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DEMOGRAPHIC REVITALIZATION OF MONTENEGRIN RURAL AREAS THROUGH THE SMART VILLAGE CONCEPT

SUMMARY

Rural areas are becoming an increasingly important alternative of living and working choice over cities. Limiting factors for the development of rural areas are depopulation and deagrarization. The industrialization that followed World War II conditioned migratory movements from rural to urban areas.

The paper analyses the application of the concept of "smart villages" in rural areas of Montenegro, with special emphasis on demographic revitalization. Based on the analysis of demographic trends in Montenegro, in addition to participation of urban and rural population in the 1955-2020 period, it implies that previous models and strategies did not contribute to a significant demographic revitalization of rural areas.

Application of the "smart village" concept in the region and beyond shows that traditional models of rural community development must be complemented by digital technologies and innovations.

The modern development of Montenegrin rural areas indicates modern communication in preforming the business, along with the use of internet marketing, which, in addition to easier access to information, will contribute to the improvement of the quality of life in general.

Key words: smart village, depopulation, rural areas, digitalization

INTRODUCTION

Smart village is a new concept in the field of EU policy-making. The Cork Declaration of 2016, entitled Better Life in Rural Areas, presented the CAP (Common Agricultural Policy of the EU) plan for more efficient rural development. Motives for launching new models of rural community development, applying the "smart villages" concept, are specifically the responses to depopulation and demographic aging of villages, using modern technologies, improving e-literacy and e-skills of rural residents, aiming at improving the quality of their life and work (Ristić and Bosković, 2020).

European rural areas face the challenges of unemployment and depopulation. Differences exist and depend on the position of the rural area in

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relation to the main urban areas (peri-urban areas, areas well connected to the main urban centres or remote rural periphery), in addition to the geographical position within the European Union. European policies dealing with the promotion of smart villages are as follows: Common Agricultural Policy, Cohesion Policy, Horizon 2020, Digital Union.

Rural areas are large, vast, covering up to 80-85% of national territories. According to the OECD methodology, a community is considered rural if the population density is less than 150 inhabitants per km^2, while a community is considered urban if the population density is higher than 150 inhabitants per km^2. According to the OECD methodology, the entire territory of Montenegro could be considered rural (Ministry of Agriculture and Rural Development, 2019). The contemporary challenge is to connect dimensions of agricultural and rural changes and contribute to socially, ecologically and economically balanced development (Knickel and Rentin, 2000). Multipurpose agriculture could become one of the key economic branches, but it is to be based on knowledge, modern technologies, in order to ensure safe and innovative products while respecting responsible resource management (Ristić, 2016). Sustainable agriculture is gaining in importance and implies the rational use of natural resources (Stojanović, 2016). The essence of sustainable development of rural communities is an improvement of the quality of life of the population and protection of the environment (Pugliese, 2001).

In recent times, it is clear that urban development is increasingly intensive at the global, European and national level. An important factor for the further development of society is development of rural areas. Trends characteristic for rural areas, both globally and in Montenegro, are the following: negative demographic trends, declining number of agricultural holdings, economically conditioned depopulation of rural communities and growing challenges in terms of access to public services, employment opportunities and overcoming the existential issues.

Rural areas incline to closer urban centres, establishing connections related to the satisfaction of basic services: finance, education, health services, trade, entertainment, culture, etc. In this process, "smart villages" are perceived as modern communities, acting proactively on relevant contemporary challenges, in order to find new opportunities for survival and development (Ristić and Bošković, 2020).

The key factors for the development of smart and competitive villages are considered to be: good connections - broadband connection of rural areas, in order to overcome their isolation and increase accessibility; use of modern services; digital market access; farm modernization; diversification of the rural economy and sustainable use of rural resources (Thorpe et all, 2016).

The conceptual boundaries of the smart village are defined on the following assumptions (Visvizi and Lytras, 2018):

a) a village is an ecosystem of limited size,
b) a smart village is conceptually different from the construct "rural area",
c) focus in smart village research is on the rural population,
d) smart village has a emphasised pragmatic orientation in an effort to diagnose the problem and offer a solution

Matter of socio-economic sustainability in the context of a smart village is crucial, as it defines the perspectives and survival of the rural community (Visvizi and Lytras, 2018). Research (Carmen et all, 2018) indicates that farms face major challenges due to lack of sustainability. Smart villages do not refer just to agriculture. In the context of the European Union, the "smart villages" concept refers to rural areas that rely on existing forces and assets, as well as to the development of new opportunities. In smart villages, traditional and new networks and services have been improved through digital, telecommunications technologies, innovation and better use of knowledge, all for the benefit of residents and their businesses (Zavratnik et all, 2018). The smart village enables its residents to use modern technological and social aspects and achievements, while the infrastructure is developed in accordance with the principles of sustainable development (Zavratnik et all, 2018). Carefully formed smart villages will provide a basic framework for the local population to improve their economic and social status, living conditions and thus strengthen their community that will be more flexible to the challenges of the outside world (Srivatsa, 2015).

