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Sustainable societal development perspectives for rural Romania in light of Horizon 2020

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Abstract. *Developmental gaps between urban and rural areas are a trademark of nowadays times, accelerated by economic models that ensure advancement chances mostly to urban hubs, rather than being focused on rural life. The Sustainable Development Goals issued by the United Nations and their desired implementation by 2030 is a first guarantee for an equitable and inclusive societal and economic framework. Currently, Romania lacks rural investments and a forward-looking attitude is much needed to reach the sustainability objectives. In addition, smart rural development, which fosters knowledge, innovation and R&D at village level is a viable tool in laying the groundwork for rural welfare, in response to issues such as migration from rural to urban, demographic ageing and poverty. Despite the multitude of programs tackling rural development at EU scale, Romania appears to perform poorly, even if its population is highly ruralized. In light of these matters, the paper conducts literature review analysis on smart rural development and sustainable development in Romania, to highlight the current performance of Romanian villages in this concern. Using literature and document analysis of Horizon 2020 programs on rural development conducted in the European Union, the aim is to identify the specific points to be addressed by decision makers in order for sustainable advancement of Romanian villages to be further enhanced.*

Keywords: smart rural development, sustainability, rural Romania, rural development programs, Horizon 2020.

Introduction

Romanian villages' own specificities reflect a great degree of development diversity and incorporate various kinds of capital, such as human, material and regional (Sandu, 1999). Apart from certain advantages provided, Romania's inclusion in the European Union has allowed room for regional differences, educational capital inequities and reductions in subsistence agriculture as a response to stricter rules of trade (Fina et al., 2021).

Human capital is a requirement for attaining competitiveness in the current shifting world and investments in this field need to be employed to increase efficiency and integrate existing innovation in rural areas (Argatu & Păunescu, 2019; Tigu et al., 2015). Research by Stanef and Manole (2013) notes that Romania presents a lagging evolution in terms of the indicators measuring students' learning performance, thus investment in education is expected to provide a positive evolution of the human capital in rural Romania, as the development of human capital in rural areas is highly influenced by education (Golovina et al., 2021).

Rural regions are essential for the economic and societal improvements of the wider regions to which they belong, through agricultural job offering (Dumitru et al., 2021). Statistically, Faludi and Neamţu (2020) claim that 46,3% of the Romanian population inhabits rural areas, being employed in subsistence or semi-subsistence agriculture. Considering the importance of

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agricultural investments, Curea and Fîntîneru (2021) highlight that the NRDP 2014-2020 provided a disposable aid of 1,2 billion Euro, directed towards assistance offered to young farmers, undertakings in agriculture and village refurbishment (Băncescu, 2021), the South-East development region of Romania being accounted for the greatest number of finished projects, 1.197 respectively.

In a globalization context, defined by competitiveness (Tudor et al., 2017), new rural development models are issued by researchers as the economic status quo is everchanging (Podgorskaya & Schitov, 2020). The World Social Report 2021 issued by United Nations (2021) argues that rural development must be reframed to foster the achievement of the Sustainable Development Goals until 2030, by implementing programs that aim to alleviate the elementary infrastructure and the human capital, as well as having sectoral policies that defend natural resources, organic farming and small-scale farmers. However, Răzvanţă (Puie) (2019) asserts that rural entrepreneurship can present difficulties due to its dependency on the economic context, the process altering the alleviation of local problems. Furthermore, Pavel et al. (2020) acknowledge that Romanian rural areas strongly need resilience to fight against persistent demographic downfall and migratory patterns. Bearing in mind the discouraging regional differences faced by rural areas in Romania, attributed to historical, economic and culture-related matters, rural development is thus an overarching process to be addressed in economic and social terms (Mitrică et al., 2020).

In line with the delineated matters, the article foresees the provision of sustainable rural development action points for rural Romania, based on literature review and document analysis, enhancing development initiatives promoted by programs within Horizon 2020. To deliver on the proposed goal, the article identified the following research questions: which are the key issues that need to be addressed in rural Romania in light of the current EU competitiveness and the new rural development paradigm?; which are the key sustainable rural development practices stemming from Horizon 2020 rural development programs operated in the EU?; what can Romanian decision makers practically do to foster the sustainable rural development of Romanian rural regions, in line with rural development practices from Horizon 2020 programs?.

