process as it proceeded to further phases.

With regard to the windows of opportunity, which are also of central importance for initiatives, the organisation of a future conference (Kürb-Ries), a call for tenders within the framework of a competitive funding programme (Blaurow, Schiebitz/Pfauenau, Weitlitz), and certain favourable local conditions where good broadband infrastructure and suitable real estate already existed (Graupelow) proved to be very helpful in getting a digitally supported novel solution for the village off the ground. Therefore, it became particularly clear that village communities often do not act in isolation but are supported by other actors, in particular by public agencies.

While in Weitlitz, Schiebitz/Pfauenau and Graupelow the focus of the inspiration phase was always very specifically on developing novel solutions that actively used digital technologies, in Blaurow and Kürb-Ries it was initially still about strengthening the local village community and finding novel solutions to current problems in general, which later led to digital solutions.

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[5] See also Christmann (2020) and Christmann/Ibert/Jessen et al. (2020). Furthermore, our findings are largely consistent with observations by Jungsberg/Copus/Herslund et al. (2020), Kluvankova/ Nijnik/Spacek et al. (2021) and, more generally, with Mulgan (2006).

In Kürb-Ries the actors describe the conference on the future as a very clear initial spark for their initiatives: "The origin was that in this future conference in April 2017, various pain points within the village were thrown up and identified" (D4_I10) and "through this a working group was formed – Information [and] Communication" (D4_I04).

In Blaurow, the village competition was seen as the decisive impetus: "Well, it all started with the participation in the district competition 'Our village has a future'. [...] And then we asked ourselves the question, what future does this village actually have? [...] This really started an avalanche, of which we had no idea, of course" (D1_I01). We can also find a similarly clear understanding of the starting points in Schiebitz/Pfauenau and Weitlitz, where the focus was on more strategically addressing opportunities that arose for their villages through digitalisation. The mayor of Schiebitz/Pfauenau told us that "the idea for the project was this competition" (D5_I02). With regard to the villages' first initiative, the project manager confirmed that "they practically submitted a project outline. It simply stated why they wanted to carry out digitalisation measures. Just a bit of digital vision, the goals, what they want to achieve with it, the initial situation in the villages" (D5_I06). In Weitlitz the call for participation within the "Digital Countryside" project opened a window of opportunity for financing village development, "and for this reason we simply applied and said to ourselves that this would be an ideal addition to our original Action Plan 2020 for village development. [...] But now we have sharpened up this Action Plan 2020 with digital projects" (D3_I01).

For Graupelow, the situation was a bit different. The starting point there was a group of social entrepreneurs, the majority of whom were not from the area. At the very beginning they were only thinking of somehow combining tourism and co-working somewhere in the countryside. In search of a place, they stumbled across Graupelow, which offered a window of opportunity for their social innovation. It promised both well-developed digital infrastructure in the surrounding area and a very suitable property, which were both interesting for the further development of the project idea. In the inspiration phase, the young social entrepreneurs tended to show behaviour that is typical of entrepreneurial action: they first began with market exploration, team building and finally a business plan. The end of this phase was clearly marked for the team: "And then at some point you come to the point: we're going to do it now" (D2_I01.1).

Overall, our research has shown that although the inspiration phase still ends with more or less vague ideas for digital tools or actions, the specific challenges on the ground have been clearly identified and analysed so they can be tackled in a novel way. The main direction for further action has been set, the group of driving actors has been formed, and in some cases funding opportunities for further development have also been found.

4.2 Emergence phase: planning and realising digitally supported novel solutions

In the second phase, which we call the emergence phase, further planning takes place, i.e. the goals are concretised, the ideas for solutions are profiled, and the first implementations of the ideas take place and are tested. In the initiatives, we observed that planning and realisation are not separate phases but go hand in hand. In the emergence phase, which now refers specifically to digital solutions, various digital tools are identified that can be helpful in overcoming the existing challenges and promise good solutions. Typically, local communities (together with public bodies) actively look for technical developers who offer, or are able to develop, the desired tools, which are then adapted or newly programmed to address the specific needs on the basis of intensive communicative processes. While the activities that took place in the inspiration phase had a more linear course, the emergence phase, in which the desired solutions were concretely developed, often ran in loops. The villagers tended to experiment. They tried something, adapted and changed it, and even created new ideas for another project or digital tool. Moreover, the approaches to a solution were often not only further developed during the process, but sometimes even expanded in terms of content in various development loops. The process of the emergence phase, thus, had more of a cyclical character.

