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Abstract: Digitalisation and the digital divide are important issues being studied, particularly within the urban-rural relationship. This paper focuses on women's perceptions of digitalisation and its potential in different types of rural areas in Czechia. A total of 241 guided interviews were conducted, of which 76 (31.5%) were with women. The respondents were rural managers/leaders, representatives of local government, businesses, and NGOs involved in LAGs who can stimulate local development. Results show similarities in the perceptions of men and women, who appreciate the benefits of digitalisation (e.g., speed of communication) and negatively perceive the weakening of social ties and unequal access to ICT infrastructure or digital skills. The sector of their work influences slight differences in women's views. It is necessary to support the construction of ICT infrastructure and the development of the population's IT skills to create equal conditions for access to digital technologies.

Keywords: Czechia, rural areas, digitalisation, women, ICT infrastructure, IT skills

Souhrn: Digitalizace a digitální propast jsou důležitými tématy, která jsou zkoumána zejména v rámci vztahu město-venkov. Tento článek se zaměřuje na vnímání digitalizace a jejího potenciálu ženami na českém venkově. Celkem bylo provedeno 241 řízených rozhovorů, z toho 76 (31,5 %) se ženami. Respondenty rozhovorů byli manažeři/vedoucí pracovníci na venkově, tj. zástupci místní samosprávy, firem a nevládních neziskových organizací zapojených do místních akčních skupin, kteří mohou stimulovat místní rozvoj. Výsledky ukazují podobnost vnímání mužů a žen, kteří oceňují výhody digitalizace (např. rychlost komunikace) a negativně vnímají oslabení sociálních vazeb a nerovný přístup k ICT infrastruktuře nebo digitálním dovednostem. Mírné rozdíly v názorech žen ovlivňuje odvětví, ve kterém pracují. Pro vytvoření rovných podmínek přístupu k digitálním technologiím je nutné podpořit budování ICT infrastruktury a rozvoj IT dovedností všech obyvatel.

Klíčová slova: Česko, venkov, digitalizace, ženy, ICT infrastruktura, IT dovednosti

Highlights

- Perception of potential and barriers of digitalisation process in Czech rural areas by rural leaders.
- Interviews with 241 rural leaders, of which 31.5% were women.
- Overall, no significant differences between men and women.
- Better educated women are more open to digital technologies than men.
- Insufficient IT skills as a barrier for certain groups, especially the elders.
- The necessity to develop IT skills of all inhabitants, regardless of gender, while building the ICT infrastructure.

1. Introduction

Digitalisation is now one of the most important processes affecting all areas of life and the entire population. An efficient and high-quality infrastructure is a prerequisite to participate in this process and benefit from the opportunities that digitalization offers. But, this is not sufficiently and uniformly developed, with rural areas facing a lack of infrastructure compared to urban areas as it was identified by Feurich et al. (2024) based in the EU.

However, within rural areas, it is possible to identify better or worse localities equipped with information and communication technology (ICT) infrastructure (Philip & Williams, 2019). Does a lack or abundance of this equipment affect residents' perceptions of the digitalisation process and its potential for rural

development? And are there differences between men's and women's perceptions of digitalisation? Women's role in rural development is unquestionable in the public, business, and non-profit sectors (Ahl et al., 2023; Vidickienė, 2017; De Pablo Valenciano et al., 2021). According to the OECD (2017), digitalisation leads to higher employment for women due to greater work flexibility, which can help improve employment for women. On the other hand, there are studies (Larsson & Viitaoja, 2019, Perifanou and Economides, 2020) that point to a lower participation of women in the digitalisation process, often influenced by a lack of IT skills. Do women in Czech rural areas perceive this potential of the digitalisation process? And whether – and to what extent – can they use the digital technologies at their disposal? These questions open space for answering and filling the research gap, which concerns the need to identify women's perceptions and attitudes towards the possibilities of using the digitalisation process in different types of rural areas, which also have different levels of ICT infrastructure. Although the academic literature focuses strongly on women's participation in ICT issues (see, for example, Krieger-Boden & Sorgner, 2018; Griffin (ed.), 2022; Olsson & Bernhard, 2021), the reflection of factors that influence the perception and acceptance of ICT in different ways in the daily activities of residents or representatives of rural stakeholders is still limited (Larsson & Viitaoja, 2019; Elena-Bucea et al., 2021).