Literature review

Future constancy of regional development differences consequently imposes costs for bridging the existing gaps, as economic systems are highly nonlinear and require knowledge, innovation (Grigorescu et al., 2020; Hadad, 2018; Maier et al., 2012) and strategic cooperation for information exchange and learning purposes (Tâlvescu & Dima, 2008). Striving for progress, rural communities face a variety of developmental issues, from societal to environmental ones, and sectoral resolution is required to enable development directions in providing rural resilience and an increase in people's wellbeing (Adamowicz & Zwolińska-Ligaj, 2020). Thus, a change from a traditional to a progressive approach in rural regions is needed (Banakar & Patil, 2018), following the European Commission's long-term vision by 2040, with demography and governance being the most important change pillars (European Commission, 2021).

The dynamics of Romania's rural areas presents some distinct features compared to the EU one. While in the EU the rural economy accounts for 14,1%, Romania is 60% agrarian (Kruszlicika et al., 2014), and research of Popescu (2014) claims that Romania accounts for 49% of the total small agricultural developments in the EU (with a utilized surface smaller than 2 hectares), in terms of the scale of agricultural exploitations. Issuing a forecasted view, Feher et al. (2022) state that agriculture is expected to supply food certainty in the time frame 2018-2038.

Consequently, agriculture and rural development of Romania need strong supportive pillars to grow. In terms of EU funding programs, Pavel and Moldovan (2019) state that the Romanian communes that received non-refundable funds for elementary infrastructure through the SAPARD program displayed a greater degree of local economic development. Approaching the EU LEADER program, Marquadt et al. (2010) specify that it is beneficial for rural growth as it employs the potential of these regions and boosts local governance by setting the partnership between the public and private sector. Additional research (Manta, 2015; Paun & Ivascu, 2021) highlights the essential character of financing and microfinancing accessibility for the growth of rural economy and the avoidance of rural exclusion. According to Răzvanţă (Puie) (2020), EU funding also allows building new rural business models and supporting entrepreneurship at rural scale.

In the view of Dumitru et al. (2021), rural development is also impeded by an aging population, the migration of young individuals, the job scarcity and the absence of co-financing in the acquirement of EU funding. A report by ESPON (2021) on rural depopulation claims that the share of population inhabiting rural areas at the level of the European Union is expected to drop to 29,2% in 2033, from a historical value of 36,1% in 1993. Regarding Romania, forecasts by the Romanian National Institute of Statistics (2020) reveal that there will be a decline in the percentage of young individuals in the total population, going from 15,6% in 2018 to 13,9% in 2100, whereas the working age population will also face a decrease of 5,8 million individuals by 2100.

In light of these matters, two key tools that can boost the rural overall wellbeing are smart rural development and sustainable development. Accommodation to the shifting patterns of rural life lead new sustainable business models to emerge, with a focus change from an economic perspective to a welfare-oriented one, where the concept of smart village must constitute a watchword in providing a better life quality to rural communities and reshaping rural development (ESPON, 2020; Profiroiu & Radulescu, 2019). Further research by Maier et al. (2020) notes that a merger between innovation and sustainability is desired to open new possibilities for both individuals and the planet. Additionally, helping rural areas to thrive also implies technical, juridical and financial considerations, as per Otiman (2008), as the wellbeing of Romanian rural communities is strongly altered by poverty, high shares of young individuals not involved in education, employment or training (NEETs) and persistent income irregularities (Istrate & Horea-Serban, 2018; Neagu, 2020; Strat & Stefan, 2017).

Sustainable development has gained a wide popularity in the research sphere, but despite that, its meaning and implications are still not fully made clear (Mensah, 2019), rural communities being empowered to develop sustainable business models and seek for long-term entrepreneurial solutions based on innovation and usage of local resources (Răzvanță et al., 2021).