Kürb-Ries had the most straightforward project course. There, the emergence phase was characterised by searching for the right village communication app, contacting different research institutions, and discussing different technical functions and finances, as well as the final online launch. "We had two or three serious alternatives for communication options and then quickly realised that [this research institution] is already on exactly the right track with this digital village project. [...] we expressed our wishes, some of which were also taken into account" (D4_I10). Altogether, this process of planning and implementation was mainly undertaken by the local communication working group and the developers, and "very quickly this was implemented" (D4_I04).

Weitlitz went through a similar process to Kürb-Ries in finding a communication app, but there were further fields of action: the actors also started to conceptualise a village emergency app and established cooperation with a developer. Additionally, they started attending training-of-trainers courses in order to be able to offer internet courses for elderly villagers in the future. In a further emergence loop,

they drew inspiration from other villages on how to equip and realise a digital community hall, and on this basis developed their concept for a smart building. These different emergence loops did not happen simultaneously nor one after the other but overlapped.

In Blaurow and Schiebitz/Pfauenau the emergence phase appears less focused, more experimental and probing. The Blaurow village community, first of all, used the prize money to buy a beamer and a screen for their community centre, and started to plan the digitalisation course "for all those who have little or no experience in this area" (D1_I01). In parallel, a car-sharing project was set up and required an app for booking and billing. Similar to the working groups in Kürb-Ries and Weitlitz, the villagers started screening digital tools for car-sharing and chose a professional developer who was willing to adapt the tool for their specific needs as a small village with only one car to manage.

The digital village project, in which Schiebitz/Pfauenau was involved, generated three loops. The first one was about evaluating and deciding on the best project ideas submitted for the competition. "Stage 2, the first implementation phase, was about setting up, testing and implementing the digitalisation concept in one municipality or one association of municipalities. The concept was then developed, so to speak, and also realised and rolled out. And in Stage 3, further fields of action were served and the implementation measures that had already been started in Stage 2 were continued. [...] When we then went into implementation, people were always invited to the working group at the beginning, or to a first meeting and from there working groups were formed" (D5_I06).

For Graupelow the first loop involved the purchase and opening of the former manor house as a co-working space. However, with a new window of opportunity – a digital village competition – another loop started with the social entrepreneurs and the public administration as the central actors. A village app has been tendered, locally discussed, programmed and handed over to the public. Furthermore, members of the social enterprise have founded an association "where we are trying to launch digitalisation projects, among other things, or let's say smart solutions, in the region. [...] And above all, these projects are usually not organised by us, but by people from the region" (D2_I01).

All in all, it is particularly interesting – and this is our answer to the question about the dynamics of innovation – that in most of the emergence phases of the initiatives studied, the core group of actors did not develop just one approach to address the problems. Rather, after the introduction of one approach to a solution, further approaches with specific measures were developed, like the many heads of a hydra. Of course, specific additional actors were also involved

at a later stage. Thus, we observed that the first loop in the development of a digitally supported, socially innovative solution often led to a dynamic expansion of the approach in terms of content, which resulted in further loops, each with its own measures. It was not only closely related approaches that emerged, such as the creation of internet access, access to digital devices, the implementation of apps and the training of digital competence, but also thematically similar approaches such as the establishment of a village communication app for all villagers, on the one hand, and a village emergency app especially for elderly people living alone, on the other hand. A very creative and equally dynamic development of new approaches to solutions can be observed here.

4.3 Consolidation phase: improving, spreading and using digital tools

The third phase of the innovation process, which we call the consolidation phase, is mainly about introducing the solutions and measures developed to potential users (and in some cases to the public), and about initiating a process of testing and improving the technical functions, evaluating the benefits for daily life, establishing proven measures and disseminating solutions. The digital tools are now being used in everyday rural life.