The area of Montenegro is a basis for the development of the entire population of the country, strengthening the essential purposeful use of spatial potentials, while preserving the diversity of landscapes and biodiversity. Regional specifics are the basis for achieving the local, regional and international identity of Montenegro and its constituent areas. For the creation of smart villages, one should rely on good practices of other countries, yet should take into consideration local and regional differences, yet nevertheless it is vital to improve the quality of life of the rural population (Bocinell et all, 2015). The vitality and development of rural areas largely depends on the availability of public services and infrastructure in rural communities and cities in rural regions. Urban-rural connections are especially pronounced in the context of road and other infrastructure planning. Good road connections and internet access are prerequisites for the technological progress of rural communities (Matković, 2017).

All previous efforts and models of rural development have not significantly contributed to the demographic renewal of rural areas. Human capital is a foundation of the development of rural areas that are of great importance in facing socio-economic, demographic, environmental and other challenges. Montenegro is the first country in the region to adopt a Smart Specialization Strategy for the 2019-2024 period. Agriculture represents a significant place within the Strategy, aimed of strengthening the value chain of organic production and the development of new agricultural products. The set goals provide the

possibility of a new concept of development of "smart villages" through the application of information and communication technology to improve life in them. The new development model can contribute to improving the demographic picture and creating conditions for the return of young people (Smart Specialization Strategy of Montenegro, 2019).

In order for rural areas in Montenegro to be further developed in modern conditions, it is necessary to use human capital effectively, which refers to the level of formal and non-formal education, quality of labour force, development of entrepreneurial spirit and culture, modern way of thinking, etc. Thus, conditions are created for endogenous resources to be used for solving socio-demographic, economic and environmental issues in a modern and innovative way.

The aim of this paper is to point out the importance of revitalization of rural areas, with special emphasis on demographic revitalization, and through the introduction of the concept of "smart villages".

MATERIAL AND METHOD

The paper analyses dynamics and forms of depopulation of rural areas in Montenegro. The official data of the Statistical Office of Montenegro (Monstat) were used in the preparation of the paper, as well as scientific and professional papers that dealt with this issue. Data referring from the Agriculture Census in Montenegro and the Population Census in the period 1948-2011 were used for the analysis. Statistical tables, line and surface graphs were used in order to display the data.

The relative numbers of the structure show the participation of the urban and rural population in Europe and Montenegro in the 1955-2020 period. Dynamic statistical analysis, more precisely, the method of calculating base indices, was also applied. The SMART method[2] was applied to formulate development goals within the concept of "smart village". Methods of description, comparison, analysis and synthesis were used in the paper

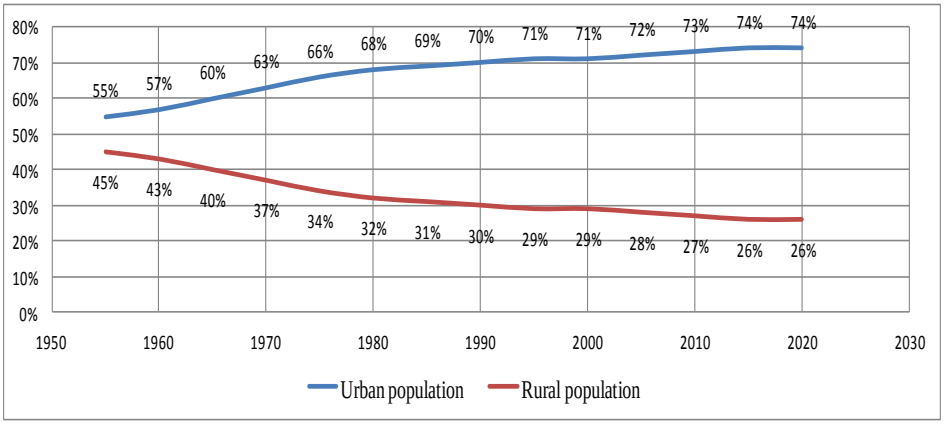
RESULTS AND DISCUSSION

Revitalization of rural areas is one of the key factors in the process of Montenegro's accession to the European Union. Rural areas in Europe are undergoing radical change. In this process, "smart villages" are perceived as modern communities, which act proactively on modern challenges, in order to find opportunities for survival and development (Ristić and Bošković, 2020).