As a tool for boosting sustainable development, rural entrepreneurship has, however, a differentiated manifestation in Central and Eastern European countries (Păunescu et al., 2018a). In order to successfully function as an entrepreneur in Romania, an individual needs to reflect certain personal attributes that influence his or her intention towards this endeavor, such as a higher educational background, developed interpersonal skills and a lower age (Păunescu et al., 2018b).

In the context of creating value for rural communities, research debates on the notion of smart rural development as a paradigm shift and a form of sustainable development that builds on R&D and knowledge to allow innovation at rural scale, through a concrete adaptability to the local conditions (Naldi et al., 2015; Sirbu et al., 2014). Regardless of EU's recognition of innovation as a tool for wellbeing enhancement and overpassing economic challenges, urban areas seem to utilize the benefits of this process more often than rural areas (Bonfiglio et al., 2017).

To fully reach rural potential, there is henceforth an utmost need for smart villages, namely development-oriented hubs employing the existing local strong points, being open to collaboration with urban and rural stakeholders and reaching public and private funding (Michelini, 2021). Most countries in Europe are already focusing on employing smart village development procedures, in line with the existing local challenges (Anastasiou et al., 2021). At the level of Romania, Redman and Samargiu (2018) argue that in order for smart villages to create impact, there needs to be a pragmatic approach, meaning that the intended aim is adapted as much as possible and is highly relevant for the targeted communities. According to Matei and Iordache (2016), a successful example of a Romanian commune that took the right steps toward becoming a smart village is Ciugud commune from the Alba county, which, through public administration investments, EU funding and entrepreneurship, now represents a benchmark for smart rural development in Romania.

Methodology

As a response for emerging societal changes and the need for smart, sustainable and inclusive growth, Horizon 2020 was designed as a financial instrument supporting research and innovation in the European Union (European Commission, 2020). The bottom line for the research goal is enhancing smart and sustainable development of Romanian rural areas, thus the paper develops a study based on literature review and document analysis of six EU Horizon 2020 rural development programs.

The programs were selected from the European Network for Rural Development website, an informational hub linking various rural development stakeholders at European scale, boost their commitment and raise the quality of programs in this domain (ENRD, 2021a). A temporal filtering criterion was employed, research being particularly focused on the programs initiated after 2018 in a four years period, also using search keywords such as "sustainable rural development in Romania Horizon 2020", "smart rural Romania and Horizon 2020", "rural development Horizon 2020 Romania", "smart rural development in Romania".

The selection process was primarily focused on those programs aiming to alleviate local rural conditions through practical, systemic and targeted actions. Additionally, the objectives and results of the selected programs build on Romania's current development necessities, for instance poverty, the persistence of rural regional differences, the scarcity of rural investments, the absence of support in reaching EU financing and the minimal focus on human capital, that are emphasized in the literature review chapter.

Furthermore, research was performed on 3 Horizon 2020 projects in which Romania acted as a participant, through agricultural, environmental and research institutions, county councils and education associations (RUBIZMO, UNISECO, RURITAGE), as well as on 3 projects in which it had no involvement, either as a coordinating party or participant (DESIRA, SHERPA and PoliRural). In such way, the analysis results would provide a more balanced depiction of how their practices can permit the sustainable advancement of rural Romania. As for the projects in which Romania had no participation, they were coordinated by higher education institutions, research institutes and companies from Sweden, United Kingdom, Italy, Germany, Belgium and Czech Republic. According to the latest Social Progress Index 2021, that measures countries' ability to deliver societal wellbeing, these countries are placed in the first two tiers of performance so they are a development benchmark for Romania, which recorded a Social Progress Index score of 78,41 points in 2021 and was placed in Tier 3 (Social Progress Imperative, 2021).

A qualitative data assessment was performed through document analysis of online reports and data regarding the selected Horizon 2020 programs. To retrieve the project data, a project name search was performed on the Projects database, available on the website of the Community Research and Development Information Service (CORDIS), that is European Commission's data source on research projects' results (Systems Medicine, 2016). In summarizing project findings, the research emphasis was made on their domains of action, that tackle the current issues underwent by rural Romania, the time frame of implementation and the programs' objectives and results.

