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"Digitalization: Status Quo and Future Trends – A New Impact on Life in Rural Areas?"

A McCloy Fellowship on Global Trends Report by

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ABSTRACT

Digital possibilities create change. This change is necessary, especially when one looks at rural areas in Germany and their struggle to maintain social services, access to education, possibilities of employment, and the like under the pressure of demographic developments such as aging and an exodus of young, qualified citizens. In the U.S., there are many innovative digital hubs in urban centers such as in Seattle, San Francisco, or New York, where people, so it seems, know how to use all of the opportunities of the digital age. This applies not only in urban settings but also in some rural parts of America, such as Mississippi, where some unique strategies on how to transition into the digital age can be found. This paper presents insights on how Americans employ today's digital possibilities regarding the structural framework, dissemination of knowledge, the mindset, and all-encompassing community development approaches for digital empowerment. The findings are that the potential for rural communities is tremendous. Applied in a well-thought-out way, digital possibilities not only can create change but also may even create a future leapfrog effect for rural communities.

1. INTRODUCTION

Digitalization is changing dynamics not only in many industries but also in terms of how society functions. The digital transformation – or perhaps we should call it the "digital revolution," in accordance with the Industrial Revolution that probably influenced our society as much as this new transformation – is already happening. Big data, collaboration tools, new (required) competencies – all of these are both opportunities as well as challenges for everyone, including people, governments, companies, organizations, living environments, and the like.

It is certain that the wealth of a nation is based on adapting digital tools in the near future (ISPRAT 2016). New expectations and hopes come up as any digital information can be delivered and received regardless of space and time. On both sides of the Atlantic, governments have developed digital strategies that embrace the opportunity to innovate more with less, to improve the quality of life and do this in a safe, secure way (BMWi 2016; White House 2012). Thereby, the broadband expansion is perceived as an essential necessity for further development.

Depending on the examined country or sector, digitalization occurs at a different pace. One major aspect of a country's digital development is its innovative capability. A recent study of the Handelsblatt Research Institute found that in terms of innovative capabilities,[1] the U.S. is one of the leading countries worldwide. More than 1.3 million people work in the Research and Development sector (compared to a little more than 353,000 in Germany) (ibid. 2016:85). In the U.S., the expenditure for this sector is, at $432.6 billion, five times higher than in Germany.[2] Another difference from Germany is that most funding comes out of the private sector, whereas the German government finances this sector. Looking at patent applications as well as the number of startups, one can also observe that the U.S. is ahead of Germany (ibid.).

[1] As measured by number of employees who are working in the Research and Development sector; expenditure for research and development (also in relation to GDP), patent applications, and newly established companies (Handelsblatt Research Institute 2016:21).

[2] However, in 2013 the U.S. spent 2.74 percent of its GDP, whereas in 2014 Germany spent 2.84 percent of its GDP on research and development (Handelsblatt Research Centre 2016:86f).

2. Research on Digitalization and Rural Areas

The U.S. and Germany are two countries that are quite different from each other in terms of size, population, politics, etc., but – one might think – united in their endeavor to use the full potential of the digital age.

However, looking at digital strategies for community development in Germany, most research is focused on "smart cities" and specifically urban ways to employ digital possibilities (Fraunhofer Institut 2016, PWC 2015). Germany is considered to be not using its full potential; the digital possibilities are still underestimated (Parsons et al. 2016, Münchner Kreis 2015:30ff). Even though it is crucial for rural communities to adapt and use digital possibilities – without denying the need to critically scrutinize digitalization and the change it brings – rural areas do not play a big role in discussions about digitalization in Germany. This lack of focus on rural communities and their transformation in the digital age does not reflect the actual need to discuss the tremendously important question of how rural areas – in which 25 percent of Germans[3] and 18 percent of U.S. Americans[4] live (World Bank 2015) – can benefit from the digital revolution.[5] Therefore, the aim of this research project is to find out more about the linkage between digitalization and rural areas' progress. This paper displays if and how the U.S. is using its innovative capabilities to have an impact on (digital) life in rural areas. Hence, the research question that structures this research project is:

"What kind of role does digitalization play for rural communities within the U.S., and how can it create change?"

3. Hypotheses of the Research

The term "digitalization" is used by many, but with various implications. People usually refer to digitalization as a process where communities get access to (high-speed) Internet.

However, the concept goes further than broadband and Internet connectivity. For this research it is defined through three aspects: 1) broadband access and high-speed Internet, 2) adaptation of digital technologies, and 3) the combination of the data that is produced to create smart solutions. And this is all accompanied by a change of mindset of all participants on how to use digital tools and integrate them into their daily lives.