The dynamics of the participation of urban and rural population in Europe in the 1955-2020 period is shown in Chart 1.

[2] The acronym SMART consists of the English words: Specific, Measurable, Achievable, Real, and Timely.

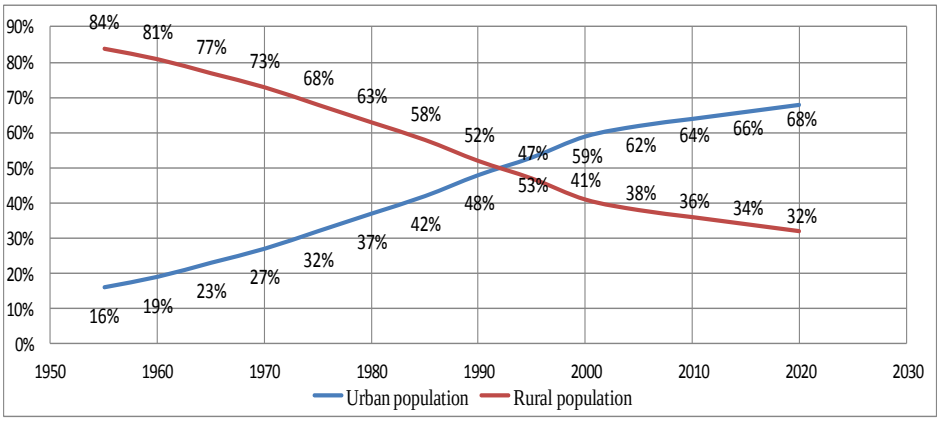
Chart 1. The dynamics of the participation of urban and rural population in Europe in the 1955-2020 period



Source: https://www.worldometers.info/demographics/demographics-of-europe

The dynamics of the participation of urban and rural population in Montenegro in the 1955-2020 period is shown in the Chart 2.

Chart 2. The dynamics of the participation of urban and rural population in Montenegro in the 1955-2020 period



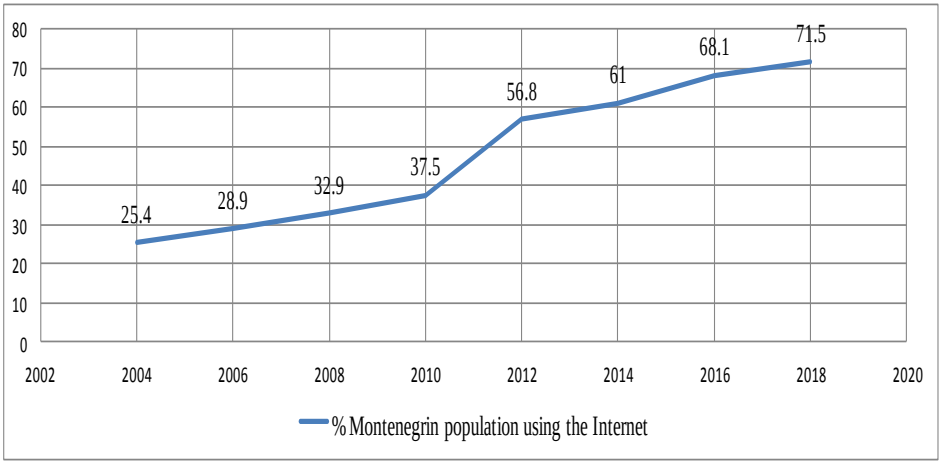
Source: https://www.worldometers.info/demographics/demographics-of-europe