This paper focuses on the perception of digitalisation, its benefits and potential, and its barriers and challenges from the perspective of men and women as rural managers/leaders. These individuals are representatives of municipalities, businesses, and non-governmental organizations (NGOs) involved in local action groups (LAGs), which can use their activities to promote local development. The paper is based on the results of an extensive empirical survey that was carried out in ten selected LAGs in five different regions (incl. predominantly rural, intermediate and predominantly suburban regions) of the Czech Republic in the form of guided, structured interviews.

The paper is structured as follows. The first section reviews the literature that deals with the theoretical basis of the digitization process in rural areas. The second section focuses on the methodology, including the selection of regions and a brief description of the respondents of the empirical survey. The third section describes the results in detail, and the fourth section discusses the research results concerning the literature review in the first section. The paper's final section focuses on concluding remarks and suggestions for future research.

2. Theoretical Background

Rural areas currently face a wide range of challenges that affect their ability to use digitalisation for their development. As early as 2002, Chapman & Slaymaker (2002) recognised the potential of ICT to facilitate better knowledge sharing and information exchange in rural areas, distinguishing the problems of knowledge gaps and information infrastructure. Stratigee (2011) defined the barriers to digitalisation in rural areas as infrastructure and skills with which to use ICT. These problems persist in rural areas (Feurich et al., 2023). In the Czech Republic, although the situation improved in the context of the COVID-19 pandemic (Weichetova & Skarlandtova, 2020), rural areas with insufficient quality and capacity of infrastructure can still be identified today. As Kramar et al. (2020) noted, developing digital infrastructure is important for developing agricultural and other economic activities in rural areas. It allows for an increase in economic culture and environmental awareness in rural areas.

However, not just infrastructure limits the digitalisation process in rural areas. As Vaishar and Stastna (2019) noted, an important factor is the rural population's lower skill level and conservatism in adopting innovations. On the other hand, not all rural dwellers can be seen as impervious to digitalisation. Zerrer and Sept (2020, p. 85) highlighted "smart villagers" characterised by their digital positivity, problem awareness, active engagement, motivation, community orientation, responsibility, and self-efficacy.

People's ability to use ICT technologies is influenced by their environment, educational background, experiences, social status, and learning community (Larsson & Viitaoja, 2019). Elena-Bucea et al. (2021) reported on age, education, gender, and income. Larsson and Viitaoja (2019) wrote about several factors that negatively influence the perception and acceptance of ICT, including limited access to material resources and economic constraints, cognitive inequalities, ideological reasons for rejection,

technophobia, etc. These factors manifest as gendered and can lead to a gender digital divide (Larsson & Viitaoja, 2019), reflected in lower female participation in the digital economy. Perifanou and Economides (2020) stated that women in the EU are underrepresented in almost all areas of ICT: education, employment, entrepreneurship, and leadership.

However, on the other hand, digitalisation brings many opportunities for women's inclusion and deeper participation in all aspects of life, provided they develop their digital skills. Although the lack of female participation in ICT fields is often discussed (Krieger-Boden & Sorgner, 2018; Griffin (ed.), 2022), women develop their digital skills concerning the needs of their work activities (Olsson & Bernhard, 2021; Rajahonka & Villman, 2019), but also personal preferences. According to Olsson and Bernhard (2021), digitalisation changes traditional entrepreneurial processes and stimulates new behaviours related to small business digitalization. All small entrepreneurs, not just women, have to cope with this.

In this context, the period of the COVID-19 pandemic could be mentioned when people were essentially forced to develop their digital skills to use digital technologies that were previously unnecessary for them, e.g., internet banking, e-shops (Young et al., 2022; Paraschiv et al., 2022; Svatosova, 2022). For example, teachers, the majority of whom are women in primary schools in the Czech Republic, have demonstrated the ability to rapidly improve their digital skills to communicate and teach online (Hájek & Vytrhlíková, 2021). Another area where digital skills are becoming increasingly important is public administration. The digitalisation of public administration places demands on the digital skills of both public administration staff and citizens and their ability to use the necessary digital technologies (Androniceanu & Georgescu, 2023; Pisár et al., 2022).