The structuring hypothesis of the research is that the employment of digital possibilities must be viewed with a holistic approach. Not only the infrastructure broadband but also tools, skills, inspiration, imagination, and some sort of encouraging structure are needed to adapt and empower through digitalization.

4. Methods and Scope of the Research Project

The research was conducted in the spring of 2017 with the overall goal to get new ideas about the nature of digitalization within the U.S. and its possible implications on rural areas. Findings are based on the results of semi-structured interviews with public/governmental institutions, think tanks, developers, researchers,

[3] Depending on the source and measurement of "rural areas," there are different figures: According to the BBRS (2013), 60 percent of Germans live in rural areas.

[4] For a discussion of the term rural, see Seidemann (2015:10ff) or Gallardo (2016:8).

[5] To get an idea about the transforming landscape concerning digitization, Gallardo (2016:43ff) provides useful insights.

(technical) sociologists, journalists, independent advisors, and leading companies as well as small startups. The aim is to show and discuss ways to employ digital possibilities and draw some general findings out of specific examples.

5. FINDINGS

An encouraging structural framework and therefore the recognition of rural communities' needs, ways of distributing knowledge, as well as a mindset to embrace digital possibilities were identified as having the greatest impact on the development of rural communities. Furthermore, strategies used in Mississippi for the transition of rural communities to the digital age will be discussed.

5.1 FRAMEWORK AND RECOGNITION OF RURAL COMMUNITIES IN THE U.S.

> **"We don't believe that communities, students, and individuals' [...] potential can be unleashed unless they have full access to digital tools, to the Internet, [and] also if they are not digital literate and able to use these tools."**
> – Sara Schapiro, Senior Director at Digital Promise League of Innovative Schools

The Digital Divide

The share of U.S. citizens with broadband at home is not increasing (Horrigan, Duggan 2015). The "digital divide" that refers to inequalities between individuals in access to information and communication technologies (ICTs), plus disparities in terms of knowledge and skills needed to access ICTs, is prevalent in the U.S.[6] (NTIA 1995, U.S. Census (2013)). Thereby, "the gap between rural and urban populations has remained remarkably consistent" over the years (NTIA 2016). This is disconcerting, especially if one recalls a study that found that poverty rates in areas with a high-speed connection were significantly lower than those that did not have broadband (Strover, Gallardo, Whitacre 2013).

The relationship between urban and rural America is displayed in recent elections and national policies. Thereby, Seidemann points out the interconnectedness between urban and rural settings, also concerning the digital infrastructure: An increase in broadband deployment "inure to the benefit of statewide and regional urban areas [...]" due to rural purchasing power, employment, and tax revenues made possible by this infrastructure (2015:18). Notwithstanding this interconnectedness, the same article also shows the demographic and economic shifts within the U.S.: "economic activity tends to follow population shifts" (ibid.). Therefore it is interesting to note that in 1990, for the first time, more than 50 percent of Americans lived in metropolitan areas larger than 1 million people and that the 2000 Census already showed that America was becoming a suburban nation (ibid.:15). This shift may explain the change in the recognition of rural areas by many parts of the urban population: The land between the innovative bubbles is referred to as a "flyover zone" and many old-fashioned stereotypes come up when talking with people who are not familiar with rural parts of their country and also vice versa (ibid., interviews 2017).

[6] The digital divide can also be observed by comparing states within the U.S. – there is a correlation between low-income states with low population density and their low rate of Internet connectivity (U.S. Census 2013). Access to ICTs varies, depending on income, age, race, and education (ibid.).

In the event of the recent presidential election, many Americans sense some sort of disconnect between the two Americas. This disconnect already happened before the election and is based on a generalizing view that implies that "there are no similarities between rural and urban communities around which common cause can be built" (Kubisch et al. 2008:7).

However, the "well-being of each place is strongly influenced by what is happening in the other and on finding opportunities to work together" (ibid.). Recognition is a mutual process, and there will always be "them" and "we," but as Ehb Teng, Co-Founder at Diginido Labs LLC and Executive Director at ATHack!, puts it: "In order to make better societies we cannot sit here in Silicon Valley and act like kings and queens and proclaim we know everything if we are not willing to go out and connect with people! That is completely backwards. So that is where a lot of the disconnect is happening with tech hubs like in Silicon Valley – or even like Boulder, Colorado, some places in New York, LA – they created these massive bubbles. Which are wonderful, but you gotta go outside your bubble, you really do!" Going outside of one's own bubble – no matter where this bubble is placed – is an important goal that was often mentioned in the interviews done for this paper.

