RURAL AREAS' DIGITAL COMPETITIVENESS: A COMPARATIVE ANALYSIS

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Abstract

The depopulation of rural areas due to the impossibility of employment and earning in urban areas has led to a significant imbalance in which urban areas have become overcrowded and rural areas devastated. The European Union has recognized such a direction as unsustainable and has decided to dedicate itself to the development of rural areas. In this paper, particular emphasis is placed on the development through a digital transformation of the community by improving the infrastructure and the digital skills of the population from rural areas. In this paper, using Eurostat and Eurobarometer data, the authors compare digital infrastructures and skills by different sociodemographic characteristics in Croatia, Austria, Slovenia, Hungary, Denmark, Finland, and Ireland with an average of 27 EU member states. Based on this comparison, an analysis of the Republic of Croatia's digital competitiveness with EU

countries in the region and demographically similar countries was conducted to specify which advantages to emphasize further and which shortcomings to correct. This paper aims to indicate which countries should be a benchmark for Croatia in the digital transformation of rural areas and whom to encourage to be the bearers of change in smart rural communities.

Keywords: *digital competitiveness, rural development, digitalization, demographic revitalization*

JEL Classification: *O18, R59*

1. INTRODUCTORY CONSIDERATIONS

Leaving the spatial component of development spontaneous was a fundamental feature of Croatia in the second half of the twentieth century, which resulted in a rapid and spatially uncontrolled process of deagrarization and deruralization, accompanied by rapid urbanization. Apart from Croatia, several former socialist countries in Europe have experienced a similar process. In wealthier western nations where rural-urban migration has practically ceased and the rural population has reduced dramatically, there has been no severe labor shortage since technical innovation has compensated for it, i.e., higher productivity. Compared to Western nations, rural populations in Eastern European countries that spent the majority of the twentieth century under socialism dropped far more rapidly due to a specific socialist model of industrialization and urbanization. During the most intense deagrarization and migration from the rural areas, existing regional and micro-regional cities did not have enough jobs outside of agriculture to keep people from leaving (Grizelj & Akrap, 2011).

According to the International Organization for Migration (IOM, 2020), the vast majority of migration happens within a country of origin, most frequently from rural to urban areas, with only a small percentage of the population migrating between countries. This smaller percentage is still essential because of more than 270 million international migrants in 2019. Most of them are of working age, with 74% between 18 and 64. Thus, individuals migrate most frequently to pursue jobs and opportunities for a better life. This phenomenon is not limited to rural areas, as the issue of migration is not purely geographical. Emigration from rural areas results in urban overcrowding, which creates problems with public transportation, traffic problems, air pollution and rising hous-

ing costs, and unplanned construction due to solid demand for housing. These are a few of the challenges that urban areas face due to direct migration (Garcia Valvadia, 2018). Urban transition, or urbanization, is the most significant trend in migration, as defined by the United Nations (2018) as the migration of people from areas where the primary sector dominates the economy to areas where the industrial (secondary) and commercial (tertiary) sectors dominate. South America is the most urbanized continent globally, with 81% of the population in cities, followed by Europe with 74%, Africa with 42%, and Asia with 50%. However, the UN forecasts that by 2050, Africa will triple its urban population, and Asia will increase by 61%, indicating a rising tendency.

Furthermore, the UN (2018) projects that by 2030, 60% of the world's population will live in urban areas and has encouraged states to establish strategies for population decentralization from large urban areas to smaller urban areas, suburban areas, or rural areas. A more considerable emphasis is placed on developing a rural development strategy to decrease rural-urban migration, endorsed by 75% of UN officials. One of these methods is undoubtedly revitalizing rural communities with digital technologies, and this section focuses specifically on the European Union's strategy.

2. DIGITALIZATION IN THE EUROPEAN UNION

Digital technologies are transforming how people communicate, live, and work, and the European Union is working to accelerate this transformation further, aided by the COVID-19 pandemic. Digitization has the potential to increase job creation, improve education, boost competitiveness and innovation, and improve European Union citizens' living standards (European Council, 2020). At the Special European Council meeting held on October 1-2, 2020, EU leaders discussed the digital transition. Digital technologies are transforming how people communicate, live, and work, and the European Union is working to accelerate this transformation further, aided by the COVID-19 pandemic. Digitization has the potential to increase job creation, improve education, boost competitiveness and innovation, and improve European Union citizens' living standards (European Council, 2020). At the extraordinary European Council meeting held on October 1-2, 2020, EU leaders discussed the digital transition. As a critical pillar of the EU's recovery from COVID-19, digitalization is crucial for fostering new forms of growth and strengthening

the EU's resilience. At the session mentioned above, the European Council's leaders urged the European Commission to present a comprehensive digital compass by March 2021, outlining the European Union's concrete digital ambitions for 2030. They agreed that at least 20% of the Recovery and Resilience Mechanism's total funding of 672.5 billion euros should be available for digital transformation. The European Union wants to use these funds to help achieve the following goals (European Council, 2020):

