Digital innovations in rural micro-enterprises

Jaana Räisänen* and Tero Tuovinen

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Faculty of Information Technology, University of Jyväskylä, P.O. Box 35, FI-40014 University of Jyväskylä, Jyväskylä, FINLAND

*Corresponding author: E-mail address: jaana.k.raisanen@jyu.fi

Abstract

Digitalization gives micro-enterprises and rural areas new possibilities and it can support their competitiveness. In this paper, we have presented one way of supporting the diffusion and adoption of digital innovations in rural micro-enterprises. First, we examined the challenges and digital competence of the micro-enterprises in the rural areas of Central Finland to better understand what they needed. The second step was to develop a workshop concept. Theories of innovation diffusion and adoption were used as a base for these workshops. The last step was to evaluate the developed concept, its effects and challenges. We found that the workshop concept worked well for spreading information, for encouraging a positive attitude towards digital innovations, and for planning the use of innovations. Important factors in order for this concept to work were trust, communication, and changing the roles of agents and opinion leaders.

Keywords: Urban-rural digital divide; Digitalization; Digital innovation; Innovation diffusion; Innovation adoption

1 Introduction

The digital divide of rural and urban areas is still a current issue [1, 2, 3]. It slows down social and economic progress of the whole nation [2]. Digitally excluded areas are also found in digitally advanced countries such as Finland. Rural areas have been studied for example in Russia, in Australia [1, 2], and in the United Kingdom [4, 5, 6, 7]. Research shows that rural and urban areas in the same country have differences in the quality of the data infrastructure, and rural areas have also lower average levels of education and skills [3]. Rural communities are remote, and usually less connected. Better digital connections may be an answer to the remoteness of the rural areas. Internet services can provide services and information that might not be otherwise possible to get in rural areas [8]. Well

working digital infrastructure can be important for example to the production of community digital heritage, to the ability to self-publish material on the internet, and as a building block in the relationship between local and global communities. [9]

Still, there are some issues that are not easy to solve. For example, faster internet technologies are becoming available, but they will be more expensive to rural households and businesses than to those that live and work in urban areas. People in rual areas may also have fewer options when selecting their broadband provider, because of their place of residence [7]. For example, Salemink [3] and Townsend et al. [8] studied rural development in the digital age, and found that faster internet technologies may actually increase the urban-rural digital divide, because faster internet technologies are harder to get and more expensive in rural areas. In addition, global competition is increasing and the slower internet connections of rural areas may result in a loss of competitiveness, not only in rural areas, but also at the national level. A transition to digital economy could be at least a part of the answer to improving the economy and, for example, improving availability of services of rural areas. Especially better services in the field of education and health are needed [2].

Faster internet technologies can narrow the digital divide, but better internet connections by themselves are not enough. Rural communities also need digital competence [5]. Alam, Erdiaw-Kwasie, Shahiduzzaman and Ryan [10] define it as "the capacity and capability of different stakeholders to embrace the emerging technologies". Without proper knowledge of digital innovations and skills to use them, internet connections do not help rural communities and enterprises to flourish [3]. Developing digital skills and talents in Europe is a necessity.

A report on the digital infrastructure in China and the European Union [11] estimates that a "10% increase in broadband penetration may raise gross domestic product (GDP) by 1 −1.5%, and by 2020, 90% of jobs will require some digital skills".

The theories selected for this research are among those widely used to explain diffusion and adoption of innovations. The Technology Acceptance Model (TAM) was created by Davis [12, 13] and explains adoption of innovations. With TAM it is possible to better understand why people are opposed to computer use, predict how users respond to systems or innovations, and improve the acceptance of information systems by changing the processes of how the information systems are introduced. The United Theory of Acceptance and Use of Technology (UTAUT) is considered good for evaluating the success of new innovations and their adoption, and the factors influencing it [14]. Rogers's innovation diffusion theory provides a holistic framework for understanding the innovation diffusion process [15, 16]. Innovations spread as a result of information and communication. Rogers's innovation diffusion theory focus on communication and communication channels [17].

Digital innovation can be defined as innovation that combines digital and physical components to create a new product [18]. Innovation is a new idea, a new way of action or a new object for an individual. Innovation does not need to be new to the market [19]. A mere idea is not necessarily sufficient to meet the definition of innovation. Innovation is something that has been

developed into a product, process, or service and/or commercialized [18]. In digital innovation, analogue information is encoded to digital, i.e., it has been digitized [20]. A digital book is an example of digital innovation; the book itself is not an invention or innovation, but when the information is digitized and is presented in a form of a book, it is something that has not previously existed.

Yoo, Henfridsson and Lyytinen [20] recognize that three of the special features of digital innovation are re-programmability, data homogenization (that is, the diversity of data is reduced and structurality grows), and self-referencing. Re-programmability allows a digital device to perform a wide variety of different functions. Data homogeneity means that all data is in digital form after all bits, i.e. zeros and ones. This, for example, allows merging data from many different sources. Data format still often brings issues, because when different tools are used, they are not usually incompatible.

Digital innovation requires digital technology to function. Adoption of digital innovations accelerates when the prices of digital technologies become cheaper, and almost anyone can participate in development and innovation without enormous risk. Diffusion of innovations is a process in which innovation is communicated over time to the social system [19]. Diffusion, the spread or adoption of new information or a new thing can be thought of as a social change. Change may be arbitrary, such as the interactions of individuals, or it may be caused by political restrictions. However, interaction and communication is needed for things to change; knowledge cannot spread without social interaction or mass media [17, 19]. Straub [21] points out that most of the adoption and diffusion theories assume that adoption takes time and does not happen at once. Because it takes time, beliefs and attitudes influence the decision to adopt the innovation. Another commonality in these theories is the preadoption bias: they all suppose that the goal is to spread information about the innovation to enable its adoption.

In this study, we have presented an example of how workshops can be used to support the diffusion of digital innovations in rural micro-enterprises. We introduce how the Digital path project developed a workshop concept for this purpose, using innovation diffusion and adoption theories as a base, how the workshops were arranged, and how they worked. Innovation diffusion and adoption theories that were used in this study were the Technology Acceptance Model (TAM), the United Theory of Acceptance and Use of Technology (UTAUT) and Rogers's innovation diffusion theory. They are also used in the analysis of the results.

2 Research method, material and procedures

The study was carried out as an action study. Social scientist Lewin [22] is considered to have developed the method. He found that to solve social problems, research results must be put into practice. Action research is a way of combining theory and practice, where the objective of the researcher is to change the social system or how it works [23, 22, 24]. Because diffusion can be seen as social change [17, 19], action research was considered to be a good choice for the present study. Another reason behind choosing action research is that it is future-oriented; it is supposed to find better ways to get to the desired or desirable goal [24].

The research material was collected from the project The digital growth path for rural entrepreneurship (in the following, Digital path project). As the research material, we used the memos of the project teams (from 52 meetings, 112 pages of memos), preliminary survey collected from companies (74 responses), a survey of workshops and events (474 responses) and a follow-up questionnaire (110 responses). Before developing the workshop concept, features of the project area were studied through interviews and surveys for development companies and municipal representatives. Development companies are non-profit companies owned by municipalities. Their purpose is to increase the growth and competitiveness of the region's businesses and thus strengthen the region's vitality.

The material was analyzed by content analysis. Qualitative content analysis is one possible method for researching text data. First, all the material was read, and any points that concerned adoption or diffusion of digital innovations or workshops were highlighted. Then the material was re-examined, and the markings were classified, to facilitate analysis of the material. Classification was performed using terms from the innovation diffusion theory, and the TAM and UTAUT models.

3 Rural-urban digital divide

Rural communities have challenges with the quality and availability of digital infrastructure and services. One of the challenges that needs to be considered by service providers and policymakers is the challenge of understanding basic technological infrastructure requirements in rural areas. [25] Reducing the digital divide is possible only by considering technological, economic and human factors. For example, only addressing the technological aspect, for example by offering web portals and online advice, is not the whole answer. Addressing the human factor means that we need to offer knowledge and information in a way that considers the learners, and helps them grow their skills and confidence. An empirical study from 2002 in the United Kingdom [4] suggests that the emergence of a digital divide may cause a disadvantage within agricultural society.

Economic factors should also be considered. In rural areas, ultra-fast broadband connections may be expensive, and rural communities may not be able to afford them. Slower connections can cause issues for example for e-commerce or remote work, both of which could be one answer for employing communities in rural regions in a time where the need for agricultural workers has decreased.