Programs on the Federal Level Addressing the Digital Divide

A limited number of programs that promote rural broadband deployment and its use exist in America. One is the National Telecommunications Cooperative Association (NTCA), which has set up a program called the "smart rural community program."

Another program is the Tech hire 2015 initiative by the White House, which connects unemployed U.S. citizens with tech jobs and has its own section focused on rural tech in the U.S. South Central Appalachia region (White House 2017). The funding supports public-private partnerships to help train citizens in valuable skills for tomorrow's job market (ibid.). The initiative transitioned into the operational program of Opportunity@Work, a nonprofit organization, and is still committed to empowering U.S. citizens to start a career in technology fields (ibid. 2017).

However, an all-encompassing strategy for rural communities on the federal level cannot be found. With that said, low-density communities in many parts of the U.S. are still without the necessary broadband infrastructure, and broadband carriers have no economic interest to change that (Gallardo 2016:127).

Overall, few efforts to bridge the digital divide can be found. It will be interesting to observe what kind of policies under the new Presidency of the U.S. will emerge. Thereby one important policy for rural communities will consider net neutrality.

The Policy Approach: Net Neutrality and Its Importance for Rural America

"Net neutrality" is a regulation that leads Internet Service Providers to treat all data the same and not charge differently or discriminate data based on who uses the Internet or what kind of content is exchanged. With the recent replacement of Tom Wheeler as Chairman of the Federal Communications Commission through Ajit Pai, the net neutrality in the U.S. might be under threat with some serious implications for rural America. One major concern is that, for example, small rural businesses relying heavily on e-commerce may not have the resources to pay for faster delivery of content and therefore cannot compete with bigger businesses (interviews with Roberto Gallardo, Associate Professor and Extension Officer at the Intelligent Communities Institute in Mississippi). Without net neutrality, users may be prevented from visiting certain websites: The abolition of time and space constraints through the Internet – the rural villages' webpage is just one click away from the cities' online presence – would then be obsolete.

5.2 Spreading Knowledge About New Possibilities in the Digital Age

> **"It is isolation that kills dreams."**
> – Tani Rae Standridge, Business Developer, CEO at MeMinder and participant in the European Start-up Weekend in Seattle

Internet connectivity and knowhow – the distribution and absorption of knowledge – are undoubtedly linked with each other: If the infrastructure is not there or limited, people will not have access to information and therefore cannot truly participate and use the possibilities of the digital age. Sharing knowledge is one of the achievements of this age. It also helps rural communities make informed decisions and get inspiration, also in remote parts of the country. Education on the benefits of digital technology and inspiration on how to use them for their problems is essential (Vivek Wadhwa, Distinguished Fellow at Carnegie Mellon University College of Engineering and expert on advancing technologies' impact on society).

It is important to point out that "rural communities are not less innovative than urban areas. There might be even more innovation going on, but we don't know about it, since these innovations don't turn into a product. In rural settings oftentimes there is no network or infrastructure to give the incentive to turn a creative solution into a business idea and scale for bigger markets" (Aurora Christé, Co-Founder and CEO of Hack for Big Choices). One way to inform people about rural innovation is, for example, the "Silicon Prairie News"[7] or rural summits, such as one on creative placemaking.[8] According to Rachel Hatch, Research Director at the Institute for the Future, a lot of businesses actually moved to the countryside after the Silicon Prairie News started, and this has a lot to do with their efforts to destigmatize rural areas. The whole definition of what is rural can be changed by new technologies, when distances in time and space do not matter anymore (interview with Hiro Saijou, CEO of Yamaha Motor Ventures).

Bearing in mind the interdependency between rural and urban, image is a really important topic to address, and efforts like those mentioned above may help to create a better understanding between urban and rural residents. Knowledge sharing and partnerships between heterogeneous rural and urban communities already work for the League of Innovative Schools (Sara Schapiro). Creating a better infrastructure for knowledge sharing is also a goal for David Harris, startup advocate at the City of Seattle. This goal may be extended beyond the borders of cities.

As explained in a recent Tech Talk[9] on empathy and the future of creative leadership by Greg Aper, Business Development Director at Whipsaw, innovation is a social activity and should not be isolated from the rest of society. This goes in alignment with the insight of Tani Rae Standridge, a participant in the European Startup Weekend in Seattle, who stated that "You don't have to have all the answers; there are people out there willing to help you and who have the answers and provide them," and social media, for example, can actually provide access to people one would not encounter in analog life. According to the theory of weak ties, this can boost one's social capital and create stronger communities through a larger network (Arthur G. Cosby, Professor at the Social Science Center at Mississippi State University). Furthermore, digital civic engagement can be untapped by access to all the possibilities the digital age offers (Roberto Gallardo,

[7] For more information visit http://siliconprairienews.com/ [05/07/2017].
[8] See http://www.rupri.org/event/next-generation-rural-creative-placemaking-summit-iowa-city-october-12-14-2016/ [05/07/2017].
[9] The link to this Tech Talk may be found at www.meynland.tumblr.com [05/07/2017].