In the 1955-2020 period, there is a tendency to reduce the share of the rural population in the total population, both in Europe and in Montenegro. Complex and intertwined processes of industrialization and urbanization, as well as deagrarization and deruralization have resulted in profound changes (Lukić, 2012). In most EU member states, rural regions have a higher percentage of the elderly population and are exposed to a higher degree of poverty compared to urban areas (European Commission, 2018). The presented demographic situation accelerated the degradation of the local rural world, reduced the standard of living

and the culture of housing. Agricultural land is neglected (Štambuk, 2002). Rural development cannot be based yet only on agriculture. Montenegrin small-scale agriculture survived the Second World War and everyone who had the opportunity left it. The result of leaving the village is an aging agricultural population. Montenegrin urban society developed much faster than rural, believing in its "perfection". The rural area was neglected, therefore schools and clinics were easily closed, there was no rural cultural activity, etc. That is reason why the revitalization of the village today is not just a return to agriculture, but represents the creation of a new social context that relies on the population. Human resources are the main driver of economic development because labour productivity depends on them (Zjalić, 2009, Rakić, 2006). Living conditions in rural areas are very important for the return of people. It is not the same to live in a village, which is about 30 minutes away from the city, and in a remote rural area, which has been cut off by snow for several months. UNDP researches in Montenegro show that the pattern of employment in villages is similar to that in nearby cities, while remote rural areas are much more dependent on agriculture, forestry and etc. (UNDP, 2013). The difficult access of the rural population to modern educational and health institutions is a significant cause of migration in the rural-urban relationship (Ristić and Bošković, 2020). Educational capital is a constitutive element of human capital and, therefore, one of the basic factors of intellectual capital (Koković, 2009, Petty and Guthrie, 2000). About half of EU farmers have secondary education and farmers do not use education enough to modernize their businesses. Regarding household access to the Internet, data for 2018 show that the lowest percentage is in rural areas (85%), in smaller cities and suburban areas 89%, and in large cities 91% (Ristić and Bošković, 2020).

According to the World Bank for 2019, the number of Internet users in Montenegro has been increasing from year to year Statistical Office

Chart 3. Percentage number of Internet users in Montenegro, 2004-2018.



Source: World bank, 2019

When it comes to the territorial representation of the Internet in households, it is the lowest in the northern region of 64.8%, while in the south it is 79.2%. Internet access in non-urban settlements is 62.80%, while in urban settlements access is achieved by about 80% of the population in 2019 (Table 1). (Statistical Office, 2019).

Table 1. Internet access at homes, (%)

Type of settlement	2019	2018
City	80.00	76.30
Other	62.80	60.90
Montenegro	74.30	72.20

Source: Statistical Office, Public Release No. 188

The average Internet use in Montenegro by age and sex in (%) in the period August-October 2019 is shown in Table 2.

Table 2. Average Internet use in Montenegro by age and sex in (%), in the period August-October 2019

Internet use	Age						Sex		Total
	16-24	25-34	35-44	45-54	55-65	65-74	M	F	
Every day or almost every day	99.6	96.3	88.6	79.6	77.9	72.8	87.4	88.5	87.9
At least once a week	0.4	3.7	10.3	17.3	21.0	20.1	11.7	9.3	10.7
Less than once a week	0.0	0.0	1,1	3.1	1.1	7.1	0.9	2.2	1.4

Source: Statistical Office, Public Release No. 188

Referring to the data from Table 2, it can be seen that the persons who stated that they used the Internet in the period August-October 2019, mostly did so every day or almost every day. The percentage of Internet use is almost every day higher for women and amounts to 88.5%, while for men it is 87.4%.

Surveys of the Statistical Office in 2019, regarding the purchase or order of goods or services over the Internet for private purposes, showed that about 69% of respondents did not buy and order goods over the Internet, while 31% of respondents bought and ordered goods over the Internet. The type of goods or services that respondents most often ordered were as follows:

Table 3. Type of goods or services that respondents most often ordered online in 2019 in Montenegro, %

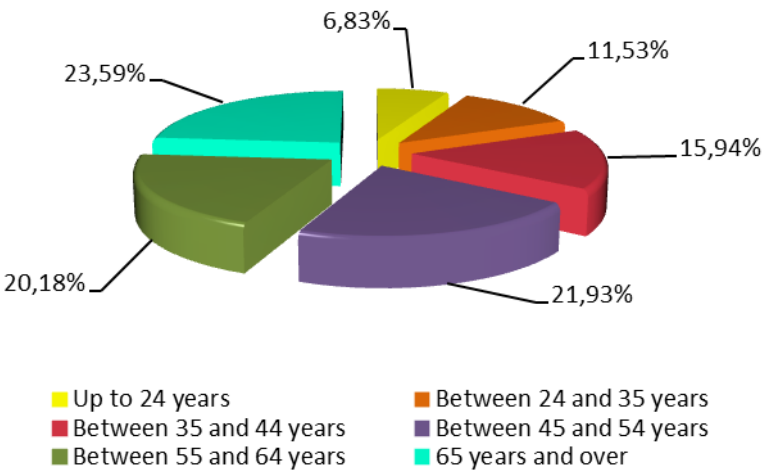
Types of goods or services	Share in order
Clothing, sports products	73.5
Toys	17.2
Pharmaceutical products	11.0
Movies and more	10.8
Video games and other merchandise	5.5