Regarding ICT adoption in rural areas, there seem to be issues on both the supply and demand sides. Poor technological infrastructure and scarce ICT expertise are examples of supply-side issues. The lack of a need for and information about the benefits of ICT are examples of demand-side issues. [26]

3.1 Rural-urban digital divide in EU

In Europe, the infrastructure for fixed and mobile broadband is not evenly distributed. Figure 1 shows urban and rural divide of EU and figure 2 shows how broadband connections are divided in the EU. There is a profound divergence across European countries and different regions within any given country. A digital divide persists across the EU, and the differences between the countries are not explained by the size of the population or by the size of the economy. For example, France and Italy do not perform well in comparison of the digital economy in EU countries, although they are two of the largest economies in the EU. [11]

Small and medium enterprises (SMEs) have more difficulties to fully engage in the digital transformation than bigger enterprises. This is because they have invested less in digital technologies and in the transformation. [11]

In 2010, EU introduced the Digital Agenda for Europe (DAE). Its goals were to 1) in 2013 for all Europeans to have a basic broadband connection (at least 144 Kbps), 2) in 2020 for all Europeans to have access to a fast broadband connection (above 30 Mbps) and 3) in 2020 for at least half of Europeans to have access to an ultra-fast broadband connection (above 100 Mbps). The first goal, basic broadband connection for everyone, is going well: 97% of Europeans currently have basic broadband access, including 90% of rural households. A clear digital divide appears regarding the faster broadband connection. Considering the ultra-fast connection, Romania, Sweden and Latvia are the most advanced, covering40% of the households. In2015, for example in Italy, Greece and Finland, there is a clear divide in the ultra-fast broadband connection infrastructure between urban and rural areas. [11]

At the population level, 79% of EU citizens use the internet at least once a week. In the Northern and Western parts of EU, the population uses the internet more than in the Southern and Central-Eastern parts of the EU. The biggest reasons not to use the internet are the lack of internet access and the lack of skills. The two main reasons for the digital divide are usually thought to be

1. conditions of the internet access and technologies, and
2. ICT skills, internet use and motivations. [11]

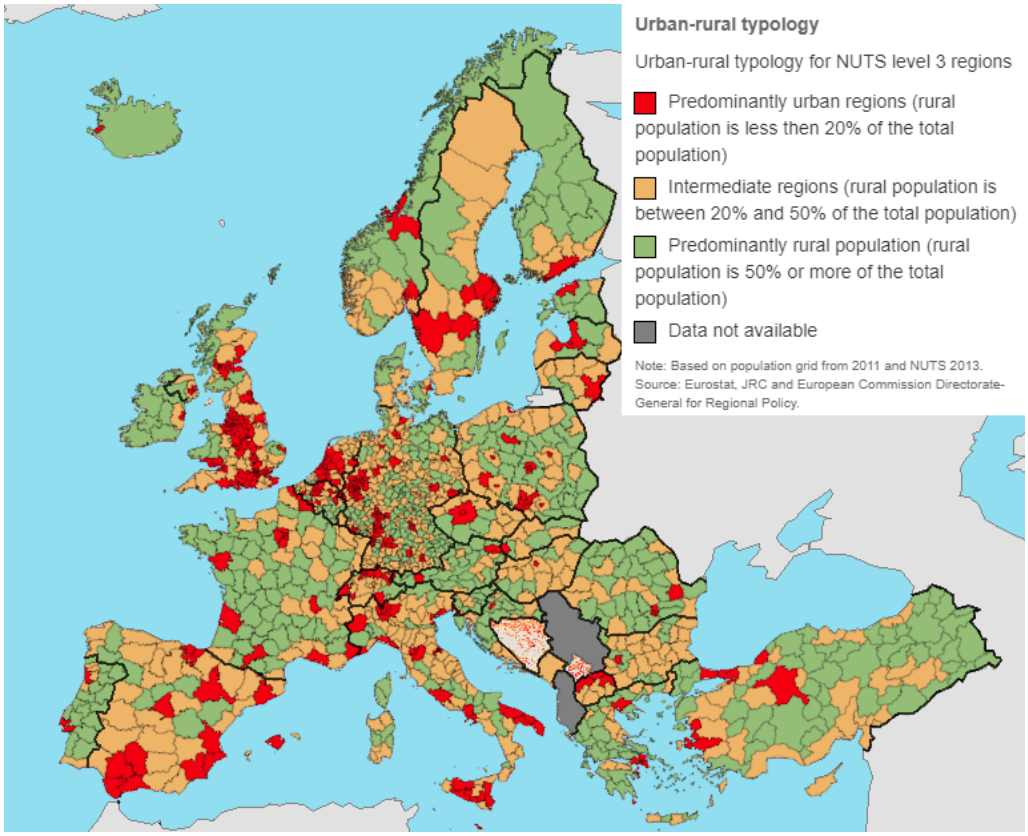

Figure 1: Divide of rural and urban areas in the EU [27].

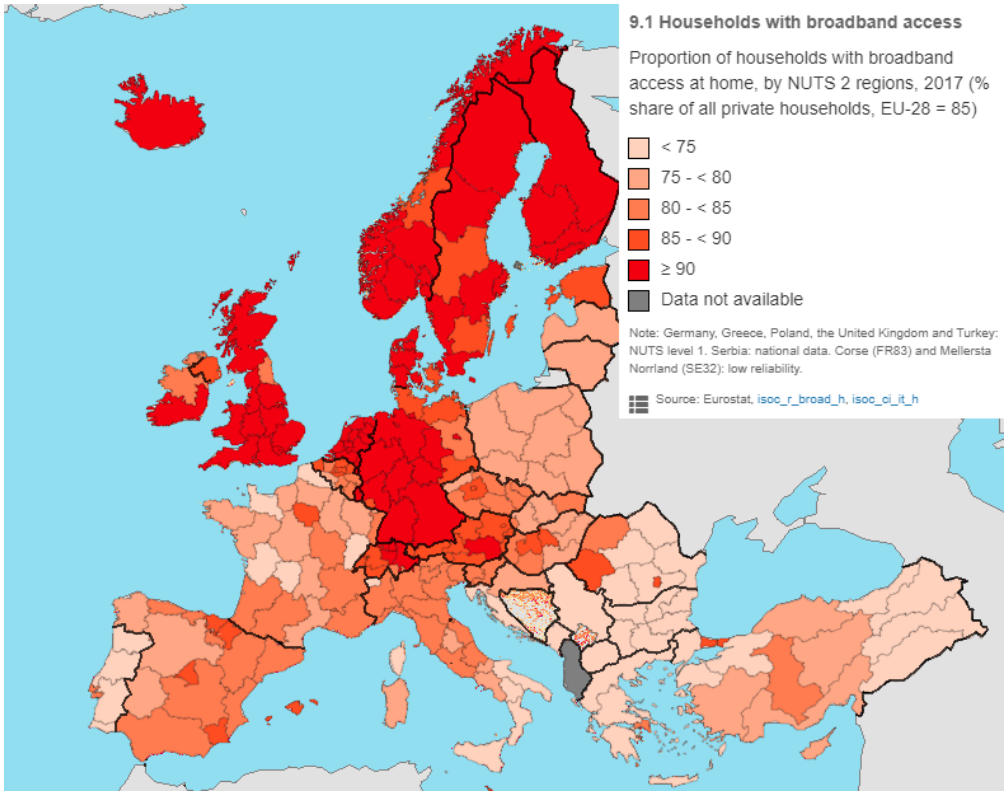

Figure 2: Precentages of the households with broadband access in the EU [27].