Associate Extension Professor at the Extension Center for Technology Outreach, Mississippi State University).

Learning and distributing knowledge is a lifestyle, and there are many micro-learning moments that do not happen in the classroom (Rachel Hatch). One organization displaying these moments online for certain regions and thus making them more accessible is the platform LRNG[10]. The platform's focus is urban; however, its approach to connecting young people with learning opportunities, mentors, and places both in digital and analog life is unique and might be applicable in rural settings.

Another way to connect, exchange ideas, and generate innovations, regardless of time and space, are so-called hackathons[11], where people from all sorts of disciplines and places meet virtually or otherwise to solve a problem they define.

It is also really important to have a physical space for this exchange of knowledge (Mitch Altman, innovator, hacker, and Co-Founder of Noisebridge). These physical spaces, nowadays called "labs" or "makerspaces," exist in various forms and can be found in most innovative hubs around the world. The digitalized world is changing at a breakneck pace. Knowing about its endless possibilities as well as its problems can only happen through the employment of digital tools. These labs and makerspaces can help give orientation and advice on how to use digital tools and empower oneself, also through access to digital tools, which require certain skills. To actively participate in today's society, people need to acquire new sets of skills. Ehb Teng noted that one new skill could be coding.

One example of a remarkable lab is the BioCurious lab in Sunnyvale, where ordinary citizens can learn how to use the bio printer – an open-source DIY cell printer – and develop their own products.[12] After all, one has to keep in mind that the people disrupting whole economies were never the ones working in the sector they are disrupting (Mario Herger, author of *The Silicon Valley Mindset*).

The Secretary and Director of Lab Operations and Safety at BioCurious, Eric Harness, is a leading example that local leaders are role models in the process of adapting digitalization. Thereby, citizen science, as practiced in this lab, is the epitome of empowerment: If one sees relevance and potential in one topic, labs like BioCurious help people achieve their goals by teaching skills, also via videoconferences to remotely located citizens, bringing together likeminded people and offering the space to experiment. Here, knowledge is treated as an open-source product and not as a means for encapsulating a small elite. In successful citizen labs or co-working spaces, there are no boundaries for participation, as Daniel Zimmer, Innovation Manager at the SAP HanaHaus, Silicon Valley, knows. Rural communities could establish such labs in their own proximity. Thereby, first adapters of digital tools play a crucial role, because they spread the word and show what one can achieve by being open to new technologies (Mario Herger). One of the designated groups to be an early adapter in rural areas may be farmers, because they are used to utilizing new technologies.

However, new technologies emerge in shorter time intervals: Digital technologies' growth is not linear, it is exponential – thus each innovation leads other innovations to emerge at a faster speed. A voice of rural

[10] https://www.lrng.org/about [05/07/2017].

[11] An interesting example on the power of hacking may be found here: https://2017.spaceappschallenge.org/ [05/07/2017].

[12] Several products were created in the BioCurious lab, including glowing plants, vegan cheese, or devices for cancer detection. http://biocurious.org/projects/ [05/07/2017].

citizens in this process is essential, because technologies are neutral – they can be used for good or evil and thus "we have to make a decision here between Star Trek or Mad Max. We should ask ourselves if the technology will benefit all people equally. If not, we should not be progressing it." And this reflects another reason to educate people on digital possibilities (Vivek Wadhwa).

In the end, it is all about getting impulses and best-practice examples on how to use Internet access for more than just entertainment. Ralph Eubanks, journalist and expert on (rural) Mississippi, suggests that communities benefit tremendously by locals who left, got input, returned home, and applied what they learned outside their bubble. In summary, the quote that "Isolation kills dreams" hits the nail on the head. To be more precise: In isolation, most often dreams do not even emerge. It feels as if there are only a few channels of exchange between rural and urban communities, but that when there are possibilities to exchange, they have quite beneficial effects on rural-urban relations as well as general knowledge exchange.

Being open for an exchange of knowledge requires a certain mindset, which will be discussed in the following chapter.