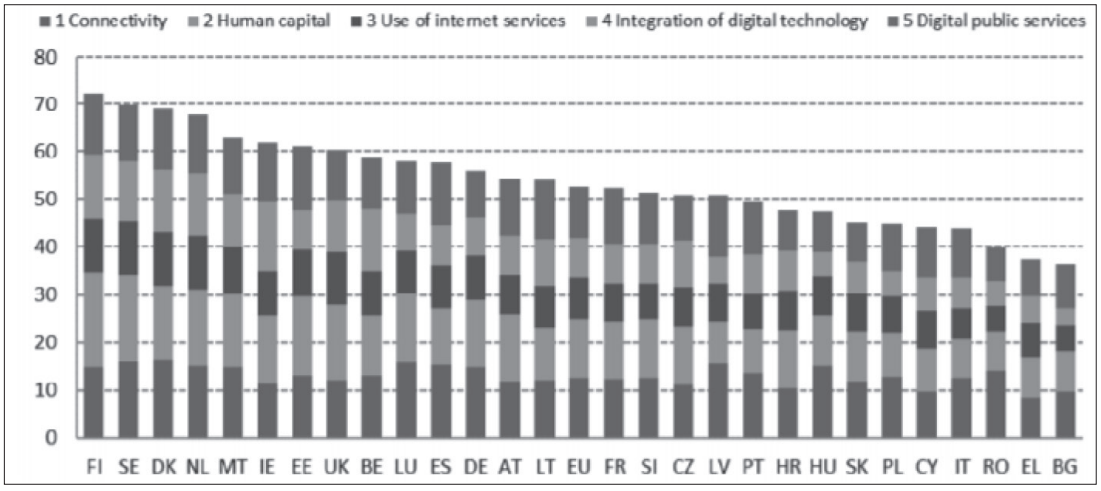
- Fostering the European development of the next generation of digital technologies, including supercomputers, quantum computing, blockchain, and human-centric artificial intelligence,
- Developing capacities in strategic digital value chains, especially microprocessors,
- Accelerating the deployment of very high capacity and secure network infrastructures – including fiber and 5G – all over the EU,
- Enhancing the EU's ability to protect itself against cyber threats,
- unleashing the full potential of digital technologies to achieve the EU's ambitious environmental and climate action objectives,
- upgrading digital capacities in education systems.

According to the European Commission's report (2020a), which analyzed the Digital Economy and Society Index for 2020 (the Digital Economy and Society Index), which monitors the evolution of digital competitiveness in the European Union, some countries, such as Finland, Sweden, the Netherlands, and Denmark, have made significant progress in this area, while others, such as Croatia, Slovakia, Cyprus, Hungary, Italy, Poland, Greece, Romania, and Bulgaria, have lagged, as shown in Graph 1. The index, as mentioned above, consider connectivity, human capital, Internet use, digital technology integration, and digital public services (from bottom to top of the chart). It is worth noting that the most significant European economies are not digital leaders. However, there are initiatives aimed at advancing the digital transition, and Germany, as the most significant European economy, recently presented measures in artificial intelligence, blockchain, cyber security, and related areas. A similar scenario exists in Italy, where the government unveiled the "Italia 2025" program. This five-year plan focuses on digitalization and innovation as part of the country's " structural and radical change" (European Commission, 2020a). For the Migration Strategy Group in the International Cooperation and Development Program in 2020, Bither and Ziebarth (2020) presented how artificial intelligence

and digital technology development can help in migration policy and how new knowledge and technologies can predict migration as well as help in accepting migrants by knowing their digital identity.

Thus, the European Union pursues sustainable development by focusing on the development of digital technologies that will help expand employment opportunities outside of major centers of power, where people migrate from less developed to more developed and more prosperous countries, or within countries where people migrate from rural areas to urban areas with a higher concentration of commercial and industrial activities. Figure 1 can be viewed in a way that connectivity has the lowest value and digital public services have the highest value.

Figure 1. EU Digital Economy and Society Index, ranking for 2020



Source: European Commission, 2020a

Mergel, Edelmann, and Haug (2019) conducted in-depth interviews with experts from public sectors and authorities working in digital transition to explore the factors that led to the need for change and digital transformation. According to their research results, these are primarily technological advancements and, to a lesser extent, business entities and citizens, with politics having the most negligible impact. Because the business environment and technological advancements have impacted citizens' lifestyles and business practices, the public sector must monitor these social and technological changes and digitize their processes, services, and documents to make life easier for citizens and their business environment more competitive.

Before implementing digital transformation through the digitization of various processes and services, it is necessary to provide society with the appropriate infrastructure and education. The level of digital skills among the European Union's population has increased more slowly over the last four years. According to the European Commission's report (2020b), 85% use the Internet, and 58% have at least basic digital skills. Sociodemographic characteristics strongly influence digital skills, as evidenced by 82% of young people aged 16 to 24, 85% of highly educated students, 68% of employed or self-employed individuals, and 87% of students have at least basic digital skills. By comparison, only 35% of respondents aged 55 to 74 confirmed having at least basic digital skills, compared to 30% of retired people. Thus, in addition to the necessary education on digital skills, particularly for the elderly, it is necessary to develop infrastructure that is not equally developed in urban and rural areas, putting rural areas at a competitive disadvantage.