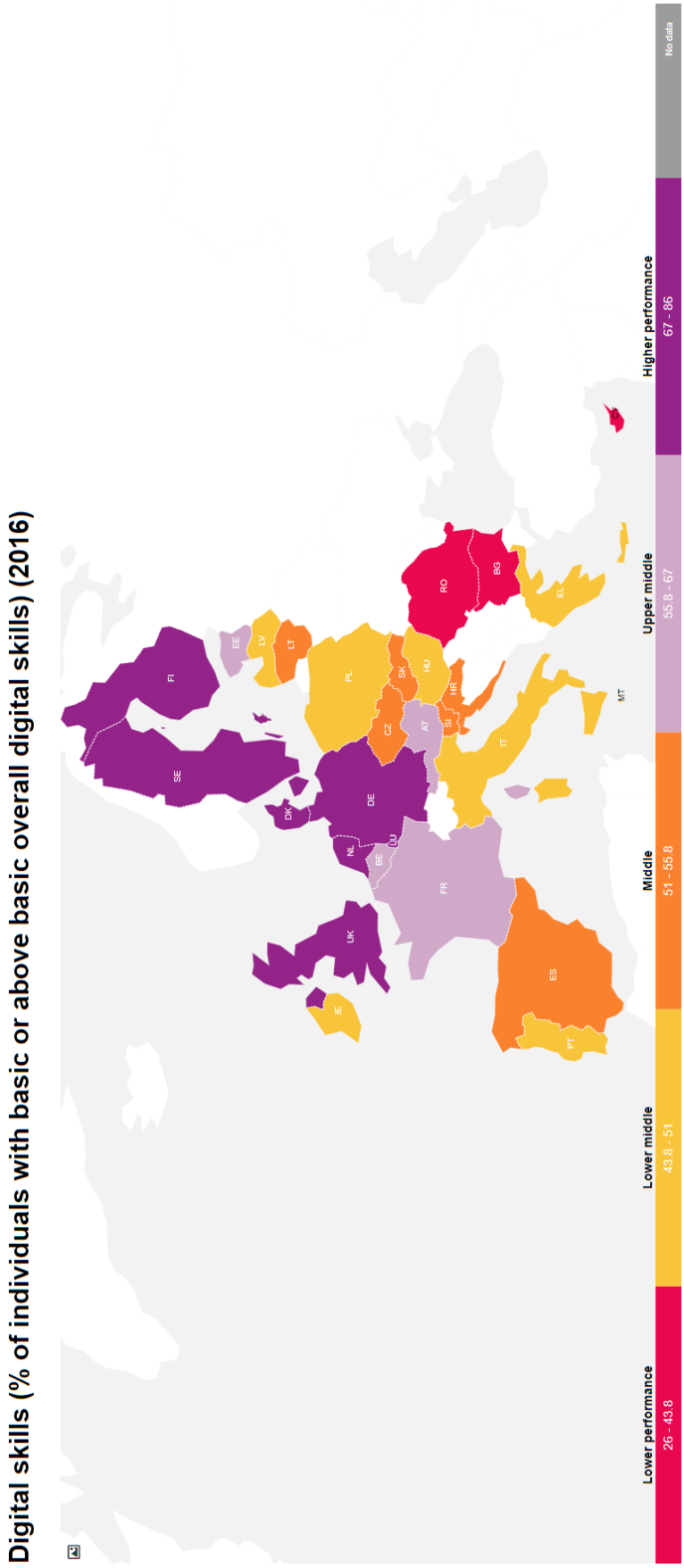

Figure 3: Digital skills: percentage of individuals with basic or above basic overall digital skills [28].

3.2 Rural-urban digital divide in Finland

Finland's population at the end of 2018 was 5, 517, 919, and the population of Central Finland was 275, 521. Finland is sparsely populated. Areas targeted by the Digital path project are mainly rural areas. Statistics Finland [29] divides rural and urban regions to seven categories. See Figure 6. The population centers of urban areas are agglomerations with more than 15, 000 residents. Urban areas are divided into three types:

1. Inner urban area. A compact and densely built area with continuous development.
2. Outer urban area. A dense urban area extending from the boundary of the inner urban area to he outer edge of the continuous built area.
3. Peri-urban area. A part of the intermediate zone between urban and rural, which is directly linked to an urban area.

Rural areas are any areas that have not been identified as urban. The following types are delineated:

1. Local centers in rural areas. Population centers located outside urban areas.
2. Rural areas close to urban areas. Areas with a rural character that are functionally connected and close to urban areas.
3. Rural heartland areas. Rural areas with intensive land use, with a relatively dense population and a diverse economic structure at the local level.
4. Sparsely populated rural areas. Sparsely populated areas with dispersed small settlements that are located at a distance from each other. Most of the land areas are forested.

In 2005 Galloway and Mochrie [26] argued that for micro-businesses in rural areas, "the most appropriate technologies need not be web based". In today's Finland, many services are provided through the internet, and they may be hard to get or even impossible to get otherwise. For example, government aids are applied for mainly through web-based services. Finland is one of the leading European countries in the use and adoption of e-government and of ICT skills. Nevertheless, Finland has a clear divide between urban and rural areas when it comes to access to an ultra-fast broadband connection. [11]

Finland is the leading country in many digital aspects (for example ICT skills), but is lacking behind in enterprises using e-commerce for sale, see Figure 4. Finnish enterprises are not satisfied with the speed of the internet connection, and are more dissatisfied than European enterprises on average, see Figure 5. [31]

The 100 Mbps mobile network coverage in Finland is close to 90% of homes, see Figure 7. However, mobile networks do not work at the same speed everywhere and at any time. The

speed of the mobile network is affected by, for example, the distance to base stations, the number of simultaneous users, and the weather. A broadband network works better, but its installation can cost over 20000€ in rural areas. [32]

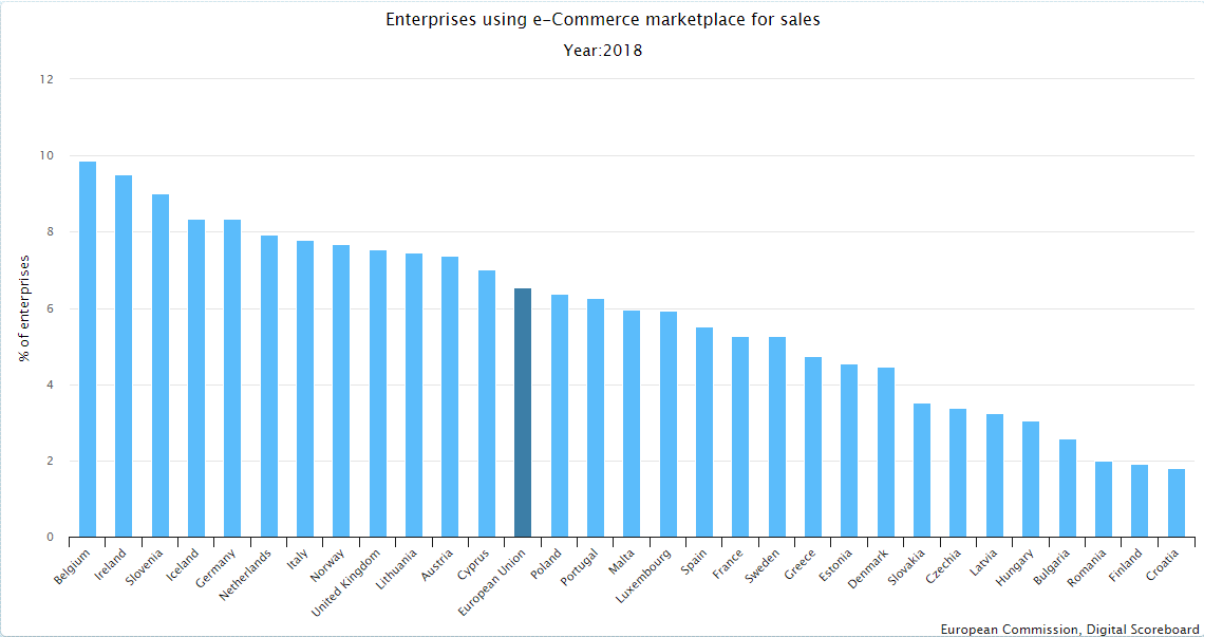

Figure 4: Enterprises using e-commerce for sale. [30]