5.3 The Mindset Needed to Adapt Digital Technologies

> **"Silicon Valley can't be copied, because Silicon Valley was not created, it happened."**
> – Mitch Altman, innovator, hacker, and Co-Founder of Noisebridge

Silicon Valley, Seattle, or New York – each of these cities is known worldwide for its innovative potential. For entrepreneurs, especially the Bay Area around San Francisco, known as Silicon Valley, is the place to learn new methods, exchange moonshot ideas, or simply get inspired. What is the magic that leads so many to start their pilgrimage to the innovative bubbles of the U.S.? What if a whole (rural) region learns from places like that, too? The reason to ask these questions is that research showed that digital literacy, which also incorporates the concept of a particular mindset, is essential in unleashing the potential of digitalization (Gilster 1997; Bawden 2008:19). Various guides for entrepreneurs and their change of mindset can be found in every kiosk around the world; however, this mindset needed from the perspective of a (rural) community is not defined yet.

Silicon Valley cannot be copied, as noted above by Mitch Altman, Co-Founder and innovator at the hackerspace Noisebridge. "What can be copied is that abstract model – in encouraging people who have some kind of affinity to come together in a community, and encourage each other to discover and explore things, it also creates a super-safe environment for failing, which has to happen a lot before anything cool happens" (ibid.). Innovative bubbles like Seattle, Silicon Valley, or New York provide such an environment. The "startup spirit" can be found everywhere: During startup weekends, hackathons, free entrepreneurial lessons at Stanford University, meet-up sessions, in Uber cabs, cafés – there is hardly any place in Silicon Valley where one cannot find traits of a different mindset. But what makes it so special? What are the attributes? Silicon Valley has one of the highest costs of living in the world. Like New York, it is a fast, demanding, and challenging environment, where everybody needs to take their future into their own hands and find unique niches (Petrina Engelke, journalist). André Spiegel, who works in New York at the unicorn startup[13] DBMongo, emphasizes the motivation to get engaged and "shoot for the stars." There is strong

[13] Private tech companies valued at $1 billion or more are called unicorns. See a list of unicorns in 2016 at http://fortune.com/unicorns/ [05/07/2017].

competitiveness not only among employees but also among companies to get highly talented people on board. The high turnover rate encourages both sides to offer the maximum.

However, there can also be a downside, as Ehb Teng knows: "The culture here [in Silicon Valley] has become vanilla. Much of what you are selling is you – your personality. You are turning into a product," and people's reputations are based on their ability to grow ideas (Hiro Saijou).

In their eagerness to change the world, most residents of the innovative bubbles are highly collaborative and love to share new ideas and also their experiences. They are confident to share insights, also when projects failed (David Zimmer, Innovation Manager at the SAP HanaHaus). There is a need for exchange, as mentioned in Section 5.2, also because innovations emerge in shorter time intervals: Again, digital technologies' growth is not linear, it is exponential – thus each innovation leads other innovations to emerge at a faster speed, and the disruption of one's own sector might happen within the blink of an eye (Veuve 2015).

It is all about networking and thereby one principle sticks out: "Give first, take later!" – which relies highly on trust (Caroline Raynaud, Executive Director of the German American Business Association of California). Trust is not an altruistic element, but rather a rational foreseeability of behavior on which the whole network in Silicon Valley is built. This leads to a highly collaborative environment, because connections, even though they might not be in one's sector, may pay off in the end. This mentality is so embedded in Silicon Valley's culture that different behavior is seen as somewhat peculiar (Mario Herger).

Additionally, the thought of hierarchy is not prevalent in interactions (ibid.). One can sense this from day one in the above-mentioned places and also at the startup weekend in Seattle, where people with all sorts of professional and national backgrounds cooperate for two and a half days to develop an idea and turn it into a product. In this international environment, differences are celebrated and collaboration is easy. After more than 30 pitches[14], small groups apply methods of design thinking to understand potential customers' needs. Participants of all ages, colors, and backgrounds work together to find the one solution. Thereby openness to new ways of thinking is celebrated. Lawyer Noah Merfeld states that he "keep[s] coming back to Startup Weekends because here I can find an environment where no ideas are considered stupid – if it's weird, it's fine." Talented people with similar interests are drawn to places like Seattle or Silicon Valley, and even for the wildest idea one can find supporters. Thereby the credo is: Just do it! – a statement also embodied by the hackerspace Noisebridge, where the "Do-ocracy Principle" is followed: "Everything happens because people do it!" and "You don't have to be good to do something! If you had to be good to do something, nothing would get done, because you can't get good without doing it!" (Mitch Altman, Co-Founder of Noisebridge).