Finally, the analysis emphasizes the main directions and actions defined in the selected programs, later providing action points enabling sustainable and smart rural development in Romania and understanding how these can be applied by actors and decision makers in the rural areas.

Results and discussions

Document analysis on Horizon 2020 rural development programs

In the first place, research is oriented towards an analysis of Horizon 2020 programs of rural development operated in the European Union, a part of them being still running at the moment. In terms of action areas, the programs tackle smart rural advancement by promoting innovation, digitalization, the defense of the cultural heritage of rural regions, agro-ecology in the farming field and boosting the agreeableness of the rural environment in line with novel development tools. Regards to the time frame of programs' implementation, it is a rather recent one and ranges from year 2018 until 2023.

The findings of the analysis, summarized by Table 1, highlight the proposed goals of the programs as well as the partial or final results, and they will serve as a basis for the issuance of directions for sustainable and smart rural development in Romania.

Table 1. An assessment of Horizon 2020 rural development programs operated in the EU (2018-2023)

Project denomination	Area of action	Time frame	Proposed objectives	Partial/final results
DESIRA (Digitisation: Economic and Social Impacts in Rural Areas)	Development of smart villages and innovation ecosystems at rural level	1 June 2019 - 31 May 2023	-Tackling the social and economic influence of digitization in agriculture; -Delivering and communicating a Conceptual and Analytical Framework to address the unknown knowledge elements in agricultural and rural digitization; -Determining digitization's impact through its connection with the Sustainable Development Goals; -Alleviating rural areas' capability of thinking about digitization - associated threats and opportunities, taking advantage of those opportunities and altering their resilience; -Fostering online learning between stakeholders through differentiated online tools.	-The developed framework indicated that the conceptualization of digital systems rules out digitization's societal consequences.

Project denomination	Area of action	Time frame	Proposed objectives	Partial/final results
SHERPA	Understanding how smart information systems alter matters linked to human rights	1 May 2018 - 31 October 2021	-Producing new ways of tackling the challenges of smart information systems; -Collaborating with stakeholders to map their perspectives; -Prioritizing the issued proposals; -Contributing to Europe's utilization methods for big data.	-Developing guidelines on the basis of stakeholder collaboration.
RURITAGE	Development of sustainable renewal by fostering the cultural and natural heritage of rural areas	1 June 2018 - 31 August 2022	-Identifying systemic innovation areas (pilgrimages, food production in sustainable terms, migration, art, adaptability, landscape overseeing).	-Summarizing lessons to be learnt from rural heritage-oriented revival programs of partner stakeholders; -Forming rural heritage hubs; -Application of the rural regeneration plans by replicators; -Conducting dissemination actions (workshops, events).
UNISECO	Understanding the accelerating and downgrading factors for agro-ecological practices' application within farming systems of the EU	1 May 2018 – 30 April 2021	-Operationalizing a structure of socio-ecological systems by taking into account the extrinsic conditions for farming systems' sustainability evaluation; -Delivering a methodology instrument for displaying the societal, economic and environmental influence of innovative agro-ecological strategies.	-Identifying the obstacles slowing down the agro-ecological practices: the absence of social capital and knowledge, the inefficiency of policy formulation; -Mapping the accelerating factors for agro-ecological shifts: the positively altered knowledge on the advantages of these processes, the education and training performed, an enhanced collaboration between the members of the agro-ecological value chain; -Communicating knowledge on the sustainability impact of agro-ecological shifts' strategies; -Thoroughly collaborating with similar projects in the field.