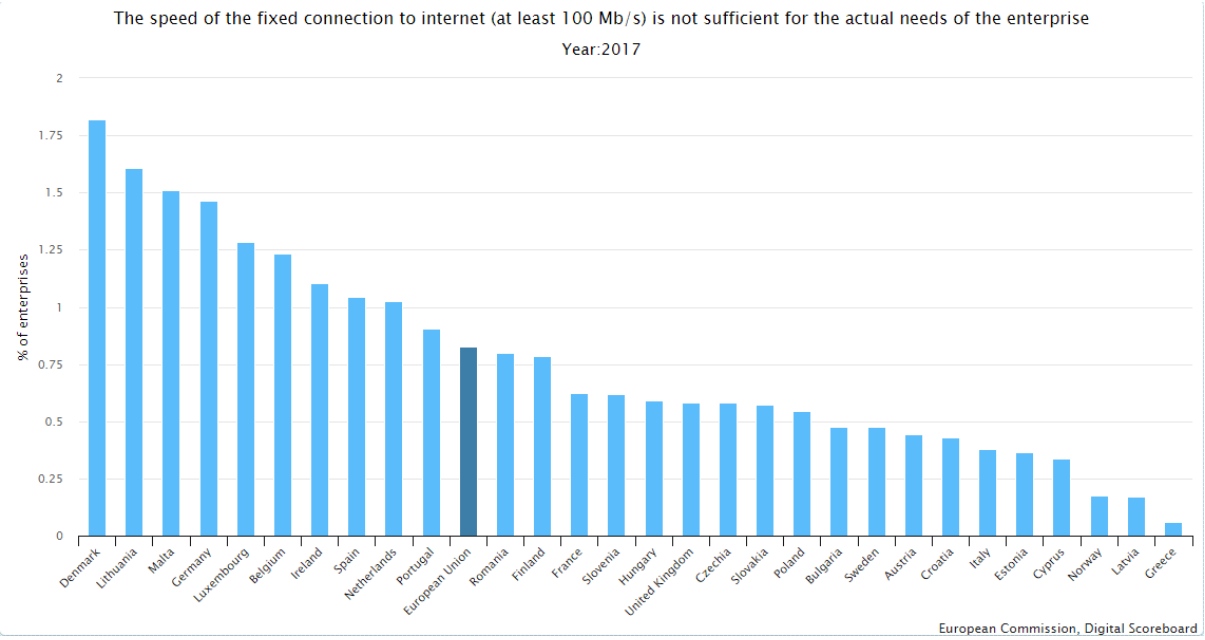

Figure 5: The speed of the fixed connection to internet is not sufficient for the actual needs of the enterprises [31].

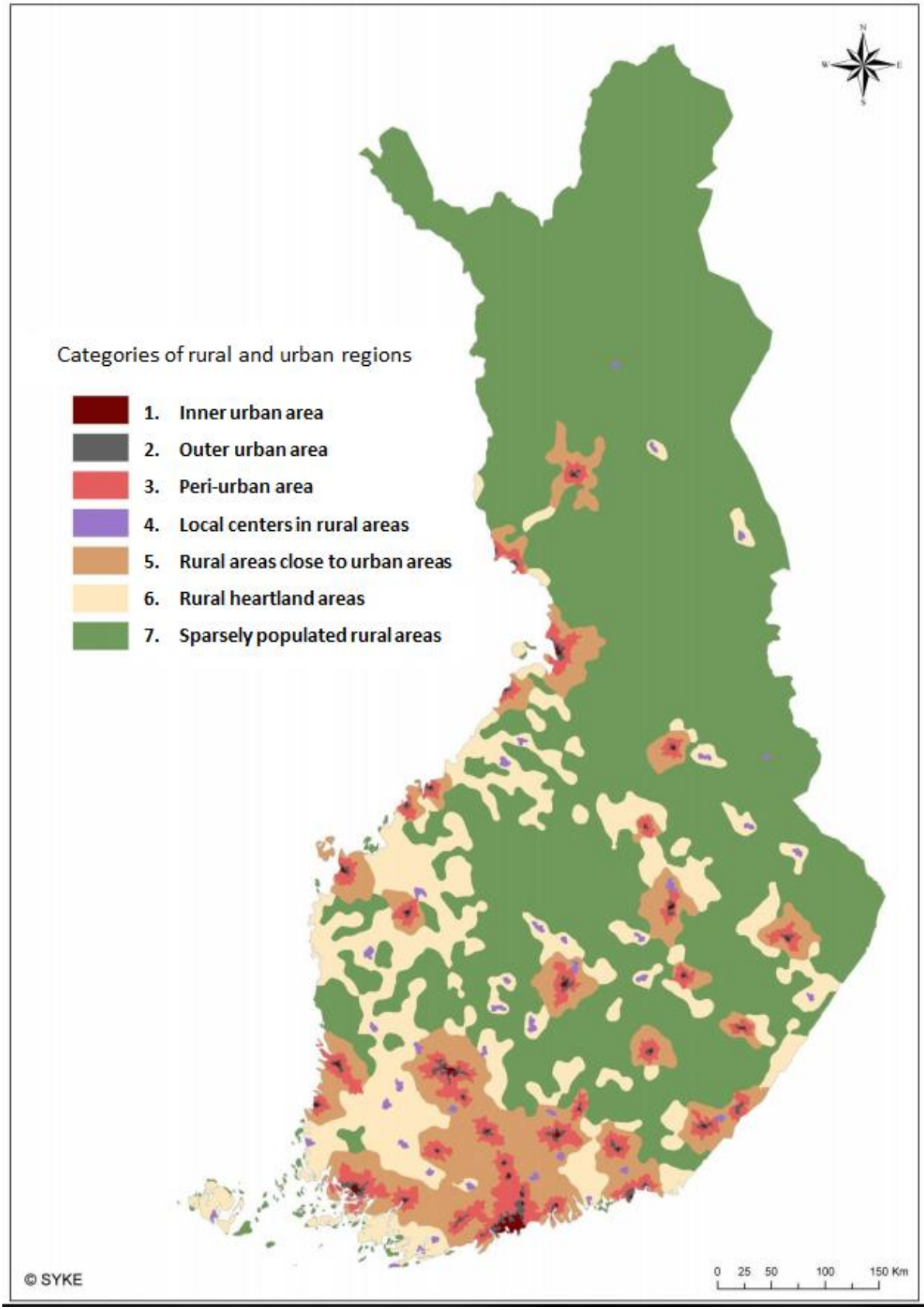

Figure 6: Rural and urban areas in Finland [33].

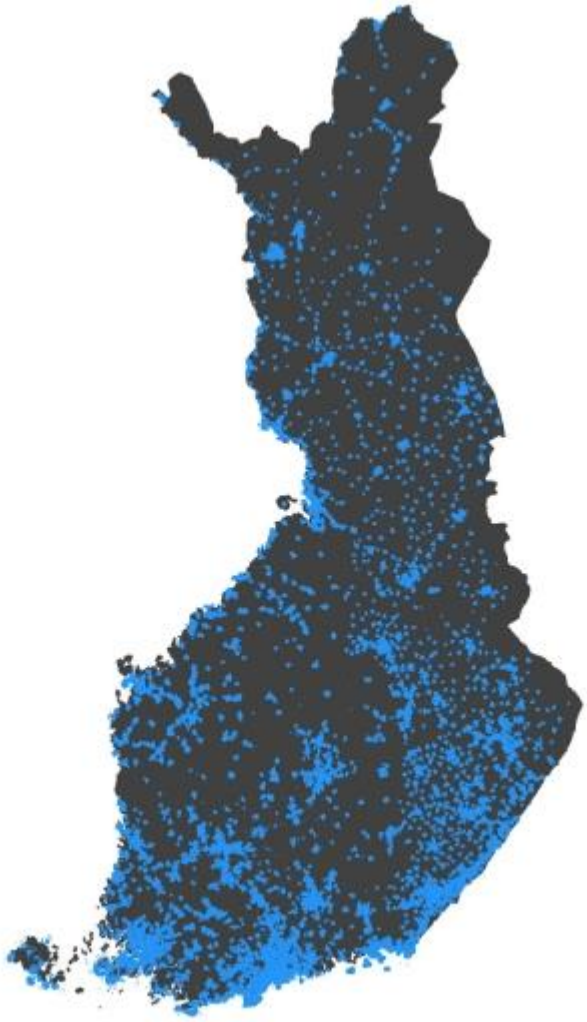

Figure 7: 100 Mbps mobile network coverage in Finland [34].

Turnover	0-2 M€	2-10 M€	10-50 M€	over 50 M€
	219	7	5	3

Table 1: Participated enterprises divided by turnover.