The structure of support is very unique in Silicon Valley, too: Here there are many so-called angel investors who are oftentimes quite risk-averse and invest – unlike venture capitalists, who manage clients' money – their own funds in early-stage startups and also support them with mentorship, networks, and knowhow (Hiro Saijou, CEO of Yamaha Motor Ventures). Together with the many incubators for startups – from which some are funded by the city, a university, or companies – they provide a nurturing structure for innovative ideas and how to turn them into businesses. Furthermore, most cities provide startup advocates like David Harris, who works for the City of Seattle and views himself as an "economic gardener" who nurtures an environment of collaboration.

[14] A pitch is a first introduction of one's ideas to an audience who knows nothing about it.

So what can one learn from such regions' culture? The (obsessive) hunger for new topics is and will be unique for the bubbles. The more abstract concepts of the mindset must be kept in mind when defining a digital strategy in rural areas, in order to involve all major stakeholders and thus empower the whole community. Elements of the mindset are cooperation, exchange of experiences (including failures), minimal hierarchy, rapid information exchange, and social acceptance that one can fail. These elements are supported by a heterogeneous, open environment that is built on trust. Some of these elements may already exist in communities, others not. That said, it takes a lot of time and willpower to truly change a mindset.

5.4 Best Practices: The Intelligent Communities in Mississippi

> **"The digital age makes no distinctions. It is disrupting everything in its path, and if you plan to play catch-up or wait it out, chances are you will fail."**
> – Roberto Gallardo, Associate Professor and Extension Officer at the Intelligent Communities Institute in Mississippi

Not only an open mind or a strong network is necessary to embrace digital possibilities, but also a certain infrastructure. In Mississippi, 64 percent of its population has access to wired broadband[15], which makes it the 50th-most connected state within the U.S. – a ranking that is unsurprising when one considers that it is the poorest state in the U.S.[16] (Frohlich, Sauter, Stebbins 2016). To create intelligent communities here and show the whole world that there can be some best practices found in Mississippi might appear to be against all odds, but it also might go along with the thesis that small communities with a lack of opportunities are the ones that are very experimental and open to innovation (Sara Schapiro).

It is of utmost relevance to include rural communities in the process of digitalization. Thereby a "hyper-tailored strategy to rural communities' needs must be created" (Kira Gidron, Sustainability and Smart City Strategist). An all-encompassing strategy to transition a community into the digital age is the intelligent community approach. The Intelligent Community Forum[17] (ICF), a think tank with a focus on urban communities, has developed this approach, and Roberto Gallardo, Extension Service Officer of Mississippi State University, has applied it in a unique way in rural communities in Mississippi. Gallardo works for the Mississippi State University Extension Service Intelligent Community Institute (MSUES-ICI), which helps rural communities "plan for, transition to, and prosper in the digital age." The MSUES-ICI is part of the Extension Service – the major stakeholder for promoting digitalization in rural Mississippi. The Extension Service is a "public-funded, non-formal educational system that links the education and research resources of the United States Department of Agriculture (USDA), land-grant universities, and county administrative units" (Seevers, Graham 2012:1). The major goal of the Extension Services is to advance agricultural innovation, extend knowledge, and implement community development programs (Randy Looper, Head of the Extension Center for Technology Outreach). The Extension Center for Technology Outreach (CTO) "enhances

[15] The Federal Communications Commission (FCC) defines broadband access as speeds of at least 25 mbps down and 3 mbps up. http://broadbandnow.com/Mississippi [05/07/2017].

[16] "The typical Mississippi household earned $40,593 last year, well below the national median income of $55,775. Mississippi also has the highest poverty rate in the country, with 22.0% of residents living below the poverty line." (Frohlich, Sauter, Stebbins 2016).

[17] More information can be found at http://www.intelligentcommunity.org/ [05/07/2017].

the Mississippi State University Extension Service outreach to rural communities by providing leadership in technology information, adoption, training, and support" for Mississippi state residents (CTO 2017). The CTO's goals are to increase usage of broadband technologies in Mississippi, improve Mississippians' access to information, enhance their knowledge of how to incorporate technical solutions into their daily life, and become digitally literate, as well as to generally increase the interest in STEM[18]-related topics (ibid.).