3. POSITION OF THE REPUBLIC OF CROATIA IN THE EUROPEAN UNION'S DIGITAL COMPETITIVENESS

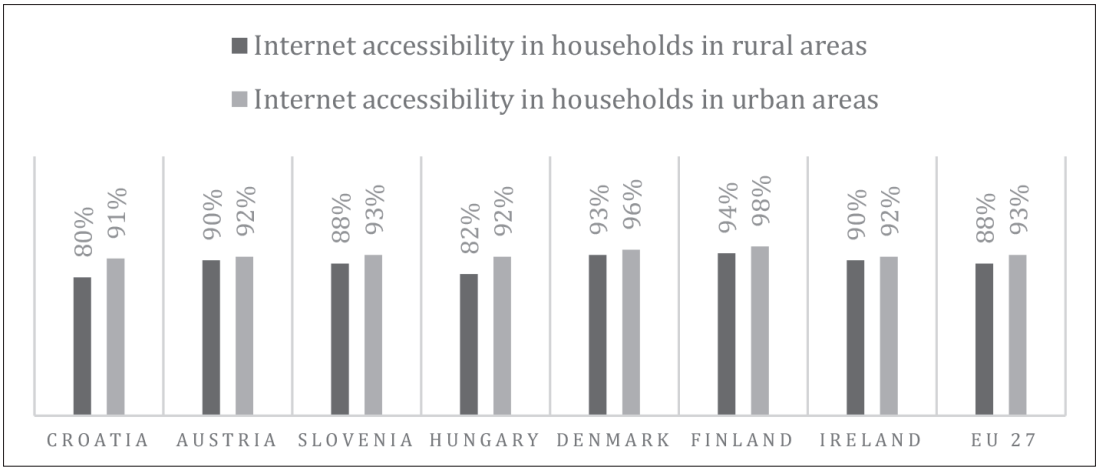
The Republic of Croatia was seriously affected by the 2008 financial crisis, with devastating consequences felt over the next decade. Joining the European Union in 2013 created opportunities for many unemployed people to find work in one of the EU's member states. Demographers estimate that approximately 350,000 people have migrated from Croatia to the EU since joining the EU. German statistics indicate that over 150,000 Croats have migrated to Germany in just three years (2016, 2017, and 2018) (Jurasi, 2020). According to demographer Živić (2019) of the Ivo Pilar Institute, Slavonia, the Republic of Croatia's most agriculturally developed region, lost 105,000 inhabitants between 2011 and 2017, and negative projections indicate that by 2050, the proportion of youth in Slavonia will fall to 10% to 15%. Thus, the Republic of Croatia's example demonstrates how negative trends contribute to rural areas' economic weakness and that reversing this trend requires investment in rural infrastructure and education.

To be digitally competitive, the country must work to close the digital divide between rural and urban areas in terms of Internet access and close the digital skills gap among the population, which is strongly related to sociodemographic

characteristics. Numerous indicators demonstrate population differences between rural and urban areas and between elderly and young populations. Thus, in the graphs below, we can see comparisons of the Republic of Croatia to several other countries, including Austria, Slovenia, Hungary, Denmark, Finland, and Ireland, chosen for comparison in this study based on several of their characteristics. Austria, Slovenia, and Hungary are countries geographically adjacent to the Republic of Croatia, whereas Denmark, Finland, and Ireland are EU member states with a population size comparable to Croatia. Croatia has a population of 4 million people, and 42.45 percent of them live in rural areas, Denmark has 5.84 million people where 11.88 percent of them live in rural areas, Finland has 5.53 million people where 14.48 percent of them live in rural areas, Ireland has 5 million people where 36.35 percent of them live in rural areas, Slovenia has 2.1 million where 44.88 percent of them live in rural areas, Austria has 8.9 million where 41.25 percent of them live in rural areas, and Hungary has 9.7 million people where 28.06 percent of them live in rural areas (EU, 2022; World Bank, 2020). The point is to show the similarities and differences between these countries. In addition to understanding them, it is necessary to mention each country's economic development, not just their population in urban or rural areas. In this case, the indicator of economic development will be expressed in GDP per capita: Croatia has 13480, Hungary has 13660, Slovenia has 22260, EU27 has 27800, Austria has 36820, Finland has 37400, Denmark has 50200, and Ireland has 70920 (Eurostat, 2021). The above figures are essential to consider for a clearer understanding of this paper.

For instance, in Figure 2, we see the disparities in Internet access between rural and urban households in the countries studied. As can be seen, all these countries' urban areas have a well-developed network, with over 90% of households having access, and the same is true for the average of the 27 EU member states. Significant differences exist only when rural areas are compared to urban areas, where the average difference between urban and rural areas in the 27 EU member states is 5%. The same is true in Slovenia; in economically developed countries such as Finland, Ireland, Denmark, or Austria, the difference is as much as 3%; in Croatia and Hungary, the difference is quite significant, accounting for more than 10% of households. Additionally, the Republic of Croatia is the weakest of the compared countries regarding Internet access in rural homes.