The village communities are sensitive to perceiving, collecting and analysing user experiences, feedback and concerns, and deriving ideas for improvement. They are keen to make the technical functions of the tool(s) more efficient and usable, to make their social function(s) more attractive and, consequently, to improve their dissemination capacity. At the same time, accompanying educational measures such as engaging "digital experts" in Weitlitz or providing digitalisation courses in Blaurow are now a stable element of the village communities. The village communities describe the measures as achievements that have been participatorily developed to improve their quality of life and, therefore, are characterised by a high level of acceptance.

It turned out that the consolidation phase has not come to a definitive end, but rather remains open to newer developments. We could see that ideas for further improvements or new digital tools, as well as newly opened windows of opportunity (especially funding opportunities) will be taken up. This could even lead back to the emergence phase and trigger new development loops: for example, in Blaurow for the e-car or in Graupelow for the smart region initiative. Weitlitz also undertook a new loop: as one of 30 villages, it became part of a new district-wide digitalisation project in 2020 and now wants to tackle the topics of public Wi-Fi and digital village tours more intensively. In Schiebitz/ Pfauenau the consolidation phase can also best be described

as further testing and prototyping, as all digital tools used were developed for pilot testing.

What proved particularly interesting was that in Weitlitz, Schiebitz/Pfauenau and Graupelow the public relations work was quite professional with press releases, interviews and information documents and/or videos on their websites. All three cases were interested in gaining public attention for different reasons. One aim of both Weitlitz and Schiebitz/Pfauenau was to act as pilot regions for digital problem solving in rural areas, and to fulfil their pilot function they needed the publics' attention. In contrast, the approach of the social entrepreneurs in Graupelow towards public attention was different. There, the co-living and co-working space needed public relations to attract new visitors. Therefore, public relations were very much involved from the beginning of the project. In the meantime, however, the public attention for the co-working space is so great throughout Germany and even internationally that the local administration, together with the cooperating social entrepreneurs, uses this prominence to give the smart region initiative better visibility. They organised "several press events [...], the State Secretary for Digitalisation, at the time in the State Chancellery, was on site several times and also addressed the topic on several occasions" (D2_I02).

With regard to our research question about a possible spatial spread of digitally supported solutions in the context of innovation dynamics, the actors are evidently interested in publicising the novel solutions and, if possible, also in disseminating them. The goal is a spatial spread of the solutions. This phenomenon makes such initiatives attractive not only for rural community development per se, but also for larger-scale rural development.

However, it must also be said that the actors in the cases of Kürb-Ries and Blaurow did not intend to actively draw the attention of the general public to their novel approaches, assuming that their digitally based solutions would serve more local purposes. Nevertheless, they received public attention from the media and other administrative and political actors because of their activities. Kürb-Ries was one of the first villages that used the village talk app. The local actors had to learn that "the press, radio and television are interested in our village talk app here" (D4_I10) and "there were also many local mayors who approached me [the village head] about this app" (D4_I04). There was even greater media attention in Blaurow around the inauguration of the village e-car, which is considered the first village car-sharing in the federal state of Brandenburg. It can, thus, be stated that even in cases where local actors did not pursue dissemination intentions regarding their solutions, there is nevertheless a great deal of attention paid to them by third parties (in media and politics). Often it is also third parties who describe these novel initiatives as "innovative".

5 Conclusions: linear-circular process of social innovation

The aim of this article was to better understand the processes and dynamics – by marking out fundamental phases – in which digitally supported social innovations are developed to address the challenges of daily life in rural areas. With the help of a comparison of five villages in Germany, we have shown that the initiatives – despite their differences in contexts, contents and driving actors – are developed over three phases: i) the inspiration phase, ii) the emergence phase and iii) the consolidation phase.