According to Pelucha and Kasabov (2020), digitalisation in rural areas can be seen as an opportunity for the development of new employment opportunities, e.g., in relation to an aging population that requires a wider range of diverse personal services, such as healthcare (see e.g., Valokivi et al., 2023), social care and tourism, supply, etc., whether provided by businesses, NGOs, or public services. These activities are essentially the domain of women and require varying levels of qualifications and digital skills, but they are also built on empathy and understanding. Carbajal et al. (2019) highlighted women's role in social work-focused NGOs. Rajahonka and Villman (2019) noted that digitalisation offers opportunities for career advancement, especially for women; women are flexible and practical-oriented in relation to digitalisation.

Therefore, according to Salemink et al. (2017), it is generally necessary to focus on connectivity (available, sufficient capacity, and quality infrastructure) and inclusion, in the sense of including all people, regardless of their background, sex, skills, affordability, cultural differences, and attitudes towards ICT.

3. Methodology

The empirical survey was conducted in the form of structured interviews in a total of 10 LAG territories between June and November 2022. There were two LAGs in each of the three types of rural areas in the Czech Republic, i.e., one predominantly suburban region (the Central Bohemia region), two intermediate regions (the Olomoucky region, the Zlinsky region), and two predominantly rural regions (the South Bohemia region, the Vysocina region). The LAGs were selected based on their ICT infrastructure facilities. Based on data from the Czech Telecommunications Office (indicator "number of internet connections per 1000 inhabitants"), the LAG territories were divided into well- and poorly-equipped with ICT infrastructure. Figure 1 shows the distribution of well and poorly-equipped LAGs on the territory of the Czech Republic.

A total of 241 guided interviews were conducted as part of a robust empirical survey. Respondents were rural managers/leaders, local government representatives (93 interviews, mainly mayors), business representatives (73 interviews), and NGO representatives (75 interviews) involved in LAGs. To ensure the representativeness of the survey, the proportion of respondents in each LAG reached at least 60(- 70)% of its members in all three groups, i.e., local government, businesses, and NGOs.

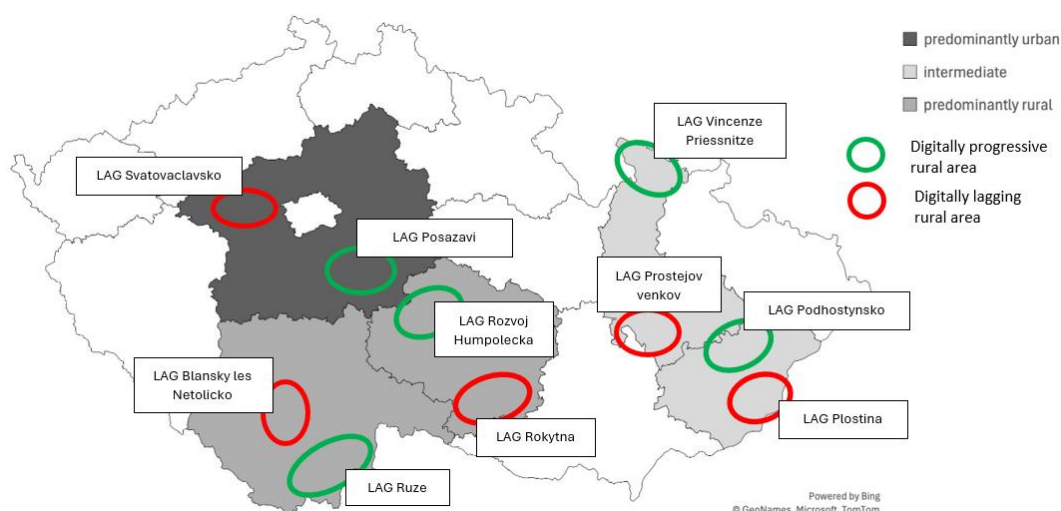


Fig 1. Distribution of LAGs participating in the empirical survey on the Czech territory. Source: own elaboration

Regarding the gender composition of respondents, out of 241 respondents, 76 were women, i.e., 31.5%. Of these, 25 were from local government (26.9% of all respondents from this group), 16 were from the business sector (21.9 %), and 35 were from the non-profit sector (46.7%). In this context, it should be emphasized that this was a specific group of women who belonged to rural leaders. Compared to the men in this survey, women are less represented in the higher age groups (60+) – see Table 1.