4 Workshops for supporting diffusion and adoption of digital innovations

Digitalization of companies in the EU is supported, for example, by EU project funding. Digital path is this kind of EU-funded project. The workshop concept was developed to support the exploitation of digitalization in micro-enterprises in Central Finland. In this study, a micro-enterprise is defined as a company with fewer than 10 employees and whose turnover does not exceed 2 million euros. The total balance sheet of the company shall not exceed 2 million euros, and the company should be independent. A company is not considered independent if 25% or more of its capital or voting shares belong to company that is not counted as small company. Small company refers here to company that

has fewer than 50 employees and that has turnover not more than 10 million euros, but that is bigger than microenterprise. The University of Jyväskylä operates as a coordinator for the Digital path project. The aim of the project is to provide free workshops for companies from various digital themes including for example web stores, digital customer management, web pages and search engine optimization. The Technology Acceptance Model (TAM), the United Theory of Acceptance and Use of Technology (UTAUT) and Rogers's innovation diffusion theory were used for developing the workshop concept.

4.1 Description of the area and digital competence of the micro-enterprises

According to the Regional Council of Central Finland[i], most enterprises in the Central Finland region are micro-enterprises of fewer than 10 people: 94% in Central Finland, and 93% in the whole country (e.g. agriculture, forestry and fisheries). 280 organizations or companies participated to the workshops. Most of the participating companies were micro-enterprises. Table 1 shows enterprises divided by their turnover. Participating organizations also included 1 project, 26 non-commercial organizations, 2 development companies and 17 municipalities or cities.

The specific features of the project area were studied through structured interviews and surveys for development companies and municipal representatives at the beginning of the project. Businesses in the area are mostly small or micro-entrepreneurs operating mainly in the local market. Challenges for businesses in the region are the lack of purchasing power, finding new customers, aging of the population, young people moving out from the region, access to skilled labor, the lack of broadband network, and the lack of understanding of the possibilities of digitalization. The size of businesses is well illustrated by the fact that there are about 600 companies in one of the targeted municipalities, and the top 15 companies employ 450 people in total, and the remaining 585 companies employ, on average, 1.4 people per company. There are also pioneers in the area, but most of the companies operate and think traditionally. One of the interviewees identified the "right not to change" thinking in the area as a barrier to business development, and another interview revealed that only some of the companies are growing. Other challenges are the chronic lack of time of entrepreneurs and the fear of change.

There are challenges in the area, but there is also a desire to change. Development companies and municipal representatives have discussed with local entrepreneurs about digitalization and its potential: new ways to find customers, the new services that digitalization allows, e-commerce and internationalization. Entrepreneurs found possibilities of digitalization interesting, but the special vocabulary in the ICT sector was not understood, and businesses would like to have concrete examples. A preliminary survey was conducted for the companies in the area before the workshops. The survey examined the digital competence and needs of the companies. IT skills were self-estimated as average, see Figure 8. Many respondents, 32 out of 74, estimated that they are basic

users, 20 experts, 13 beginners, 3 pioneers, 2 adepts, and 2 thought they did not have any know-how. Typology used here was developed through research.

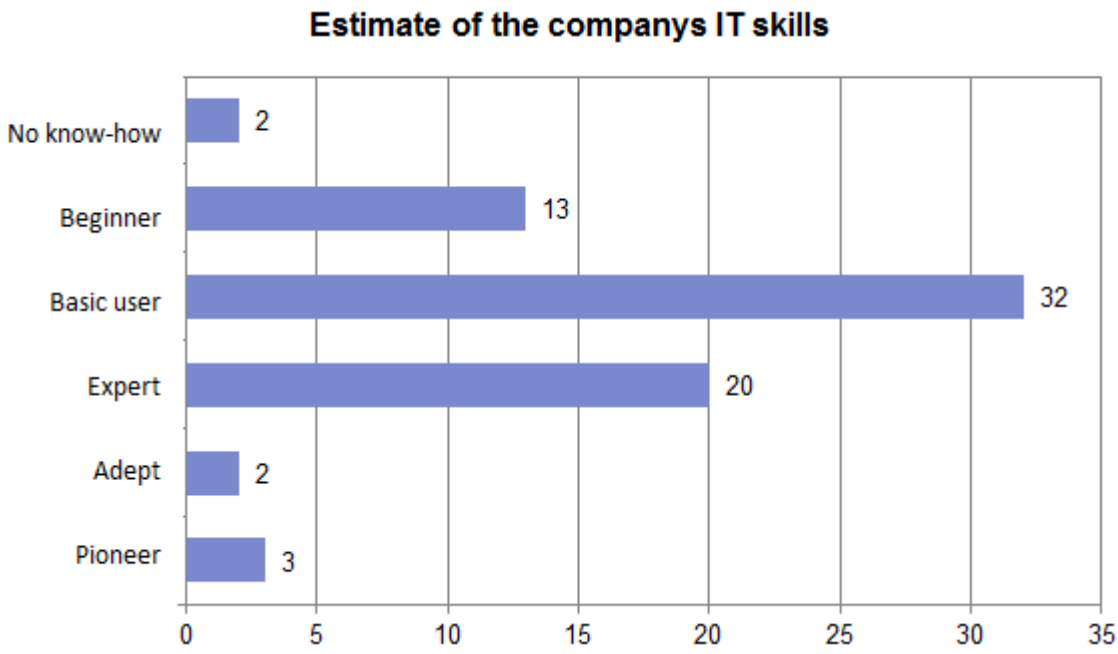

Figure 8: Self-estimate of IT skills, showing the number of respondents that chose each option.

In the questionnaire it was also asked what aspects the companies have experienced as problematic in the use of IT solutions. The biggest problems are related to their own skills: for example, a person does not have the necessary skills to update their web page, or to target digital marketing to the right customer groups. The lack of time and a low cost-benefit ratio were also seen as problematic. A few (3) respondents said that they did not find it sensible to try new IT solutions, and were not willing to try them. However, the respondents were willing to develop the activities of their companies. For existing IT solutions, more emphasis was placed on marketing solutions. The second most wanted area for development was sales. Sales and marketing are often seen as complementary or even synonymous, so this does not seem surprising.

The questionnaire also asked about the benefits of the use of information technology to the companies. The majority of respondents (36) had applied IT solutions for marketing purposes. Other reasons for using IT solutions included saving time and costs, sales of services or products, smoothness and continuity of processes, efficiency in administration, business development and financial management. Respondents were also asked directly about their wishes for themes for the workshops. Marketing and sales solutions were the most desired topics, but also some surprising topics were suggested: mobile technologies, customer relationship management solutions, and cloud services.

4.2 Planning the workshop concept

Workshop topics were developed gradually. For example, the topic of the first workshop of the project was digital marketing, but later the subject was divided into several areas, because it was too broad to handle at once. Topics are presented in the Figure 9. At its simplest, Rogers's innovation diffusion theory considers that the adoption or diffusion process consists of an innovation, an individual or a community with experience or knowledge about the innovation, another individual or community that does not yet have the knowledge or experience of the innovation, and a communication channel that combines these two [16, 19]. Innovation decision-making process refers to the process during which a person adopts or rejects an innovation. There are five steps in the process: knowledge, persuasion, decision, implementation and confirmation [19]. The project team wanted to start from the first step of the process, and attempted to make workshops easy to come by and accessible to rural areas.

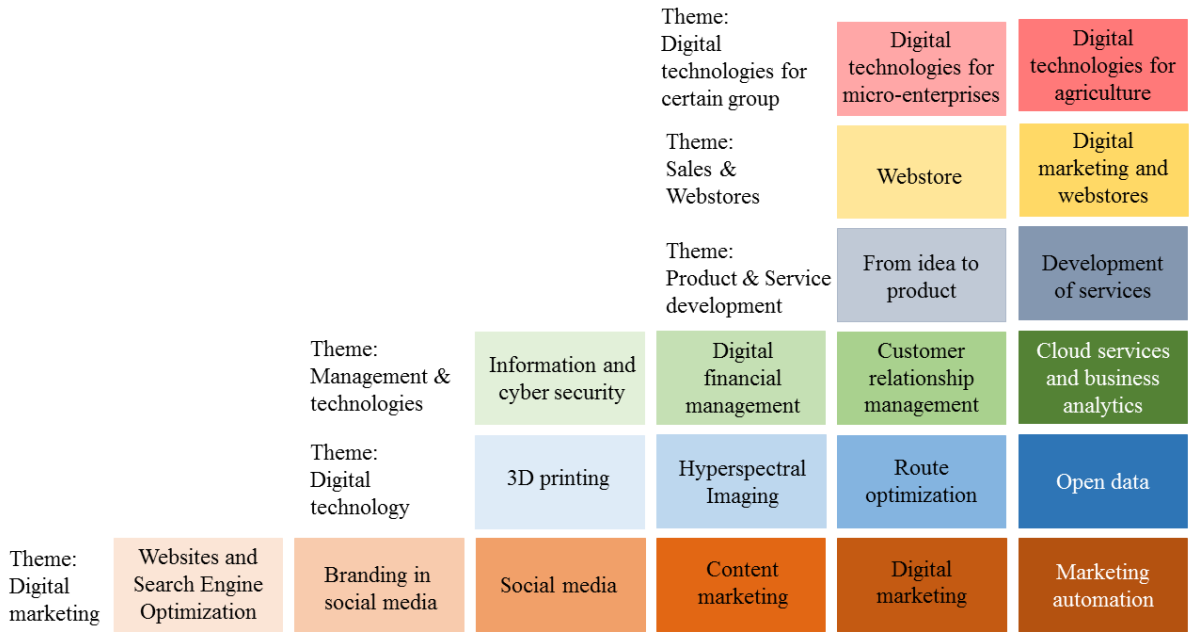

Figure 9: Topics of the workshops, organized according to themes.