According to Roberto Gallardo, the digital transition takes place through an educational planning process using six criteria identified by the ICF. Gallardo thereby makes a clear distinction between smart and intelligent communities: Whereas smart communities use innovations related to the Internet of Things (IoT) to improve their effectiveness and reduce costs, intelligent communities' focus is more on the community's development (Gallardo 2016:42). There are six characteristics of an Intelligent Community: 1) broadband connectivity, 2) digital equality, 3) innovation, 4) sustainability, 5) a knowledge workforce, and 6) marketing (ibid.). These six elements provide a holistic view on community development in the digital age. By combining different community development theories with a specific emphasis on self-help and sustainable capacity building, Gallardo created the "rural outreach process," which helps rural communities display the ICF's six characteristics (ibid.: 136). The rural outreach process can be adjusted according to the rural community's needs. However, usually the process starts with increasing awareness and an understanding of the implications of the digital age. It is essential for the whole process to involve as many community members as possible. After that, a survey called a checklist is given to the community to do a self-assessment. Once this is done, a report on the findings and possible recommendations on what to do next will be discussed with the community. This is where top-down meets bottom-up: Recommendations are made by the MSUES-ICI, and the final decision on which of these recommendations to follow through on are made by the community. Already existing resources, such as existing networks, are connected and integrated within the approach, which is very important to point out. One should bear in mind that rural areas often already offer many resources people need for the transition into the digital age.

It is important to note that the whole process is open to every member of the community and is meant to start a conversation about the community's own way to achieve their goals. When the community agrees upon the next steps to take, an action plan is formulated. This plan is defined by the community – the extension officer is (just) the moderator of the process. Oftentimes, additional programs by the Extension Service are pointed out, if they suit the community's needs: The CTO has several programs in addition to the MSUES-ICI that are worth presenting here, since they are also integrated into the holistic approach on how to transition into the digital age and may be applied in rural areas around the world.

One important CTO program is the 4-H Robotics Youth Development Program, which engages 4-H youth across the state in STEM subjects and teaches how to program robots. The 4-H movement has been around for many decades and can be referred to as one of the first maker movements within the U.S., (Eric Harness).

Furthermore, there are other digital literacy programs and workshops with the aim to improve technology skills in Word, Excel, and PowerPoint, and to build awareness of phishing, malware and spyware, cyberbullying, and the like. Additionally, specific courses target the digital literacy of teachers.

[18] STEM (Science, Technology, Engineering, Math).

The Master of Innovation Program helps to create some digital equality by placing technology volunteers in communities with the aim to better assist Mississippi residents with their technology needs. The tech volunteers receive fundamental training by the CTO.

Another interesting program is the Virtual Incubator Program (VIP), which assists small businesses and farmers in improving their online presence with workshops on social media and web design so that local products may be found online all over the world, where these unique products are more than welcome. Oftentimes there is not even the need for a computer; only a smartphone and an email address improve the sales of small rural businesses tremendously (Lauren-Colby Lindley, Extension Instructor at the Center for Technology Outreach). Additionally, the program for rural entrepreneurs of the American Farm Bureau supports local farmers (Lisa Benson, Director of Rural Development at the American Farm Bureau Federation).

In Section 5.1, it was mentioned that there needs to be some kind of destigmatization of rural communities. The E-Front Door Initiative therefore assists communities across Mississippi with improving their online reputation. During the program, a rural community's virtual presence is assessed by public-relations majors at Mississippi State University who also crosscheck it later on with reality. Afterwards recommendations on possible improvements are made.

Telework can also be a solution incorporated into the ICI's holistic approach. It can help rural communities with sufficient Internet access ease unemployment and brain drain, plus increase tax revenues of local communities (Gallardo 2016:70). Therefore the ICI cooperates with Digital Works[19], a nonprofit organization in Ohio that offers rural residents access to online jobs. However, one also has to make sure that the telework is not happening in precarious conditions (Knut Panknin, Program Officer at the Friedrich Ebert Foundation).

All programs and theoretical aspects aside, the important question is if the community really wants to make a transition in the digital age: "It is also possible that rural communities do not yet understand that they have to get on board with digital technologies and platforms. They may not realize that they have as much to gain as urban areas if they embrace a digital mindset. This leads us to the crucial question: How do we extend this awareness and knowledge to rural communities?" (Gallardo 2016: vii). Getting the message out and creating awareness and excitement about the issue is the essential and most difficult part of community development. In Mississippi, some elements have helped get the message out: First, the international connection with the ICF helps to justify and back up some of the changes required to become an intelligent community. The ICF can also recognize rural communities' success by nominating them for their worldwide awards. Second, extension officer Roberto Gallardo is extremely passionate about the topic and well accepted in the communities he serves. Additionally, he is sent by the Extension Services, which is a major stakeholder in rural Mississippi and thus very well connected, widely accepted, and in general a trusted institution. Third, local key individuals play major roles in the process of adaptation, and are from day one incorporated in the intelligent-community concept. Desired improvements of problems many rural communities face cannot simply be solved by an Internet connection. Rather, they need active ownership of a digital vision to create a culture of innovation and agility. Such ownership is also created by community hubs, like the East Mississippian Library, where a 3-D printer can be found, and kids and adults alike can learn in a safe environment with digital tools (Joshua Haidet, Director of the East Mississippian Library). Roberto Gallardo addresses local leaders, especially mayors and economic developers. These local