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Tab 1. Respondents by age groups. Source: own elaboration

Age group	% of respondent – men	% of respondent – women
18 – 30 years	2.1	1.5
31 – 40 years	19.3	17.9
41 – 50 years	27.3	32.8
51 – 60 years	31	34.3
61 – 70 years	17.1	11.9
71+ years	3.2	1.5

Tab 2. Respondents by formal education achieved. Source: own elaboration

Education achieved	% of respondents – men	% of respondents – women
Basic	0.6	0
Secondary completed by an apprenticeship exam	15.6	0
Secondary completed by a school leaving exam	27.7	36.8
Higher vocational	2.3	1.5
University (Bachelor's, Master's)	49.1	55.9
Post-doctoral university	4.6	5.9

The age, occupational and educational characteristics of the respondents suggest that they are not representative of the general rural population in Czechia. These are representatives of rural stakeholders (i.e., municipalities, non-profit organisations and entrepreneurs) in different types of rural areas in the Czech Republic. Reflecting their perceptions of the possibilities of using digitisation is essential, as these respondents are key players in the potential development of the rural areas studied.

The guided, structured interview covered a relatively wide range of questions focusing on perceptions of the potential importance of digitisation as an ongoing process and its impact on the territory. It also included questions related to the respondents' ICT knowledge and skills, as well as their views and experiences of the IT skills of their staff/colleagues or, more broadly, of the population in their municipality/region. The availability, capacity, and quality of ICT infrastructure, the need for improvement, and other related issues were also important. In this paper, we focus on topics related to perceptions of the digitalisation process and the knowledge and skills needed to take advantage of the opportunities that digitalisation brings from the perspective of men and women.

4. Results

4.1 Respondents' use of digital technologies

One of the factors influencing the perception of potential and the overall approach to digitalisation is the skills needed to use digital technologies. There is minimal variation in the use of digital technologies by respondents both in terms of gender and the ICT infrastructure of the LAG area, as shown in Figure 2 (use of violin plots).