When looking at the emergence of technical innovations, some authors note that processes can be observed that may be described as "circular" in the sense of "various forms of trial, error and feedback loops" (Butzin 2014: 8). Also, innovation processes in design thinking are viewed in a similar way (Plattner/Meinel/Weinberg 2009: 114; Ney/Meinel 2019: 10). On the other hand, space-related social innovation processes are often described as more of a linear process model, as has been shown for social innovation in spatial planning (Christmann/Ibert/Jessen et al. 2020) or with regard to different social innovations in remote rural areas (Christmann 2020; Jungsberg/Copus/Herslund et al. 2020; Kluvankova/Nijnik/Spacek et al. 2021). In the context of our study on digitally supported social innovation in rural areas, we conclude that we have empirically observed a linear-circular process (see Figure 2). We describe the innovation process as linear-circular because it is possible to identify an overall very targeted development of innovative problem solutions within the framework of the three-phase process, on the one hand, and simultaneous creative development loops – in both the emergence and consolidation phases – on the other hand. As we show in Figure 2, once the process has started successfully, the emergence phase in particular can develop strong momentum and continues to fuel the process with continuous new content and ideas, so that mutually beneficial hydra-like constellations can arise.

The inspiration phase is preceded by an inception impulse that involves local pressure to address a problem, new actor constellations and windows of opportunity. On this basis, initial ideas for solutions are developed. The inspiration phase leads to a second phase that we describe as the emergence phase, characterised by collectively planning and realising digital measures. In this phase, we observed a process of overlapping loops of creative elaboration of approaches not only to one problem, but to several different, often interrelated, challenges. In other words, from the hull of the first novel solution approach, further novel approaches are developed. The end of this phase can be defined as a mixture of "successful market entry after invention" (in our cases the online launch of digital tools), on the one hand, which is
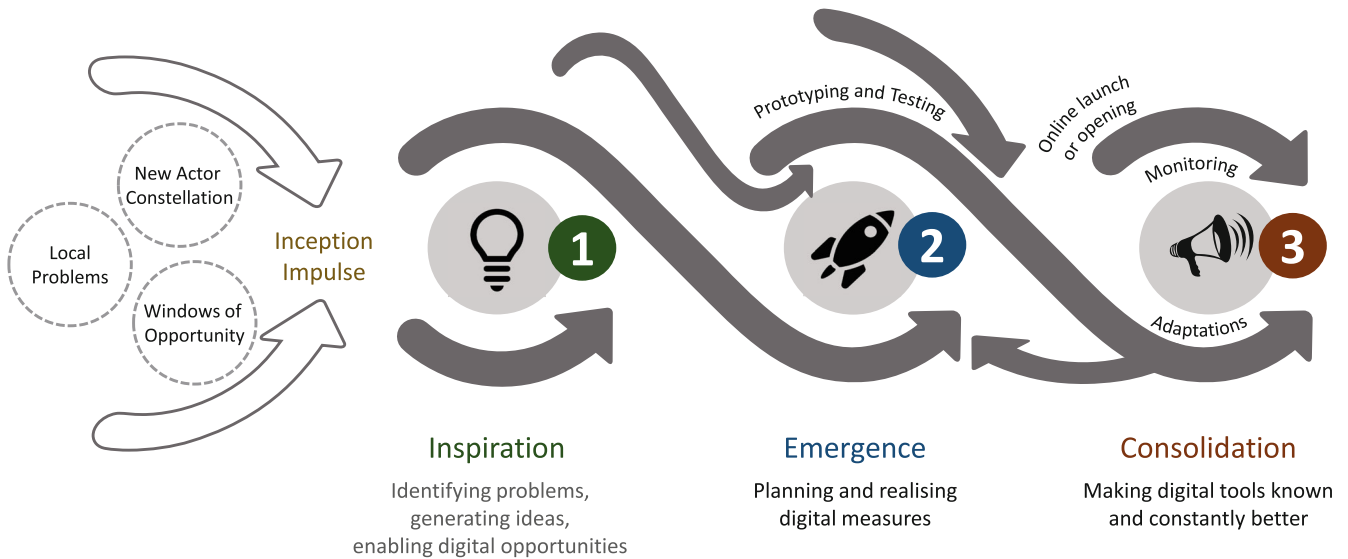
Figure 2 Linear-circular process of digitally supported social innovations

described as crucial for economic and technological innovations (cf. Schumpeter 1911), and the 'imitation of novel practices' on the other hand, which is seen as crucial for social innovation (cf. Howaldt/Kopp/Schwarz 2015). The emergence phase is then followed by a third phase that we call the consolidation phase, which is characterised by constant adjustments and evaluation, as well as monitoring and, thus, also lives from constant adaptation loops.