[19] More information may be found at http://digitalworksjobs.com/states/mississippi/ [05/07/2017].

champions also target groups within their community, to persuade residents to get involved in the process. Sometimes some unusual strategies are applied, such as the one from a mayor who invited all the young kids of his village to eat pizza and to present them the possibilities by getting broadband access. A very smart move, since especially digital natives understand the need for digitalization (Mario Herger). It is important to remember that digital tools are just the means to empower a community. A method of assessing a community's needs could be design thinking as it has been employed at the HanaHaus to make sure programs are tailored to residents' needs (Daniel Zimmer). Also, when discussing how else a community can be motivated to get involved in a project, many interview partners pointed out that they "need to have some skin in the game" – to invest something (time, money, or other resources) in order to stick and continue their community development projects.

The intelligent-communities approach applied in Mississippi is just starting.[20] Thus, it does not come as a surprise that no participating rural community has completed the rural outreach process – yet. Only time will tell how these communities will progress. Therefore the question of the evaluation of such a process remains. The detailed action plan is already a great base for self-evaluation (David Fetterman, author of the book *Empowerment Evaluation*). Furthermore, embedded storytelling might give some other rural communities an idea of what an intelligent rural community can look like (Sara Schapiro).

6. Conclusion

This paper set out to determine what kind of role digitalization plays for rural communities within the U.S. and how it can create change. The answer is that digitalization can play an important role for the empowerment of rural communities in the U.S. and also in other rural settings around the world.

However, a holistic approach to digitalization is not very easy to follow through on, especially since access to high-speed Internet is still not a given in rural America and the digital divide is prevalent. Of utmost relevance for rural development is broadband and how it is used. If there are no approaches and policies on how to apply and use digital technologies, the chance to bridge the digital divide between rural and urban areas has not been pursued.

The intelligent communities in Mississippi give hope that if rural communities can combine their strengths with a strategy on how to transition into the digital age, they can improve their living conditions.

The research shows that a lack of infrastructure, recognition, and political will can significantly hinder rural communities' digital empowerment. Also, the absence of best-practice examples or exchange with other regions makes it more difficult to get impulses about how to imagine and build one's future. Thereby, one major accelerator for development is dissemination – communication must be more effective and must reach out to various users in order to make an impact, as shown by the intelligent communities in Mississippi.

Digitalization is not about making rural communities grow out of their comfort zone. It is more about retaining and stabilizing a chosen lifestyle with the amenities of the digital age. An idea of what kind of mindset might help embrace the digital possibilities was given in Section 5.3. Rural communities can learn from the "startup spirit," which refers to conditions for creating change and being innovative. That is not to

[20] A map of participating communities may be found at https://www.google.com/maps/d/viewer?mid=11EqEVHmwTIMKdtPtpHBCn0Ux1Ck&ll=31.784144447879406%2C-90.00580781250005&z=7 [05/07/2017].

say that this mindset is not given in rural communities: Some or maybe even all elements may be already there.

One has to keep in mind that digital tools are just the means to empower rural communities: They enable rural communities to participate and experience the world without constraints. Thereby the desired improvements of problems many rural communities face cannot simply be solved by broadband infrastructure but rather need an active ownership of rural citizens taking action and shaping their digital world according to their needs.

Some findings and suggestions other rural communities all over the world might want to apply include:

- Digital technologies are only the catalyst to empowerment.
- Rural communities' efforts to transition into the digital age should be documented and made available.
- Many companies send their trend/startup scouts to innovative bubbles like Silicon Valley. Rural communities could also appoint ambassadors for rural interests.
- Other structures of knowledge sharing and learning emerge and can be valuable in rural settings, such as labs. These labs could serve as actual physical space for exchange and might be included in rural libraries.
- Digitalization is an abstract concept that is defined in various ways. Therefore communities need to tangibly experience the possibilities of the digital age.
- New forms of partnerships between urban and rural approaches to employ digital tools are promising. Such forms can include international hackathons with a focus on rural communities' challenges.
- Active ownership is necessary to understand the implications of the digital age and make informed decisions about future policies, also in rural areas. Thereby local champions are essential.

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