According to TAM, created by Davis [13, 12], two factors have a particular impact on the user's acceptance: perceived usefulness and perceived ease of use. Usefulness means that the user feels that the use of the system improves his performance in the organization. Perceived ease of use refers to how easy the user thinks the system is to use before using it. Ease of use is important for the introduction of a system or innovation, but usefulness is even more important. Users can tolerate a system that is more difficult to use, if its benefits are large enough. User-assessed system utility is, however, different from the real benefit of the system. A user can estimate the benefit to be greater or smaller than it actually is. Later TAM has been updated to a new model named TAM2, which adds

three social factors that affect the individual's decision to accept or reject an innovation: subjective norm, voluntariness and image. Subjective norm refers to how the person thinks his close personal relationships think he should or should not behave. Voluntariness means that the person himself chooses to do something; it is not mandatory. Image refers to the image the person wants to establish or maintain in his social group.

According to UTAUT, created by Venkatesh and Davis [35, 36], four concepts explain most of technology adoption and use: performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy refers to how much an individual believes that a system or technology helps in carrying out their work. Performance expectancy predicts best the intent to use, and it is important in both in a voluntary and compulsory situation. Age and gender affect performance expectancy; its impact is higher especially for young men. Effort expectancy means how easy or effortless the individual thinks the use of the technology is. Effort expectancy has an effect especially in the early stages of new behavior. Age, gender, and experience affect effort expectancy; its impact is higher particularly for young women, and at the beginning of the new behavior.

The workshop concept developed in the project has four stages that are based in TAM, UTAUT and Rogers's diffusion of innovation theory (see Figure 10):

1. trust building,
2. lecturing by experts,
3. example of peers and
4. participation to workshop tasks.

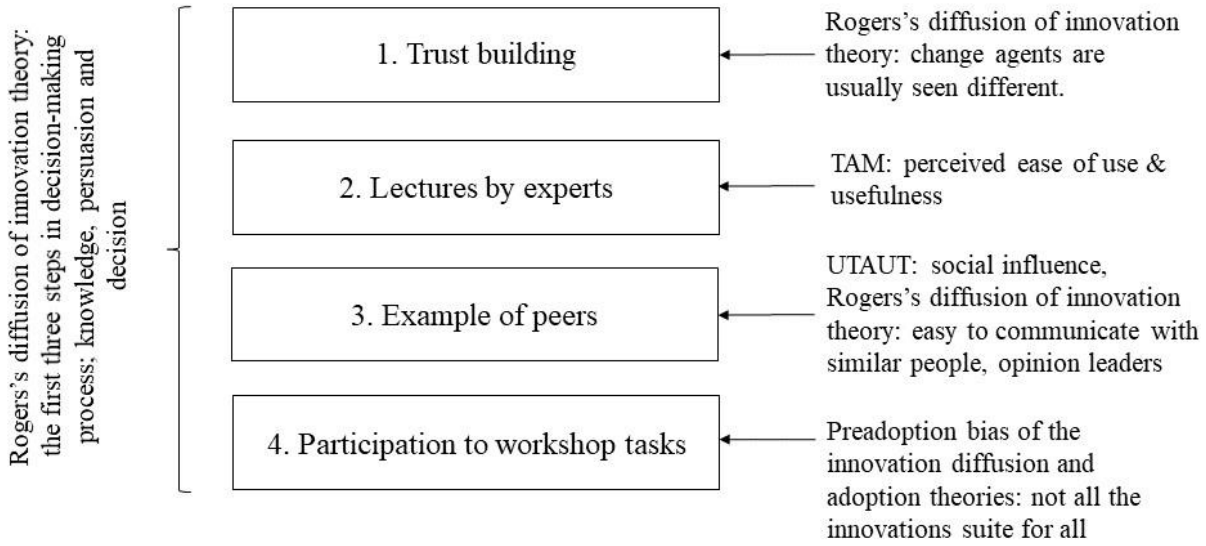

Figure 10: Topics of the workshops, organized according to themes.

The first stage of the workshop concept is building trust to others and breaking the ice between participants. Change agents are often higher educated, and their socioeconomic background differs from the social system they are trying to influence [19]. This is why building trust among the participants and change agents was considered important. Rogers [19] points out that in general, ideas are easy to communicate between similar people. Khrais [37] and Werber, Baggia and Žnidaršič [38] also include trust in their expanded model based on TAM. Participants in workshops must therefore feel like they are in a situation among their peers they can rely on.

The second stage of the workshop concept is providing information about the innovation to participants: what it is, how it is used and what one can achieve by using it. The information is shared by an expert. According to TAM, perceived usefulness and perceived ease of use are important factors when individual is adopting an innovation [13]. According to UTAUT, performance expectancy and effort expectancy are important factors when adopting an innovation [36]. According to Rogers's innovation diffusion theory there are five stages in the innovation decision process: knowledge, persuasion, decision, implementation and confirmation [19].

The third stage of the workshop concept is the example of peers. TAM2 adds social influence to TAM, and it considers that an individual can act according to subjective norms [35]. In addition, UTAUT considers that social influence affects the adoption of an innovation [36]. In Rogers's innovation diffusion theory, opinion leaders have an influence on innovation diffusion by affecting others' opinions of innovations [19]. For example, Valente and Davis [39] and Puska et al. [40] support the use of opinion leaders to accelerate the diffusion of an innovation. In the third stage of the workshop, local entrepreneurs were used as opinion leaders to explain how they have used the innovation and how useful it has been.

The fourth stage of the workshop was the workshop itself where participants could think and reflect on how they can use the innovation. Workshop tasks were performed by using the facilitation methods. Facilitating methods refers to methods that help to lead workshops so that each participant as a person and their creative input is taken account. The project team wanted people to think about the use of the innovation by themselves. Participants were usually divided into small groups so that they had room to speak, but still also had support of the other participants. Not all innovations are useful or desirable to all [19]. This is why it is important that participants think the use of the innovation by themselves, so they can decide if the innovation is suitable for them or not.

5 Evaluating the workshop concept

The project has been running since the start of February 2016, and has organized 43 events or workshops about digital innovations in 18 different locations. Participants have made approximately 800 visits to workshops. The project ended at the end of February 2019.

5.1 Communication

Communication channels play a major role in the adoption and diffusion of innovations at all stages of the innovation decision-making process [16, 19]. Communication was thought to be big part of the project's success. Mass media has less influence on decision making than personal communication [41], and role of the mass media in this project was kept small. Communication from municipalities, development companies and entrepreneurial associations to local entrepreneurs had a big role. At the beginning of the project, it was decided that the project would not spend money on newspaper advertising.

Communication is, for example, one of the core activities in Rogers's innovation diffusion theory [19]. Without communication, innovation cannot spread. The communication channels chosen for the project did not change greatly during the project. The role of municipalities and development companies in communication was important throughout the project. Other communication channels were local entrepreneur associations, social media, event calendars and media releases. Most of the participants heard about the events and workshops through municipalities and development companies (136 respondents), but the second largest group (122 respondents) heard about the workshop from personal e-mails, from others' personal recommendations, event calendars, and other similar channels.

The higher education and better knowledge of digital innovations of the change agents posed a challenge for effective communication between the change agents and participants. Although the project team knew that they should use easily comprehensible language, they still used the special vocabulary of the field (for example customer relationship management). In some cases, participants in the workshops mentioned that they did not understand the terms used, or that they were difficult to understand. This certainly affected, for example, the number of participants in workshops on the more difficult topics.