Despite the technical components, manifested in the software and hardware of the digital tools, and the development of these as part of the innovative process, we perceive the observed initiatives as more social than technical innovations. One reason for such an interpretation is the strong focus on collectively finding new solutions to existing local problems. This dynamic is especially visible when focusing on the actors involved in the three phases. In all cases a core group starts to ideate and collaborate in the inspiration phase. In the emergence phase experts for specific tasks are added to the group of actors, and in the consolidation phase the group of users become the most important group of actors. The core group of driving actors consists in all cases of a small circle of either just volunteers or a combination of volunteers and professionals that take on the responsibility of managing and developing the measures throughout all phases. The dependence on this core group can be critical for reaching the next phase and, therefore, the success of the initiative. If one actor, for example, drops out due to health reasons, this could stall or halt the initiative completely.

Furthermore, the fact that in many cases the technical tools are not complete novelties but are a combination of pre-existing elements directs the focus to social innovations.

The village talk app, for instance, might seem very similar to existing digital (commercial) communication tools, but it combines the communicative functions of such tools with the specific needs of the local area, making it a more intimate but, at the same time, open communication platform restricted to the proper village community, as in Kürb-Ries. It can also be adapted to include digital subgroups for existing groups such as associations in the village, as in Weitlitz. Also in the consolidation phase, where the digital solutions are applied, refined and established, more and more villagers are involved as supporters and users, leading to dynamic community development in the villages.

Moreover, we observed very professional active public relation work and interest from outside the villages to take over the digital tools or to actively spread the solutions into other regions. Such a spatial spread as well as "sharing knowledge and propagating new practices are typical features of social innovations" (Christmann/Ibert/Jessen et al. 2020: 500). It is already becoming apparent that the activities of the smart villagers will probably not remain isolated initiatives that are focused only on community development, but that they will – click-by-click – make contributions to rural development. The mutual impact of rural development and digitally supported social innovations is not integrated in our model of phases but could be fruitful inspiration for further research.

Above all, there are indications that not only are digital solutions for rural problems provided, but that there is an increasing digitalisation of actions in peripheral rural regions just as there is in urban regions and smart cities. Digitalisation as a megatrend has arrived in rural regions as well. How the rural is changing in the face of digital networking

and global connectivity is another interesting question that cannot be explored in this paper.

Further limitations of this research concern the long-term developments and the spatial focus on Germany. As mentioned above, we observed innovation processes over a span of four to five years, which is a relatively short period. Future research at a later date could examine the possible stabilisation, collapse or reorientation of the initiatives, and investigate further long-term effects. Moreover, the period under review coincides with the launch of numerous new funding programmes for the digitalisation of rural areas in Germany, which could not be considered completely in this research.

6 List of cited interviews

D1=Blaurow, D2=Graupelow, D3=Weitlitz, D4=Kürb-Ries, D5=Schiebitz/Pfauenau

- D1_I01 Chair of the village association, 05/07/2019
- D1_I02 Village head, 05/07/2019
- D2_I01 Social entrepreneur, 01/10/2019
- D2_I02 Digitalisation officer in the administration, 18/09/2019
- D3_I01 Head of the village workshop and village chronicler, 10/10/2019
- D3_I02 Project manager "Digital Countryside", 10/11/2019
- D4_I04 Village head and member of the local council (2 people), 19/09/2019
- D4_I10 Member of the working group "communication and information", 28/02/2020
- D5_I02 Village head of Schiebitz, 11/04/2019
- D5_I06 Project lead for the region of Schiebitz/Pfauenau, 12/08/2020

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