Figure 2. Comparison of rural and urban areas by Internet accessibility in households

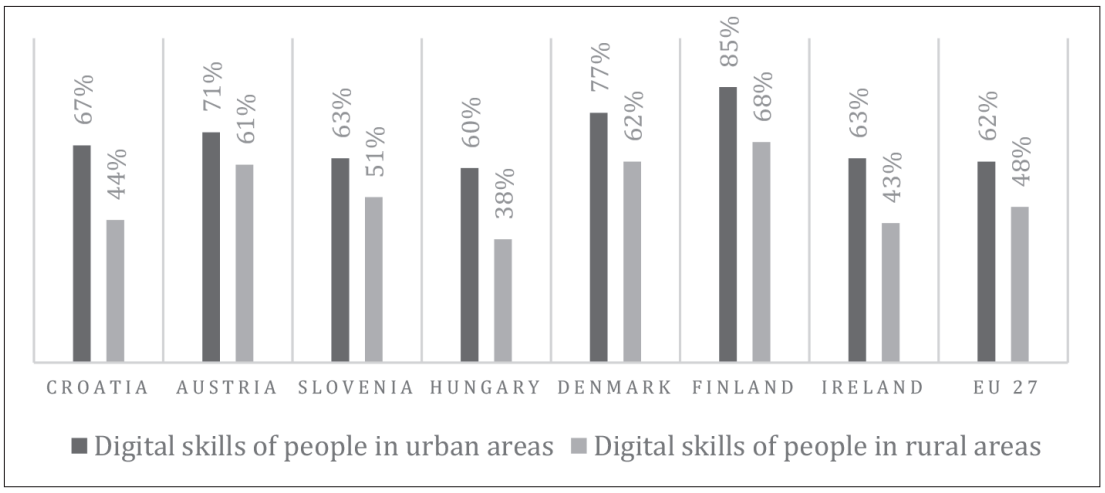


Source: Eurostat, 2020a

A similar situation is displayed in Figure 3, which compares rural and urban residents' digital skills. The rural population of the Republic of Croatia ranks among the lowest in terms of digital skills compared to the other countries, but they are not the worst; rural populations in Hungary and Ireland have lower levels of digital skills. However, more significant than Croatia's comparison to other countries is the gap highlighted in Figure 4, which shows that the average digital skills of the EU-27's expopulation and urban areas are 14% higher than the average digital skills of rural populations. It is worth noting that, while a higher percentage of rural Finland's population has basic digital skills than urban Croatia's, the same population in urban Croatia is 5% higher than the EU average.

Croatia has two-thirds of its urban population with at least basic digital skills, compared to 63%, 60%, and 63% in Slovenia, Hungary, and Ireland. The issue is that rural populations suffer from a huge gap. 44% of them have at least basic digital skills, which is slightly higher than the EU-27 average of 48% but is significantly higher than the rural population in Finland (68%), Denmark (62%), and Austria (61%).

Figure 3. Comparison of digital skills in rural and urban areas



Source: Eurostat, 2020b

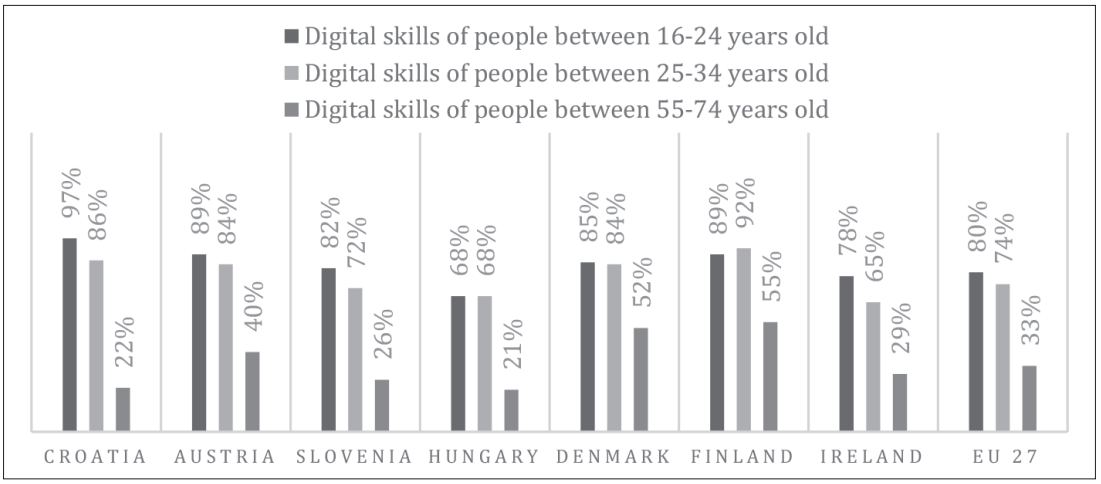
However, the rural-urban divide is not the only sociodemographic factor affecting digital competitiveness. It is undoubtedly necessary to compare people's digital skills across their ages and their levels of education. Thus, Figure 4 compares the Republic of Croatia, Austria, Slovenia, Hungary, Denmark, Finland, and Ireland regarding their digital skills populations aged 16 to 24, 25 to 34, and 55 to 74. Thus, Figure 5 shows that Croatian youth aged 16 to 24 are the most digitally skilled in the European Union (97 %), performing up to 17% better than the EU average or up to 19% better than Ireland, a country with a similar population to Croatia but which is home to the most prominent digital age companies such as Facebook, Google, LinkedIn, Apple, Paypal, and Airbnb (Enger Lin, 2021). When neighboring countries are considered, 89% of Austrian young people aged 16 to 24 possess at least basic digital skills, compared to 82% in Slovenia and 68% in Hungary.