Another challenge related to communication was the internal communication of the project team. The project team organized a meeting every time before an event or workshop, so that everyone knew what their role in the workshop was. Successful target group communication does not necessarily guarantee a successful workshop; also internal communication must work.

5.2 Opinion leaders

Local entrepreneurs were used in the workshops as an opinion leaders. In the workshops, they presented how they had used digital innovations and what benefits they had achieved. Project team memos show that the project team itself was happy with this practice. However, the presentations of the example companies were not completely trouble-free. The participants' feedback and project team

memos show that the presentations varied in quality, and not all those selected as an example company were considered as a good choice after the fact.

The project team approved most of the chosen example companies before the company concerned was involved. When the project team chose the opinion leaders, they used the internet and the municipalities' representative or the development companies' recommendations to choose the companies. This method did not necessarily find the best opinion leaders. Often opinion leaders can be identified by examining the personal networks of individuals; opinion leaders have supposedly more contacts outside of the social system than other individuals in the social system [39]. The project had no resources to do research on networks of entrepreneurs, so opinion leaders had to be chosen by the project team. Other people in the social system evaluate how credible and trustworthy the opinion leaders are: whether or not they really know the innovation well, and how well they are able to use it to their advantage [39].

5.3 Change agents

The project team can be seen as change agents: they try to affect innovation diffusion. Change agents differ in their background, education, and expertise from the participants of the workshops. The project team wanted to reduce this gap, and in the workshops, their role was to carefully guide the work of the participants without giving them answers or directing their work too much. It was seen important that participants consider and ponder the use of the innovations by themselves.

In several workshops, part of the work was brainstorming. It that was found to be difficult for both the project team and the participants. It would be good to pay attention to both external and internal communications, since internal communication within the project also plays a major role in the project's success.

The role of change agents in innovation diffusion is complex. Their expertise, which is supposedly higher than the members of the social system, is important, but the differences between the change agents and participants' knowledge and backgrounds should not be ignored. It may be difficult for people working as experts to break away from their usual role and give space to the participants' own ideas and thoughts. On the other hand, the expertise of the change agents can also be utilized in workshops. Change agents thus have a twofold role: they share knowledge and make use of their expertise, and act as an impartial facilitator during brainstorming.

5.4 Trust

During the workshops, efforts were made to build trust. Various methods of facilitation emphasize that at the beginning of the workshop, it is important to break ice and build trust. It is difficult to think of new ideas if you do not trust the situation and the people in it. For example, Rogers [19] points out

that in general, ideas are easily communicated between similar people. Participants in workshops must therefore be aware that they are in a situation among their peers they can rely on. The project team paid attention to the building of trust in the workshops. Nevertheless, the memos show that this did not always work. Participants did not want to share their ideas to others, which shows that they do not trust the other participants or the change agents. Some participants wrote in the feedback questionnaire that they did not want others to steal their ideas.

Although building trust was found to be important right from the beginning of the project, it was not always successful. Especially in workshops, where the focus was on the brainstorming, building trust was considered to be important. Trust between the participants and between participants and change agents could create better opportunities for business development.

6 Effect of the workshops on diffusion and adoption of digital innovations

Overall the feedback from the participants was good. 474 persons answered the feedback survey, and most of them thought that the workshop or event was good or excellent. 266 persons answered that they benefited from the workshops to some extent, and 176 persons answered that they benefited from the workshops a lot.

Participants were asked to estimate how likely it was that they would take action after the workshop, see Figure 11. 413 persons answered this question. Out of them, 190 answered that it was quite likely that they would take action after the workshop, and 181 persons thought that it was likely that they would take action after the workshop. These two groups comprise 90% of the respondents, which seems to support the conclusion that the workshops were useful for promoting innovation diffusion. Of course, this does not mean that all of these people really took action. What we can say is that they had a positive attitude towards the digital innovations presented, enough knowledge to think that they could do something, and that they already planned what to do with the innovations. 329 answered to open ended question what they are planning to do after the workshop (Appendix). This can be seen quite positively: many thought that digital innovation was useful and they had enough information to do something with it after the workshop. There are also many (83) respondents that thought they need more information, but good thing is that they were interested enough to plan to look more information.

Some time (2 weeks to a month) after the workshop, participants received a new survey asking if they had used the innovations and taken action. 110 persons answered this survey. 20 persons answered that they still thought that workshop was useful for them, 65 persons answered that the workshop was useful for them to some extent, 21 persons answered that it was a little useful, and one person answered that the workshop was not useful for them.

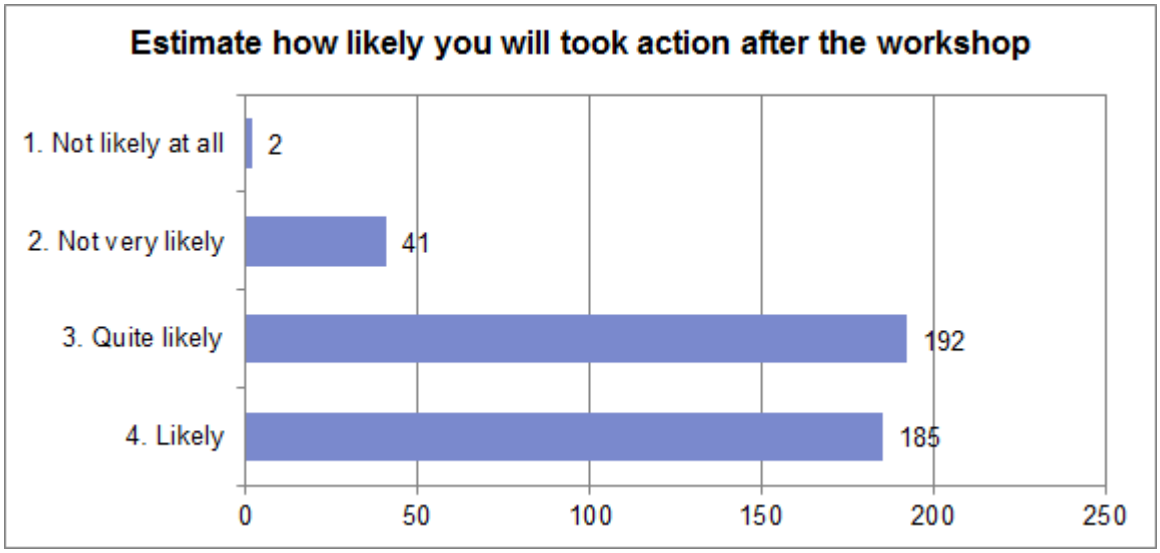

Figure 11: How likely participants thought they would take action after the workshop, showing the number of respondents that chose each option.

108 persons answered to question if they had taken the action they planned in the workshop, see Figure 12. 39 persons answered that they had done the planned action, and 69 had not done the planned action. In percentage terms, this means that 36% of the respondents took planned action. 105 persons answered the survey question on whether they had taken some other action inspired by the workshop. Out of them, 32 answered yes, and 73 no. This means that 30, 5% took some other action inspired by the workshop. Summing up the results from the previous two questions, this means that out of all respondents, 58% took some action (planned or other) after the workshop. However, it is possible that those who answered the follow-up survey were more active than those that did not answer the survey.

The workshops had also other benefits. 20 persons had found a new business partner, and participants were acquainted with other local entrepreneurs. Only three persons thought that they workshops did not help them to get acquainted with other entrepreneurs. Figure 14 shows a table of the perceived satisfaction in the workshop, perceived benefit, and realization of the planned actions by topic. As expected, more people thought that the workshop was useful than really took action.

Workshops seem to be useful way to support the diffusion and adoption of digital innovations for micro-enterprises. Participants thought workshops were useful and planned how they could use digital innovations in their business. Before workshops, in the preliminary survey, digital marketing was found as the most interesting topic. This was seen also in practice throughout the project: digital marketing workshops (for example about social media, websites and search engine optimization and branding in social media) were the most popular ones.