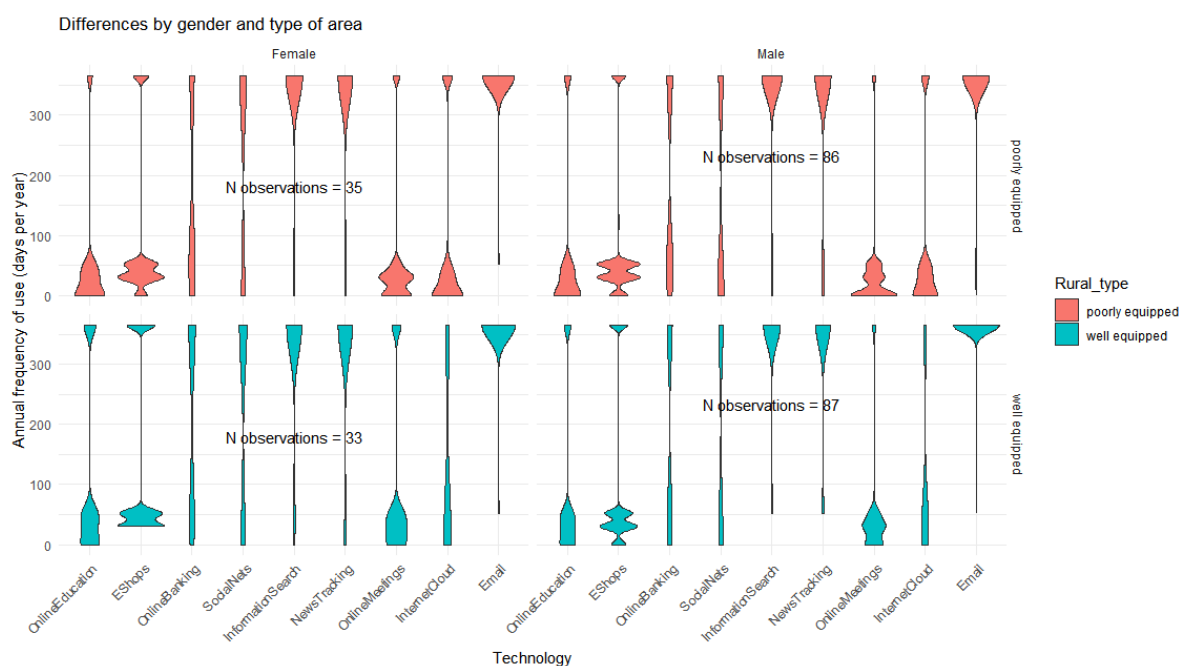


Fig 2. Differences in the use of ICT technologies by gender and the region's ICT infrastructure. Source: own elaboration

Note: Authors' elaboration in R. This figure illustrates the variation in technology use across gender and area type (rural or urban). Each fiddle represents a specific technology, with the width indicating the annual frequency of use distribution. The more frequently the technology is used, the higher the value on the y-axis, e.g., for daily use the value on the y-axis is 365. The violins are grouped by rural type; within each type, the distribution is further differentiated by gender. Text annotations indicate the number of observations for each category combination, providing insight into the sample size for each group. The graph allows a visual comparison of technology use patterns, highlighting any differences by gender and rural type.

Figure 2 shows that email emerges as the most used technology for both genders, with men from well-equipped regions being the most frequent users. There is no significant difference in email use for women between the poorly and the well-equipped regions. As for Internet clouds, there are more differences between the well-equipped regions than between the genders. On the other hand, women are slightly

more likely than men to have online meetings in both types of regions. Watching the news is somewhat more prevalent among men than women, especially among men in well-equipped regions. The same applies to searching for information.

On the other hand, women, especially those in well-equipped regions, show a higher proportion of daily use of social networks than men. The use of online banking is similar between genders, with women in well-equipped regions reporting slightly higher daily usage rates. The use of e-shops appears to be similar for both genders, with women in well-equipped regions having a higher frequency of daily use. In this context, the impact of the COVID-19 pandemic on the development of e-shops is noteworthy (e.g., Svatosova, 2022).

In summary, the overall differences in the use of digital technologies between the genders are not significant. The most widely used technology for all participants is email. Men are more likely to search for information and follow the news, while women are more likely to use social networks and online meetings.

4.2 Perception of the digitalisation process and its potential by all respondent

Focusing on perceptions of the digitalisation process and its potential in rural areas, a comparison of the survey results shows that there is little difference between the responses of men and women. Both genders agree on the benefits of digitalisation, such as the ease and speed of communication, the speed, and scope of information searches, including professional searches, and the possibility of dealing with many issues, including working from home (home office). It should be noted that the answers do not differ according to the equipment used in the region's ICT infrastructure.

I see the potential in quick action, easy-to-find information you need, and online training. It makes it all easier.

(female, business, 61–70 years old, university education, poorly-equipped region)

Potential - reduction of administrative burden, simplification, and reduction of labour costs.

(male, business, 61–70 years old, secondary education with an apprenticeship exam, well-equipped region)

Regardless of gender, respondents perceive the loss of personal contact, weakening of social ties, restrictions on physical contact, and some shared activities (sports, leisure activities) as a barrier, especially for children.

I see the loss of personal contact caused by the overuse of digital technology as a negative.

(female, mayor, 51–60 years old, university education, poorly-equipped region)

There is a potential to reach the target group through social networks; a barrier to our activities is that digitalisation takes time away from children's sports activities.

(male, NGO, 31–40 years old, university education, well-equipped region)

Furthermore, respondents, regardless of gender, highlight the problem of unequal access to ICT infrastructure, which can affect IT skills. Poor quality and infrastructure capacity can negatively impact people's motivation to develop their IT skills and equip themselves with the relevant technology (hardware and software). The digital literacy and skills of the older generation are perceived as problematic by all respondents, regardless of gender.

Older people have problems learning how to work with technology. Everything is moving very fast, but things are not polished. Technology is good, but its adoption is fast, and there are too many

(female, mayor, 41–50 years old, university education, well-equipped region)

Older people don't have a computer at all, so they don't have the opportunity to use it (digitalisation). If they had it, it would still seem like a waste of time to some.