Additionally, 86% of Croatian youth between the ages of 25 and 34 possess at least basic digital skills. Only Finland, with 92%, outperforms the other countries, while Austria and Denmark, with 84%, are relatively close to Croatia. Slovenia, with 72%, Hungary, with 68%, and the European Union average of 74%, all scored lower than the Republic of Croatia, indicating that young people in Croatia have above-average digital skills. These generations hold the potential for digital competitiveness. The issue arises when the older generation is considered, i.e., the population aged 55 to 74. Croatia ranks among the lowest in Europe, 11 % below the EU average and even 33 % lower than Finland. It is important to emphasize that while the population of that age is not a generator

of change or a carrier of digital transformation, it is a significant factor in significant technological changes that affect society and the life habits of all, including those in old age.

Between the ages of 55 and 74, just 22% of the Croatian population has at least rudimentary digital skills, compared to 40% in Austria, 26% in Slovenia, 21% in Hungary, 29% in Ireland, 33% in the EU, 52% in Denmark, and up to 55% in Finland (Eurostat, 2020b).

Figure 4. Comparison of digital skills depending on age

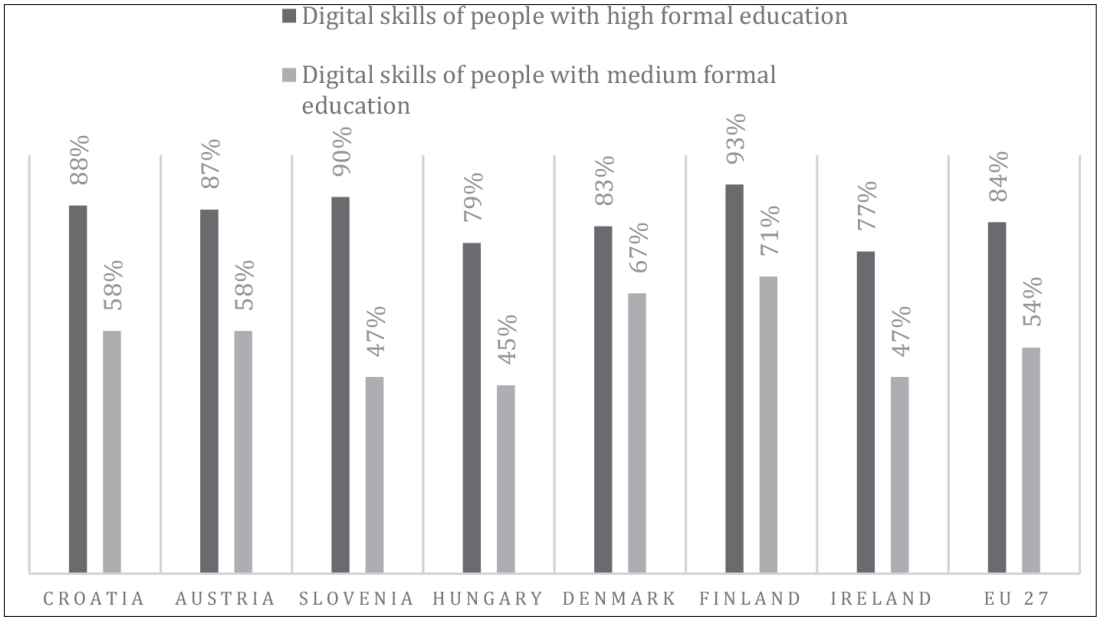


Source: Eurostat, 2020b

While it has been shown that the digital divide between the elderly and the young is greater than the divide between rural and urban populations, it is equally important to show how much education influences digital skills. Figure 5 compares the digital skills of the highly educated and the secondary education populations, with an average of 54% of the secondary education population having at least basic digital skills and 84% of the highly educated population having at least basic digital skills, a difference of 30%. The situation is very similar in Croatia, where Croatian education outperforms the European Union average in digital skills development. The Croatian population outperforms the EU 27 average in both categories by 4%. In Slovenia, where 87% of highly educated adults possess at least basic digital skills, and only 47% of highly educated adults possess the same digital skills, Ireland and Hungary performed worse in both groups than the European Union average. In contrast, Finland performed best in both groups. Denmark's results are intriguing, as they fall one percent-

age point short of the EU average but have the smallest digital divide between secondary and higher education (Eurostat, 2020b).