Source: Statistical Office, Public Release No. 188

The data show that the ordering of agricultural and food products has not yet come to life, although a survey was conducted in Montenegro regarding the online promotion of agricultural products (Žarić et all, 2017). There is significant room for improving Internet food sales, namely to promote the "smart village" concept. Advances in information and communication technology in the context of rural communities represent an opportunity for villages in the 21st century to become places for quality and comfortable living. The path to the implementation of the "smart village" concept is not easy, primarily because it is necessary to solve the problem of depopulation and the outflow of young people from rural areas to urban centres.

Depopulation and unfavourable age structure of employees in agriculture in Montenegro are a significant limiting factor in the development of the concept of "smart village". Montenegrin agriculture is characterized by an aging rural population and significantly lower average level of education. More than 44% of the population is older than 55, 65% older than 45. More than half (55.3%) of employees in agriculture graduated from high school, and only 9.1% graduated from high school or college (Agriculture Census 2010, Structure of agricultural holdings).

Chart 4. Age structure of the labour force on family farms in Montenegro



Source: Monstat, 2010

The unfavourable age structure on family farms is a consequence of a number of economic and social factors. Education is a necessary factor in the modernization of rural communities. The majority of the rural population does not have the basic e-skills necessary for success in a society in which digitalization is an important factor in the development and competitiveness of "smart villages" (Ožegović, 2019).

Table 4 shows the percentage of the population aged 15 and over according to education in Montenegro in the 1981-2011 period.

Table 4. Percentage of participation of the population aged 15 and over by education and sex in Montenegro, 1981-2011

		Total	Without education	Elementary school	High School	Higher School	University	No answer
1981	Total	100	13,86	51,36	28,34	2,89	3,26	0,26
	Male	100	6,66	47,9	36,42	3,91	4,76	0,28
	Female	100	20,76	54,63	20,60	1,92	1,83	0,25
1991	Total	100	8,86	45,82	34,97	3,82	5,03	1,48
	Male	100	4,12	41,82	41,02	4,77	6,63	1,65
	Female	100	13,47	49,69	29,12	2,89	3,49	1,31
2003	Total	100	4,30	32,59	48,44	5,03	7,51	2,10
	Male	100	2,09	27,29	53,32	5,93	8,83	2,51
	Female	100	6,38	37,59	43,83	0,41	6,62	1,73
2011	Total	100	2,3	28,16	51,90	5,20	11,92	0,50
	Male	100	0,88	23,33	57,00	6,15	12,12	0,55
	Female	100	3,56	32,80	47,10	4,30	11,73	0,50

Source: Despotović, A.(2016).

The analysis based on the base index (1981 = base) shows a declining trend in the number of inhabitants without school and only with primary school, and there is a trend of increasing the number of inhabitants with secondary and higher education. The largest number of residents has completed high school. According to the 2011 census, the number of inhabitants with secondary school increased by 116% compared to the base year 1981 **(Despotović, 2016).** According to the same author, in the period 1981-2011. The percentage of women without school and with (un)completed primary school ranges from 75.39% according to the 1981 Census to 36.4% according to the 2011 Census.

Demographic changes occurred in the 1965-2011 period influenced the further development of family farms in Montenegro and by region. The importance of agricultural farmers emanate from the fact that almost all production takes place on them (Despotović et all, 2016). In Croatian agricultural policy, family farms also take the main place (Štambuk, 2002).

Based on the aforementioned characteristics of rural areas and the changes that have taken place in the last fifty years, it is not possible to talk about the rapid implementation of the concept of "smart villages". In that direction, it is necessary to recognize the opportunities brought by digitalization, new business models, precision agriculture, bio-economy, etc. as soon as possible.