(male, mayor, 71+ years old, university education, poorly-equipped region)

The negative side of digitalisation, as perceived by local government representatives, is that citizens do not respect working hours. By putting local government online, they expect a quick response from the mayor or office staff. Other problems are the anonymity and even aggressiveness of some people on Facebook.

...people expect an immediate answer/resolution to a problem – why does the mayor have to work on a Saturday night?

(male, mayor, 51–60 years old, secondary education with school leaving exam, poorly-equipped region)

4.3 Women's perception of the digitalisation process and its potential

Focusing on women according to their affiliation with the different groups of respondents – local government, businesses, or NGOs – it is possible to identify some differences in views on the possibilities of digitisation and its impact on the territory. Businesswomen or NGO representatives generally perceive the digitalization process more positively. This is mainly related to their focus and the target group of their activities (marketing, engagement, information sharing).

Of course, it is the fastest way to transfer information. Still, on the other hand, it takes away personal contact, the social element of communication, and privacy. In business, it's great because it makes it easier to advertise, present, and contact customers.

(female, business, 31–40 years old, university education, well-equipped region)

Potential – promotion, awareness, speed, feedback, but the problem is that you are more comfortable sitting at home than going out and being physically present in social interaction.

(female, NGO, 51–60 years old, university education, poorly-equipped region)

On the other hand, they are aware of some of its limitations, particularly citing problems related to the digital skills of both staff and clients.

We have limitations in terms of target groups, both clients and staff. Some clients are IT illiterate or do not have access to the Internet. Staff in different positions also have limitations.

(female, NGO, 41–50 years old, university education, well-equipped region)

Local government representatives are somewhat more skeptical, as their target group is the entire population of their community. They see problems not only in equipping the municipality with quality and capacity infrastructure but also in equipping socially vulnerable households with both appropriate technology (hardware and software) and skills; this was evident during the COVID-19 pandemic in the provision of online learning (see, e.g., OECD, 2020; Kostecká et al., 2021). In the context of the ongoing digitalisation of public administration, they are much more aware of the need to develop the digital skills of all citizens, identifying older people as the most vulnerable group in this process.

As digitalisation increases, more and more of the older population is moving to digital, but it's a skill that a certain group of people can't master... you also need to be prepared, and that means having savings for the latest software, multi-licensing and more.

(female, mayor, 51–60 years old, university education, well-equipped region)

I see digitalisation as a very positive thing... I see a disadvantage in the lack of functionality on all sides. It is a simplification, especially for the younger generation, but a block for older users.

(female, mayor, 51–60 years old, university education, poorly-equipped region)

5. Discussion

In interpreting the results of this research, it is important to remember who the respondents are – people in leadership positions in local government, businesses, and NGO – who are not ordinary citizens, and their age and education reflect this. Thus, the results of the empirical research do not reflect the general rural population, which limits the wider observation of this issue in rural areas. On the other hand, these representatives of rural stakeholders involved in the empirical research are potential agents with the possibility to fundamentally influence the socio-economic development of the given rural areas. In practice, this means that through their actions and attitudes, these people influence those other individuals around them, and they can motivate them to use digital technologies and the associated development of digital skills. Perhaps these people can also help others overcome their fear of new technologies. In fact, a heterogeneous perception of this issue would mean a fundamentally different potential for the development of the given areas.

This is a specific group because these people must be able to use digital technologies, at least to some extent, as required by their position/profession, because they are 'forced' to do so. Few of them can afford to ignore the digitalisation process. Suppose they cannot use digital technologies themselves, particularly for small businessmen/farmers in their older age. In that case, they are helped by family members (children, wife).

The current digitalisation is at the limits of my abilities...

(male, business, 61–70 years old, secondary education completed by a school leaving exam, poorly-equipped region)

The interviews also show that women are generally more open to digital technologies, but their level of education may influence this. Women use social networks more than men. Women are more willing to continue learning, not only for professional reasons (Olsson & Bernhard, 2021). Especially for older age groups, the motivation is to keep in touch (Arroyo, 2020), sometimes over long distances, with children and grandchildren, or with extended family and friends (Skype, Facebook, Instagram, WhatsApp, etc.). During the COVID-19 pandemic, older age groups, especially women, were "forced" to learn how to use e-shops and internet banking. Women also appreciate the time saved by digital technologies and the flexibility in work matters (Rajahonka & Villman, 2019).