Figure 5. Comparison of digital skills depending on the level of education

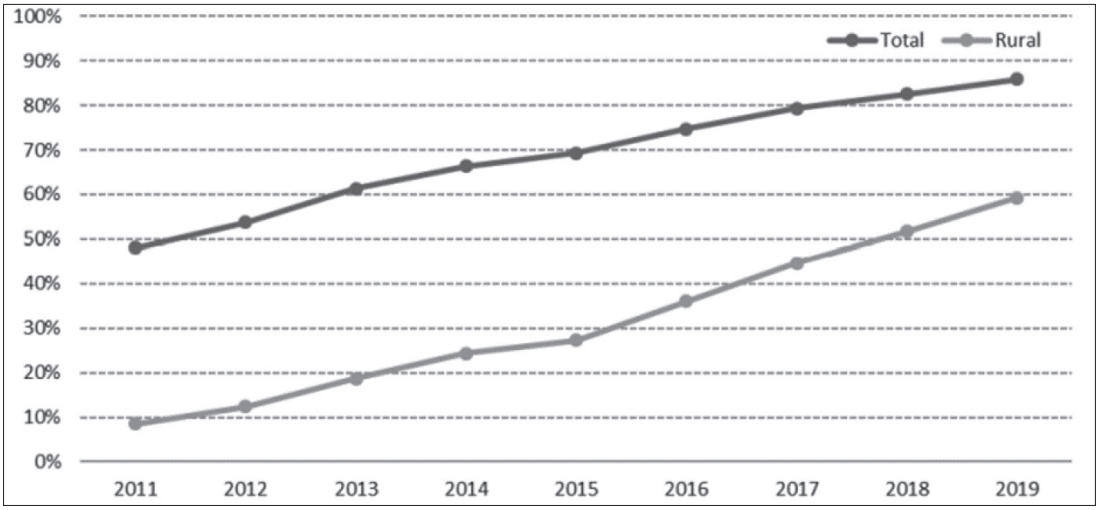


Source: Eurostat, 2020b

Figure 6 depicts the gap in Europe's digital development region, gradually closing. Specifically, rural areas are significantly less developed in terms of infrastructure quality, and Graph 6 illustrates the development of the Next Generation Access Network (NGA), which is a network built on optical fiber infrastructure that provides a broad range of high-speed telecommunications capacity, called the next-generation network in Croatia. According to the European Commission (2020a), internet availability is no longer an issue almost anywhere in Europe. At least a 4G network covers 99.4% of the area, and 90% of the area has access to fixed Internet, even in rural areas. Thus, the modern era's challenge is to provide high-speed internet coverage to rural areas to compete in the ICT sector and all other jobs reliant on quality network infrastructure. The coverage of NGA technologies continues to expand each year. Figure 6 shows that in 2019, access to the following generation network was available to 86% of total EU households but only 59% of rural households. However, the situation differs from 2011, when only 9% of rural households had access to next-generation networks, and the countries that lag in this regard are Finland, Lithuania, Bulgaria, Poland, and Croatia; however, excellent results have not

been shown by more developed countries such as France and Sweden, which, along with these countries, are at the bottom of the column in terms of the development of a high-capacity Internet. The growth of NGA network coverage is represented in graph 6, with the line below representing next-generation network coverage in rural areas.

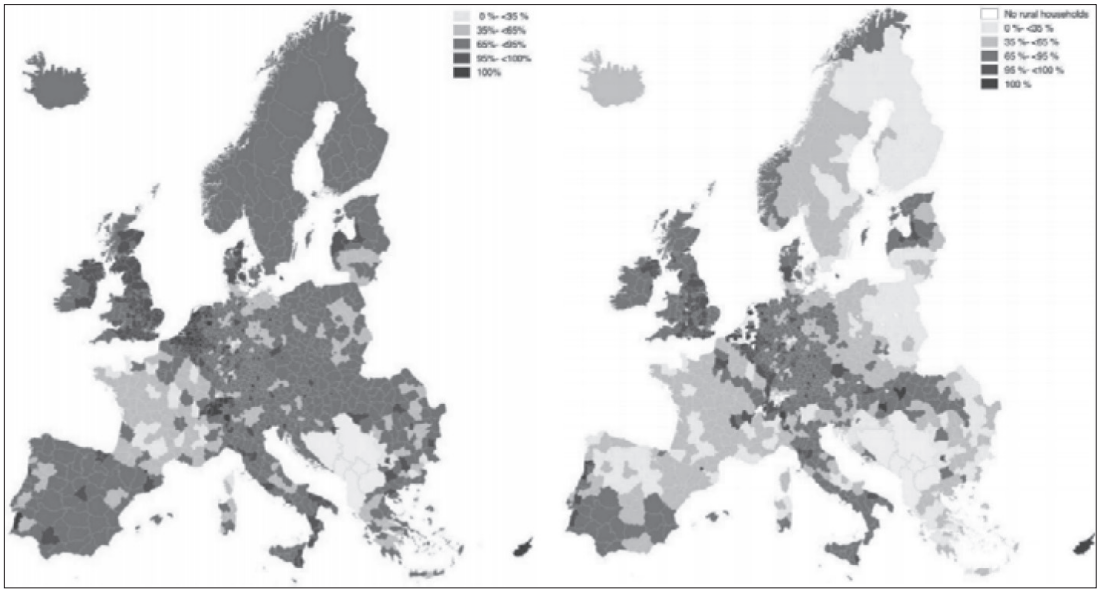
Figure 6. Next-Generation Network Coverage (NGA) (% of EU households), 2011 - 2019



Source: European Commission, 2020a

To illustrate the extent of the NGA coverage gap in Figure 7, the comparison of regions across the European Union is shown visually. According to the European Commission (2020a), broadband networks using NGA technologies are available to more than 90% of households in 13 European Union countries.

Figure 7. Differences in the next generation's broadband network coverage compared to overall coverage and availability in rural areas of the European Union (% of households), 2019



Source: European Commission, 2020a

On the right side of Figure 7, the so-called "white areas of next-generation network coverage" can be seen. These areas are frequently mentioned in funding requests for the construction of the NGA network. For instance, the Ministry of Regional Development and European Union Funds (2019) announced that the Republic of Croatia, as one of the countries at the back of development in terms of coverage of the next-generation network of the Operational Program Competitiveness and Cohesion, has received an invitation co-financed by EU grants totaling 1.1 billion HRK in order to increase the availability of broadband Internet, which, according to the competent ministry, is one of the critical preconditions for preventing the digital gap, encouraging the development of less developed areas (white areas) and increasing employment in this area.