Topic of the workshop	Perceived satisfaction of the workshop: The respondent was satisfied with the workshop	The respondent found the workshop useful (Perceived benefit was a lot or some)	Realization of the planned actions: the respondent took planned action after the workshop
Digital marketing (n 49)	90 %	78 %	35 %
Social media (n 19)	95 %	68 %	42 %
Customer relations management (n 2)	100 %	100 %	50 %
e-commerce (n 5)	100 %	100 %	40 %
Information security (n 6)	67 %	67 %	33 %
Cloud services and business analytics (n 3)	67 %	67 %	33 %
Marketing automation (n 2)	100 %	100 %	0 %
Service design (n 4)	100 %	50 %	0 %
Digital technologies for agriculture (n 6)	83 %	83 %	17 %
Digitalization financial management (n 1)	100 %	100 %	0 %

Table 2: Table of satisfaction of the workshop, perceived benefit and realization of the planned action. *n* refers to the number of respondents. Satisfaction of the wokrshop and perceived benefit do not always match.

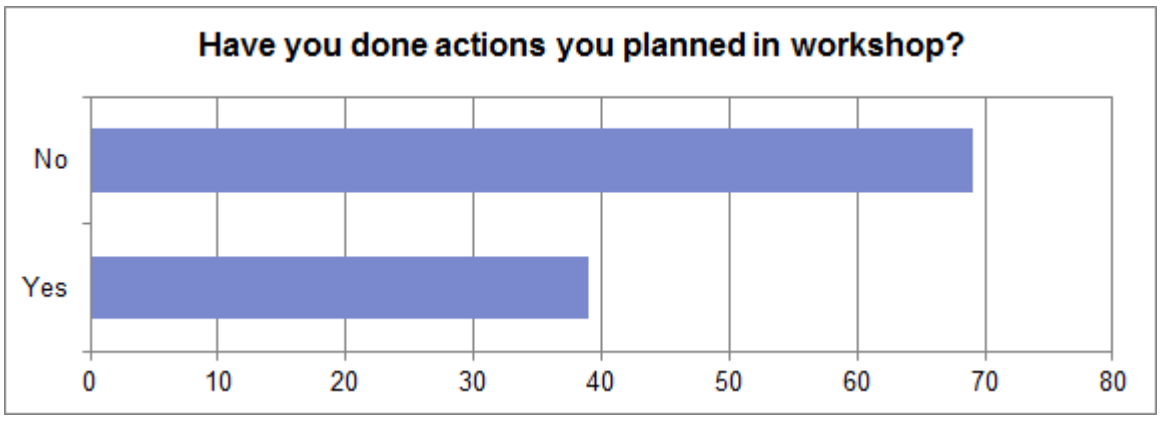

Figure 12: Results of follow-up survey on whether the participants had taken the action they planned during the workshop.

7 Discussion

We suggest that key elements for supporting diffusion of digital innovations in rural micro-enterprises are communication, opinion leaders, change agents and trust. These are the things we can pretty easily influence. Of course, for example, change resistance and overall conditions (laws, regulations, internet infrastructure etc.) also matter, but they are not so easily affected by change agents.

Answers of the questionnaire seem to support the conclusion that workshops were useful for promoting diffusion of innovations in the rural area of the Central Finland. Although workshops were found successful in some aspects, there were also some issues. Participants did not follow through with their planned actions. Participants did not answer as actively to the follow-up survey (110 answers) than they did to the feedback survey (474 answers). We can only guess why the participants did not follow through with the actions: maybe it was because there were no other measures to support the actions, or they lack in time or competence to follow through. This should be studied further to understand why, and how to better support the workshop participants.

Another challenge was the remoteness of the rural area: distances were long for some of the entrepreneurs, and they had to travel a long way to get to the workshops. The number of residents in villages were between 1, 375 and 19, 374, and the number of the participants in the workshops varied. Sparsely populated areas have also a disadvantage with regard to digitalization: where there are fewer people, the usage rate of their personal connections is lower, and digital innovations usually spread the most effectively between personal connections [1].

The aim of the project was to provide free workshops about digital innovations that are easy to come by for local micro-enterprises. The plan was to implement workshops so that the language used would not be too difficult, and that regardless of the participants' level of digital competence, they would get some new information about the topic. It was a problem that the digital competence of the participants varied a lot, with some not even having basic knowledge. These entrepreneurs would perhaps need education about using smart phones or the internet before they can successfully use digital innovations such as web stores, search engine optimization, or social media for marketing purposes. Some of the participants asked for webinars, but it may be quite difficult to arrange webinars, if the target participants do not have enough digital competence to use such technology.

Used innovation adoption and diffusion theories, Rogers's innovation theory, TAM and UTAUT, seem good choices as a base for the developed workshops and as a lens for analyzing the data, but there is preadoption bias with these theories: not all the innovations suite for all. Future research could develop a model for identifying suitable innovation for the user. Innovation resistance should be also considered, because it can be major problem for innovation diffusion.

Digital path project lasted three years. This is quite limited time to reach the rural enterprises and to support the diffusion and adoption of digital innovations, because diffusion of innovation usually takes time (Rogers). This is why project team decided to focus to the three first steps of Rogers's decision making process: knowledge, persuasion and decision. The last steps, implementation and confirmation were given less attention. Used workshop concept seemed to support the first three steps of the decision making process as planned, but to support the implementation of the digital innovations, the concept should be improved and include more implementation support for the enterprises.

Some of the workshops revealed that some entrepreneurs did not have a clear idea of what their business idea was, or who their customers were. This was also a bit problematic, for example, when the participants were planning using paid Facebook ads: if you do not know what you are selling, or to whom you are selling, marketing does not usually work as desired. These entrepreneurs could maybe use some help to develop their business before they can successfully use digital innovations and achieve the full potential of digitalization. There are no easy answers to these challenges, and any one actor or project cannot answer them all.

8 Conclusion

Compared to urban communities, rural communities do not have equal opportunities considering digitalization, because there infrastructure is often lacking, internet connections are slower, and fast broadband connections are more expensive. [25, 8, 6] There are may also be fewer options when selecting broadband provider. [7] The rural-urban digital divide can not be answered by considering only technological or economic factors, but one must also consider human factors, for example, the digital skills of rural communities. [4] The aim of the action research was to develop a workshop concept that can be used for supporting adoption and diffusion of digital innovations in rural micro-enterprises. Developed workshop concept used Rogers's innovation diffusion theory, TAM and UTAUT as base, because they are well-known theories of diffusion and adoption of innovations and they seemed to fit well in this case. Terms from these theories were used for classification of the research data. The knowledge of digital innovations in micro-enterprises in rural communities can be improved with free workshops that are easy to come by. Developed workshop concept seems to support the conclusion that workshops were useful for promoting diffusion of innovations in the rural area of the Central Finland. A challenge is how to better support the implementation phase in micro-enterprises. In this study, about one third of the participants that answered the survey questionnaire, took action after the workshop. This number may be biased, because it is possible that those who answered were more active than those that did not, so the real number can be even smaller. Ben et al. [11] estimated that "by 2020, 90% of jobs will require some digital skills". This means that if the

digital divide of rural and urban areas stays the same, or even grows, rural areas are facing serious trouble. It is important to inform the politicians that the rural-urban digital divide is a critical issue. The main contribution of this paper is that it presents a real-life case for supporting diffusion and adoption of digital innovations to micro-enterprises in rural areas. The material used for this article is authentic, and describes a possible method for promoting the diffusion and adoption of digital innovations, as well as its challenges.

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Appendix A.

Questionnaire answers: What are you planning to do after the workshop? Open end answers are bundled by the action. Number of respondents: 329

Action	Number of respondents
Branding of my expertise/company	3
Build a mobile application	1
Build a website	11
Develop current website	48
Develop customer relationship management	4
Develop information security of the company	17
Develop more content for marketing	9
Develop services of the company	8
Expand my network	5
I´m planning to learn more about the topic	83
Identify customer segments	5
Identify marketing channels	4
Identify marketing goals	1
Monitor and measure marketing	1
More systematic use of marketing	7
More systematic use of social media for marketing	48
Nothing new / different	4
Plan more for starting a webcommerce	12
Search Engine Optimization	13
Share what I have learned to others	20
Start a webcommerce	3
Start using digital marketing	1
Start using social media for marketing purposes	16
Start/develop current e-mail marketing	2
Starting a blog	5
Try facilitating methods in my work	9
Try to activate customers more in social media	1
Use automation for marketing	4
Use cloud services	1
Use Facebook ads for marketing purposes	17
Use more pictures for marketing purposes	2
Use more targeted marketing	5
Use more videos for marketing purposes	7