Modern development of Montenegrin rural areas implies modern communication in business, with the use of internet marketing. This development requires a quality way of financing, increasing the competitiveness of agricultural products, as well as better road connections with urban communities. Total food consumption decreases with the improvement of per capita income levels in urban communities, but with the improvement of the living standard of the population, food consumption tends to be based on better quality products (Jovanović, 2016). The market of organic products in Montenegro is gaining in

importance, with special emphasis on the development of tourist consumption of agricultural products in rural areas of Montenegro (Jovanović et all, 2017).

In some EU countries (Germany, Hungary, Slovenia) pilot projects of good practice of "smart villages" have been implemented. Thus, for example in Slovenia, a series of courses on digital technology were held, thus encouraging young people to stay in the countryside. The pilot project resulted in the digitization of six regional centres, in addition to 35 smaller cities (Ristić and Bošković, 2020). The "smart villages" concept is being successfully implemented in Croatia as an EU member, by encouraging the digitalization of villages.

Based on the experiences of the countries of the region, information and communication technologies are the basis for smart growth and development. In order to harmonize with the Digital Agenda in Europe and the Strategy for the Digital Single Market, Montenegro has adopted a Strategy for the Development of the Information Society until 2020, which defines the strategic directions for the development of the information society (Ministry of Finance, 2017). All social segments should be transformed based on new technologies, with special emphasis on rural areas. The use of information and communication technologies in rural areas would save time and money, as well as easier access to information, which is important for life, private and business, and would contribute to improving the quality of life.

Taking into account the current situation of Montenegrin rural communities, the "smart village" concept should be directed in several directions:

- –Applying digitalization to put agricultural production in the broader context of rural policy through horizontal networking in the local area;
- –Inclusion of vulnerable groups, especially rural women in the process of modernization of life in rural communities,
- –Solving the problems of elderly people left to live alone in villages;
- –Improve mobility, especially of the elderly through improved public transport and taxi services;
- –Innovations in the field of health services, education and financing;
- –Application of digital technologies and the Internet in connecting food producers and consumers;
- –Work intensively on the preservation of Montenegrin tradition and cultural heritage;
- –Encouraging the development of rural entrepreneurship through the diversification of activities on the farm;
- –Improving the environment for the development of agritourism, old crafts, etc.

Previous analysis of the situation in Montenegrin rural communities is a starting point for the application of SMART methods for creating development goals within the concept of "smart village".

Source:https://www.google.com/search?q=SMART+(Specific,+Measurable,+Attainable,+Realistic,+Time+bound

Table 5. SMART analysis of rural community development goals within the concept of "smart village"

S	**Specific**	Digitization, innovation, networking, green econom
M	**Measurable**	Measurement of achieved economic results: effectiveness, efficiency, economy, productivity, profitability
A	**Attainable**	The goals are achievable with permanent education of the population, transfer of knowledge in the field of IT, financial support of the state and local governments
R	**Realistic**	Adapt the concept of "smart village" to the real conditions of rural communities and the real state of agricultural production
T	**Time bound**	Make progress in the development of rural communities in certain timeframes, through socio-economic indicators

Source: Author based on Ristić, Jakšić and Trlaković, 2019; Ristić and Barbarić, 2019

Picture 1. Application of digital technology in agriculture

Source: Žulj M. (2019): Digital Transformation of Agricultural Value Chain_EN-mm

Based on the SMART analysis, it can be seen that the concept of developing a "smart village" in the Montenegrin rural community is achievable with permanent education of the population, knowledge transfer, financial support from the state and local governments. The results of the achieved goals should be visible throughout the food value chain.

CONCLUSION

After the Second World War, Montenegro was an area where migratory movements in the north-south direction were very apparent. This has led to a change in the structure of the population, primarily in age and education. Such changes had a negative impact on the development of agricultural production. Labour shortages continue to be a significant problem in the process of agricultural and rural community development, as human resources are a major driver of economic development on which labour productivity depends. Previous models of rural development have not contributed to the demographic revitalization of rural areas.

The analysis in this paper showed that the “smart village” concept may play a key role in the process of demographic revitalization of rural communities.

The application of the concept of “smart village” in the region, primarily in Slovenia and Croatia, shows that traditional models of rural community development must be complemented by digital technologies and innovations.

The level of efficiency of the application of the mentioned concept in Montenegro will significantly depend on the extent to which the creators, first, of the agrarian policy will recognize its importance. The concept of "smart village" should be adapted to the real conditions of rural communities and the real state of agricultural production. This requires the engagement of the wider community, through the financing of projects for the application of information and communication technologies, followed by the readiness of the population to master new knowledge and skills in using it.

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