The Croatian Rural Parliament identified broadband mobile and fixed connections as a crucial component of rural development. In order to maximize opportunities for the development of smart villages and cities for economic and social development, these networks must be fully accessible, as guaranteed by the Cork Declaration 2.0 adopted in 2016 (HMRR, 2020).

The European Committee of the Regions, which is responsible for revitalizing rural areas and promoting the development of smart villages, regrets that

progress in this area has been slow and that significant disparities remain, as evident by the fact that 9.1 million EU households lacked access to broadband Internet in 2012, with over 90% of these households located in rural areas.

They emphasize the importance of closing the digital gap as soon as possible and recommend recognizing Internet access as a public good at the EU level, allowing the application of the concepts of "smart villages" and "smart rural areas" (Official Journal of the European Union, 2018).

4. ANALYSIS BEHIND THE PROBLEM OF DIGITAL COMPETITIVENESS

This paper uses an adjusted Eurobarometer 93.2 methodology carried out in August and September 2020 in 27 European Union member countries and the United Kingdom. For this article, seven countries were chosen, with a total sample size of 7309 respondents representing various social and demographic groups, and primary raw data access enabled through the Gesis database (2020).

Seven selected countries from the European Union are Croatia (n=1013), Austria (n=994), Slovenia (n=972), Hungary (n=1040), Denmark (n=952), Finland (n=1239), and Ireland (n=1239). Of the total respondents, 46.1% were male and 53.9% were female, 37.5% lived in rural areas, 31.8% in suburns and towns, and 30.7% of them lived in cities. Most of the respondents, 52.1% of them, are from the middle class of society, 21.1% are from the working class of society, 14.4% are from the lower middle class, 9.6% of them are from the upper-middle class of society, and 1.1% of them represent themselves as the higher class of society. Respondents were divided into age groups, 2.6% of them are under the age of 18, 5.6% of them are 18-24 years old, 11.7% of them are 25-34 years old, 16.6% of them are 35-44 years old, 18.9% of them are 45-54 years old, 18.3% of them 55-64 years old, and 26.4% are older than 65 years old.

A questionnaire in this Eurobarometer survey measures perceptions of job opportunities, educational facilities, and high-speed Internet in rural areas on a scale of 1 to 4: (1) very bad, (2) reasonably bad, (3) reasonably good, (4) very good, but measures perceptions of development in rural areas on a scale of 1 to 3: (1) got worse, (2) stayed about the same, and (3) improved. A detailed analysis of the data is provided below.

Leven's test determines if these seven samples have equal variances. The *p*-value is .000, so for the analysis of results in Table 1, Table 2, and Table 3, the results of the Games-Howell test of the post hoc analysis approach for performing multiple comparisons are used. Statistically significant differences were found between seven compared countries. Results of an analysis of variance test (ANOVA) show that respondents from Croatia perceive job opportunities in rural areas as significantly lower than respondents from six other countries. Job opportunities usually tend to be positively associated with job opportunities (Khan, 2007). If it is taken into account that Croatia has the lowest GDP per capita of all observed countries and that Croatia has one of the highest percentages of the population in rural areas, the results are expected.

Table 1. Results of ANOVA on the perception of job opportunities in rural areas

Country	Mean	Std. Deviation	ANOVA
Croatia	2.01	.854	F= 50,345
Austria	2.52	.868	p<0.01
Slovenia	2.28	.816	df=6
Hungary	2.38	.876	
Denmark	2.49	.732	
Finland	2.19	.639	
Ireland	2.34	.779	

Source: Created by authors based on Eurobarometer 93.2

According to Table 2., Croatia also has the lowest mean in these results, indicating that respondents from Croatia have a lower opinion of educational facilities in Croatia than others. However, on this scale of 1 to 4, the perception of educational facilities in Croatia is the only one in the comparison that is closer to fairly bad than reasonably good. According to an ANOVA test, respondents from Croatia perceive educational facilities in rural areas to be significantly lower than those from Ireland, Austria, Hungary, and Slovenia but not significantly different from Denmark and Finland. These results contradict those in Graph 3, which shows people's digital skills in rural and urban areas. It was expected that a more positive perception of educational facilities in rural areas would be connected somehow, but this was not the case. For example, the World Economic Forum (2020) ranks Finland's educational system as one of the best in the world. Graph 3 indicates that their digital skills are the high-

est among compared countries. However, Eurobarometer data indicates that perceptions of educational facilities are not as high as might be expected, which may be since 68.3% of Finland is sparsely populated rural areas (Ala-Karvia & Terama, 2018). However, it is devastating that Croatia's neighbors, including Slovenia, Austria, and Hungary, have significantly more positive perceptions of rural educational facilities.