Project denomination	Area of action	Time frame	Proposed objectives	Partial/final results
RUBIZMO	Enhancement of business models in various economic sectors at rural level (agriculture, ecosystem services)	1 May 2018 - 31 October 2021	-Providing job creation in rural areas; -Sustaining the involvement of multiple actors to produce common value; -Provide support to the Europe 2020 strategy; -Developing user-oriented tools (virtual library, guidelines for launching business models).	-Identifying emerging opportunities: the usage of ICT as knowledge sharing means, the expansion of bio economy through renewable resources (sunflower, wheat, grass, and cereal byproducts), and the usage of ecosystem services for touristic purposes.
PoliRural	Increasing the attractiveness of rural regions and professions through innovative tools (Text Mining, System Dynamic Modelling)	1 June 2019 - 30 September 2022	-Designing rural policies that are human and future-oriented; -Conducting actionable research through the collaboration of researchers, rural inhabitants and policymakers; -Helping decision makers address rural issues and developing rural resilience.	-Forming a rural stakeholder community; -Performing a survey to understand rural attractiveness factors for the regions involved; -Performing online dissemination actions.

Source: CORDIS (2020a), CORDIS (2020b), CORDIS (2021a), CORDIS (2021b), CORDIS (2021c), CORDIS (2021d), CORDIS (2021e), CORDIS (2021f), CORDIS (2021g), CORDIS (2021h), Desira (2021), ENRD (2021b), RUBIZMO (2018a), RUBIZMO (2018b), UNISECO (2018), UNISECO (2021).

Formulating action points for sustainable and smart rural development in Romania

Conglomerating the findings from the literature review and the evaluation of practices from several EU Horizon 2020 rural development programs, research leads to a set of action points that need to be further applied by Romania to ensure that its rural regions can reach smart and sustainable development.

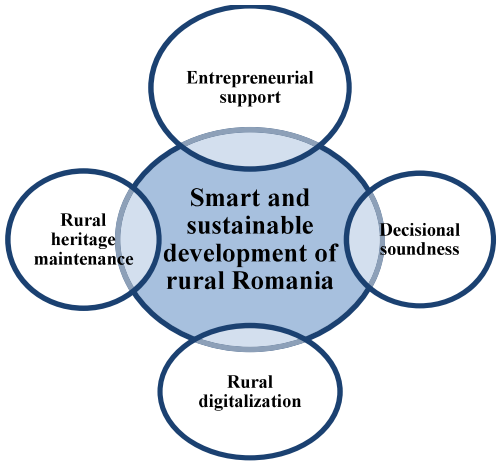


Figure 1. Action points enabling sustainable and smart rural development in Romania

Source: Authors' own research.

Briefly, to foster the capacity of rural areas, Romanian decision makers must reflect an open mindset towards rural entrepreneurial experiences and provide a learning environment, collaborate in order to generate good rural practices, employ the latest IT tools for information dissemination and show utmost attention in caretaking the cultural rural heritage of Romanian villages. The action points are grouped into four categories, namely entrepreneurial support, decisional soundness, rural digitalization and rural heritage maintenance, as indicated by Figure 1.

In order for rural areas of Romania to enhance sustainability, implementation of entrepreneurial support measures is required, to facilitate rural entrepreneurship's success and encourage newcomer entrepreneurs to become change vectors and start rural ventures. Hence, we argue on the need of Romanian decision makers to deliver training sessions on writing financing proposals, listen and act on the feedback received from rural entrepreneurs and to provide financial and material incentivization for bio agriculture. This action pillar is thus in line with the findings of the UNISECO and RUBIZMO projects, Curea and Fîntîneru (2021), Răzvanţă (Puie) (2020), Răzvanță et al. (2021), who debate on the importance of financial aid, the utilization of local resources and trainings' implementation to boost rural beneficiaries' knowledge on existing opportunities. The pillar also holds value by linking to the research of Păunescu et al. (2018b), who emphasize the significance of interpersonal skills in entrepreneurial actions.