Not all respondents know the opportunities that digital technologies can bring in terms of older people's participation in social activities in the community (Fischl et al., 2020). Still, all respondents know the challenges related to their digital skills. Older people are often limited by the fear of doing something wrong and of doing something that cannot be undone. This is confirmed by Larsson and Viitaoja (2019), according to whom technophobia is particularly prevalent among older people. However, in the context of the digitisation of public administration (and indeed of life in general), efforts should be made to develop the skills of older people so that they can interact with public administration in a relevant way. On the other hand, however, it is not only age that matters, but also other factors such as education, income, pre-retirement employment, and seniors' overall access to digital technologies (Elena-Bucea et al., 2021; Larsson & Viitaoja, 2019). Even seniors can belong to a group of residents that Zerrer and Sept (2020) call 'smart villagers.'

The respondents' opinions did not differ significantly regarding ICT infrastructure equipment or gender. Even after more than 20 years, it is possible to agree with Chapman and Slaymaker (2002), that there is a need to close the gap in the ICT infrastructure equipment of rural areas and, in particular, to develop the population's digital skills. This will enable them to be more included in the digitalisation process (Salemink et al., 2017) and take advantage of the opportunities that digitalisation offers in their professional and private lives.

6. Conclusion

This paper focused on the perception of the digitalisation process, its benefits, and its potential by men and women as rural managers/leaders in ten selected rural areas in five regions of the Czech Republic.

These are one predominantly suburban region (the Central Bohemia Region), two intermediate regions (the Olomoucky Region, the Zlinsky Region), and two predominantly rural regions (the South Bohemia Region, the Vysocina Region). The selected rural regions cover the territory of the LAGs and, based on the Czech Telecommunications Office data, were divided into poorly-equipped and well-equipped regions.

The results of this robust empirical research show that there are only slight differences in the views of men and women, who perceive both the potential and the opportunities, as well as the barriers and threats associated with the digitalisation process. All respondents know the need for an adequate infrastructure of sufficient quality and capacity, which is not yet evenly distributed across the Czech Republic. They attach great importance to digital literacy and skills, which is a significant barrier to exploiting the potential of digitalisation. It can become a problem in accessing public administration and public services. This is particularly relevant for the older generation. The results of the research also show that women in rural areas of the Czech Republic are aware of the opportunities offered by digitalisation and are able to make use of the digital technologies available to them, which was already evident during the period of the COVID-19 pandemic. Therefore, it is necessary to create conditions for developing IT skills of all inhabitants of all generations, regardless of gender, in parallel with the development of the ICT infrastructure.

An important conclusion of the analyses carried out is that the perception and acceptance of ICT opportunities in the digitalisation process do not differ significantly within the various rural areas studied, not even from a gender perspective. In other words, the representatives of the addressed rural actors are fully aware of the possibilities they can or could use. The only limiting factor is the quality of the ICT infrastructure, the varying availability of which affects the level of development and use of digital skills. However, empirical research has shown that women with higher levels of education are more open to digital technologies than men. Overall, it can be emphasised that the availability of quality ICT infrastructure, which is perceived as a fundamental factor regardless of gender, is still a limiting factor for more intensive use of digital technologies.

A specific limitation of the results of this study is the nature of the respondent group, which consisted of representatives from local government, business and NGOs. In terms of age structure, the respondents were predominantly in the 41–60 age group, with a predominance of those with a university education. These respondents, as rural leaders, represent the potential bearers of the development of particular rural areas, and therefore these people use or have to use IT technologies in their working lives. For this reason, they mostly perceive the possibilities of digitalisation as positive (i.e., saving time, simplifying and speeding up processes, flexibility, etc.). On the other hand, they are aware of the loss of personal contacts and the weakening of social ties.

In future research on digitisation in rural areas, it would be advisable to expand the group of respondents with a view to greater involvement of the general rural population, with representation of all age categories and educational levels, and to compare the given results of the empirical research with the results of the perception of digitisation opportunities by representatives of rural stakeholder leaders in the given areas. Such research would further expand the knowledge base and strengthen the interpretation of the degree of influence of a wide range of factors on the ability of the rural population to adequately participate in the digitisation process.

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