Table 2. Results of ANOVA on the perception of educational facilities in rural areas

Country	Mean	Std. Deviation	ANOVA
Croatia	2.45	.775	F= 39,707
Austria	2.75	.798	p<0.01
Slovenia	2.74	.804	df=6
Hungary	2.76	.782	
Denmark	2.53	.804	
Finland	2.54	.743	
Ireland	3.00	.723	

Source: Created by authors based on Eurobarometer 93.2

Table 3. illustrates rural residents' perceptions of high-speed Internet, and Croatia is not the worst on this score. Ireland has the lowest perception of high-speed Internet, which is surprising given US technology companies such as Google, Microsoft, Dell, Intel, IBM, Facebook, LinkedIn, Twitter, HubSpot, and PayPal (Smart MBS, 2020). While Graph 2 indicates that 92% of rural households in Ireland have access to the Internet, their perception of high-speed Internet is not great. The ANOVA test reveals statistically significant differences between the compared countries. Respondents from Croatia rated their country's high-speed Internet in rural areas significantly lower than respondents from Finland, Hungary, and Slovenia but significantly higher than respondents from Ireland. The map in Figure 1 compares high-speed internet access in Europe to overall internet coverage. The differences are quite noticeable, particularly on the right side of the figure, which represents high-speed internet infrastructure in urban and rural areas. While the overall internet coverage in the countries compared in this study is very good, high-speed internet coverage is slightly lower. Table 3 presents a different perspective, referring to the perception of high-speed Internet. It provided some unexpected findings,

with Hungarians and Slovenians evaluating their rural high-speed infrastructure significantly better than people from Denmark and Ireland.

Table 3. Results of ANOVA on the perception of high-speed Internet in rural areas

Country	Mean	Std. Deviation	ANOVA
Croatia	2.66	.856	F= 164,200
Austria	2.68	.840	p<0.01
Slovenia	3.07	.798	df=6
Hungary	3.21	.733	
Denmark	2.60	.850	
Finland	2.99	.711	
Ireland	2.29	.884	

Source: Created by authors based on Eurobarometer 93.2

What is evident from the comparison is that the Eurostat (2020) data shows different results than the Eurobarometer 93.2 (2020), mainly because it is based on the perception of respondents and the different methodology of the research. However, it is exciting to compare these data. Although perceptions of Finland's educational facilities in rural areas are low, they have the best digital skills across almost all categories, including older adults, people with higher education, and people with a medium education, in both rural and urban areas, and they are widely recognized as a country with an excellent educational system. When discussing respondents' perceptions, it is essential to note that the country's geography can influence that perception. Northern Finland, for example, is dominantly rural, which may explain why educational facilities are not perceived as well as those in urban areas.

Another example could be the perception of job opportunities in rural areas where Austria performs best, with the logical explanation being that some rural areas in Austria are highly dependent on tourism. A closer analysis of the data shows that the European Union's educational system prepares young generations and others with higher education for digitalization and modern needs. There is much space for improvement in the situation with job opportunities in rural areas because of the untapped potential of digitalization which is still undeveloped in many rural areas, and young people migrated to more urban areas because of it.

5. LIMITATIONS AND FUTURE RESEARCH

Due to the variety of significant research characteristics, the presented research findings and conclusions are limited. The study is based on original but previously obtained data, which could be considered primary data but are technically secondary. There was no way to control or influence the survey method's quality or form or the research scales used, considering the circumstances. Another essential factor to consider when evaluating research limitations is that most research instruments focus on respondents' perceptions of the study topic and related issues. Their perceived values may differ from the actual values shown in Chapter 2.

Regarding respondents' perceptions, some other factors were not considered, such as the difference in the level of development between rural Austria and rural Finland, for example. There are a few essential suggestions for future research in this or close directions and scopes. Some of the essential questions to explore are developing intelligent communities in rural areas and digitally connected communities that make life easier for all community members. The limited data at our disposal did not provide clear answers to the connection between digital infrastructure and digital skills of the population with ICT-related job opportunities in rural areas. If a correlation is found between these factors, an essential question for rural communities is whether this prevents young people from migrating to urban and more developed areas.

6. CONCLUSION

NGA network coverage, good education, and high digital skills were positively associated with high-speed internet access, job opportunities in rural areas, and educational facilities in rural areas. However, it turned out that they are not that associated. It turned out that the country's economic development has a stronger connection with these categories, or at least on the perception of the same. High-speed Internet in this context seems to be an essential part of digital competitiveness but not crucial. Much more important seems to be education for all parts of society, from senior citizens to people with lower education, people from non-IT sectors, and people from all parts. Rural areas do not have as many opportunities as urban areas, but urbanization of this kind is not sustainable. Rural areas must keep up with the development of ICT infrastructure, investing in education programs to improve digital skills for everyone and

to achieve sustainable growth with intelligent communities where digitalization can improve many aspects of lives in rural communities. The comparison of Croatia, Slovenia, Hungary, Ireland, Denmark, and Finland shows that Croatia's digital competitiveness in rural areas is poor and lower than the European average and many indicators of development, including GDP per capita. However, there are some reasons for optimism because the younger generations have excellent digital skills, and digital infrastructure is getting better. Concluding this comparison, more robust economic growth will probably lead to better job opportunities in many industries and ICT-related industries, and less highly educated young people will migrate to urban areas. The conclusion is that investing in rural areas improves the quality of life in these communities. However, it is not enough for such communities to be a driver of international competitiveness. The whole national economy requires strong economic growth, which is reflected in the competitiveness of rural areas.

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