Furthermore, we underline the need for decisional soundness, meaning the designation of realistic strategies that produce high added value to the entire rural social and economic ecosystem. The pillar indicates the need of decision makers to run practice exchange programs, in accordance with Tâlvescu and Dima (2008), the UNISECO and SHERPA projects, which highlight stakeholder collaboration as a rural change catalyst. An additional action point implies the clear eligibility guidelines for rural advancement programs and the encouragement of entry stage entrepreneurs, in linkage with the European Commission (2021), as well as Dumitru et al. (2021) regarding the lack of co-financing as an impediment in accessing EU funding. Finally, the pillar advocates for operating repairment works on Romanian rural households that cannot provide a minimal degree of infrastructural quality, emphasizing the severity of poverty and income inconsistencies in rural Romania, as per Istrate and Horea-Serban (2018) and Neagu (2020).

A third pillar of further action is rural digitalization, which brings IT instruments meant to ease the interaction between decision makers and a real-time identification of the progress made. In this sense, the action pillar refers to the usage of groundbreaking IT tools in stakeholders' collaboration, and the dissemination of the conducted work through open-access platforms. The measures are built on the systemic requirement of knowledge, innovation and local adaptability indicated by Grigorescu et al. (2020), Maier et al. (2012), Michelini (2021) and Naldi et al. (2015). The pillar also correlates with findings from the DESIRA and RUBIZMO projects, that underline the need for stakeholders' online learning through various ICT instruments. Last but not least, actions concerning rural heritage maintenance are desired to preserve and promote the cultural rural heritage through collaboration with various third parties. Proposed action points imply the organization of learning hubs to help non-rural people better understand the cultural rural specificities and the implementation of various support measures to recondition rural heritage sites. The measures link to the research of Golovina et al. (2021), who highlight the positive return of investments in education at rural scale and the RURITAGE and PoliRural programs, that reflect on the valuableness of the collaboration between rural stakeholders and the fostering of landscape management as an innovative area. A structural image of the pillars reflecting the nominated action points for sustainable and smart rural development in Romania is provided by Figure 2.



Figure 2. Directions of action fostering sustainable and smart rural development in Romania – a comprehensive view

Source: Authors' own research.

The research findings, which underline Romania's need for enhanced rural caretaking, stable and anticipatory thinking on rural entrepreneurship, are in line with Pavel and Moldovan (2019) and Curea and Fîntîneru (2021), who recognize rural investments are correlated with a

higher level of sustainable rural wellbeing. Additional support on the proposed action points, which are both economic and societal, is provided by literature advocating on the new sustainable rural development paradigm in the competitive EU framework (Anastasiou et al., 2021; Banakar & Patil, 2018; Mitrică et al., 2020; Podgorskaya & Schitov, 2020).

Conclusion

The rural areas of Romania hold an enormous development potential despite the economic and societal turbulences they face, change being possible only through aggregated and ongoing deployed efforts. More precisely, to survive hardships, such areas must be subject to innovation, improvement of their resilience and continuous knowledge exchange between key stakeholders. The current requirement for a balance between competitiveness and the need for healthy advancement models pushes rural regions to assess the situation in a smart and sustainable manner, as the context no longer ensures competitive advantage to the regions that view solely the economic indicators as wellbeing predictors.

The article highlights further areas of action that Romania may employ to enlighten the potential of its rural areas to grow in sustainable terms. Decision makers in Romania must urgently act on four particular directions, hence they need to provide enhanced support means to rural entrepreneurs, issue strategies that are sound, actionable and clear enough for their beneficiaries, foster rural digitalization through upgraded IT tools to map the progress reached and actively take care to promote and preserve the cultural rural heritage, either by themselves or through third party collaboration.

Research limitations refer to the incomplete information identified within the implementation of the programs, due to the time span considered to be analyzed (several programs are still running at the moment and final results will be provided at the end of the implementation period). Considering the availability of data and identified results, further analysis could define a more clear definition of the specified pillars of action, as well as identifying new action points for decision makers in rural development.

The solutions identified can be practically applied at the local level and stand at the basis of new sustainable and smart business models in Romanian rural communities. Starting from the four pillars explained in the research results, the rural entrepreneurs can create rural development strategies with a focus on a continuous added value for the rural areas' growth. Furthermore, in a competitive European environment, the scope of the proposed directions is to provide measures that can support Romanian rural development actors to reach the level of development defined by the benchmark EU countries.

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