

Acceleration of digital innovations within the framework of the Smart Village concept in the Republic of Moldova

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Abstract: The global epidemiological crisis COVID-19 has intensified the process of digital transformation in the economic and social spheres. This article analyses best practices of digital innovation in achieving regional and cross-border interoperability in terms of the **Smart Village concept** to be implemented in the Republic of Moldova. It proposes to build on the experience of a project in Scotland that encourages young people in rural areas to join focus groups to develop innovative Smart Villages. This approach focuses **on young and local people** to form a sustainable, dynamic, creative and localized digital ecosystem together. Multilevel management of innovative development and adaptation of smart learning in human settlements could be built on the experience of the MobiReg Regional Mobility project, funded by the European Commission. In the context of smart specialization approaches, digital innovations in rural areas will reach consumers - local initiative groups - faster, creating synergies between national funds and international programs at regional level. In turn, the development and implementation of distance learning modules in the digital economy will facilitate the recognition of innovative qualifications and skills acquired through mobility projects and other relevant measures. This will stimulate entrepreneurship development, modernization of rural services and digital mobility of young people.

Keywords: economy, smart village, digital mobility, distance learning

Introduction

The main purpose and motivation of the study was to present international approaches to smart village concepts to local public administrations, innovation organisations, business associations and farmers' associations. An important aim of the publication is to achieve, through an adaptation of the selected concepts, synergies between the national programmes of the regional development fund and the research and innovation programme for 2020-2023. Currently, the Government of the Republic of Moldova has launched the European Village programme within the local development support measures for the first level local authorities responsible for planning the development of rural settlements. Experience in building interaction with local public administrations, civil society organisations, business associations and farmers'

associations has revealed a number of problems, which are associated with a low level of knowledge in the sectors of digital economy, which affects the formation of innovative public-private partnerships in rural areas.

Smart connectivity

The capacity of private and public actors to conduct modern technological research and innovation varies between EU member states and Eastern Partnership countries. The innovation gap between EU innovation leaders and Eastern Partnership countries, does not allow the EU to use its research and development potential to the fullest extent in these territories, including EU regions, and thus poses a serious threat to economic growth, prosperity and social stability in the regions of EU associated countries. Cooperation with potential

partner organizations will help to improve methodological approaches and capabilities for initiation and implementation of cross-border innovation digital platforms [1], in the framework of comparative analysis of international and European initiatives, as well as of the "National Programme for Innovation and Research 2020-2023". Currently, in the Republic of Moldova, there is a growing interest in consumer-friendly technologies. First of all, this is due to the need to reduce the environmental burden of excessive consumption, lack of resources, rising energy and fuel costs, asked to develop digitalization and informatization. The digital approach, based on an interdisciplinary innovative public-private partnership, will help build a multilevel coordination of international innovative technical support for infrastructure projects of local initiative groups in the programs of national funds. Stimulation of creation of digital ecosystem of consumer clean technologies in regions, activation of innovative enterprises and communities, are necessary to increase digital competencies and skills of companies' personnel. Identification of new ideas and best international practices in the sectors of local entrepreneurship, allows innovative public-private partnerships in a coordinated way to identify and solve the problems of the innovation gap of each particular locality of the territory of the Republic of Moldova.

The international nature of the digital cooperation platform can be related to the concept of "Smart Connection" [2], which was presented at the Three Seas Virtual Summit in Estonia in 2020. This was Estonia's additional contribution to finding ways to expand digital components in key infrastructure, including in rural areas, which in turn should support new business models and technologies, such as real-time remote operation to manage the local economy, smart grids with renewable energy, smart logistics and traffic management. It is about making future-oriented investments in energy and transport and increasing the competitiveness of the Three Seas (3S) regions [3]. The Republic of Moldova and

Ukraine, represented by the presidents, have expressed interest in joining their countries to the "Three Seas Initiative" [4]. Therefore, for our countries are becoming relevant research opportunities for the planning of interoperability of data models of information transboundary exchange, management and control [5], contributing to the sustainable economic development of the regions. Realizing this ambitious vision involves adhering to the same principles throughout the Three Seas region in building transportation, energy, and information infrastructure (figure 1) and will require a greater emphasis on the open exchange of new, updated data and the use of accumulated data.

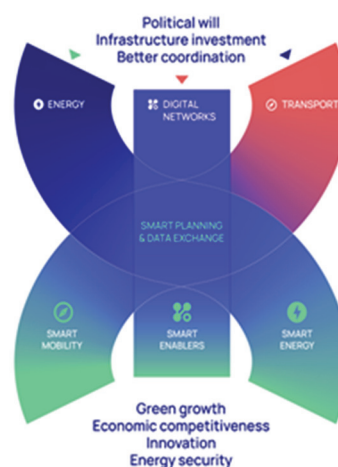


Figure 1. Intelligent communication of the "Three Seas" region (Ref: 3 Sea) [2]

COVID-19 has brought difficult and uncertain times, accelerating the process of digital transformation. This involves, among other things, equipping SMEs, farms with digital tools. It is also necessary to provide for the appropriate harmonization of legislation and the formation of technological incentives, modernization of lifelong learning approaches available at the country and/or regional level. Realizing this ambitious vision

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Stimulation of distance learning digital transformation

A systematic comparative marketing analysis (benchmarking) of best practices of international projects, based on digital spatial planning [6], contributes to the modernization of localized digital educational products/services. This approach achieves an acceptable level of collaborative decision-making in sectors of the local economy, corresponding to the data model of information exchange for management, control and advice of member countries and NATO Partnership for Peace partner countries [7]. Short timeframes for ICT-based management decisions can significantly reduce the costs of infrastructure projects and reduce the risks of financial losses, poor execution of works in the regions of non-EU countries. The "rural youth project in Scotland" [8], under consideration, encourages young people to join a focus group to help create a pioneering "world's first" youth-focused smart village that will encourage young people to work together to build a dynamic, creative and sustainable rural economy where they live. Smart villages, a concept put forward by the European Rural Development Network, are rural digital villages that bring together physical and digital communities to enhance their sustainability by building on local strengths and opportunities.

The Smart village Scotland digital community platform, in partnership with rural youth in communities across Scotland, has created Smart village, a project for rural youth that functions as a space for young people to connect. This is intended to foster a cyberspace that, according to [9], is a connected global network, supported by computers, generated by them and managed by them, a

multidimensional set of overlapping virtual communities. It is clear that in such a space, thanks to multitasking, it is quite common to be virtually present in two or more places at the same time. This contributes to the development of new cognitive abilities. Above all, this applies to computer-educated youth, who are able to perceive several programs displayed simultaneously on a monitor and to synchronize texts by combining different types of media.

In the conditions of the pilot regions of the Republic of Moldova, it is proposed to take into consideration the results of the European project "Decent work for youth" [10], in order to develop and adapt a methodological approach of interregional and transnational knowledge exchange, based on digital technologies, implemented in several districts of the Republic of Moldova. The project aims to improve the socio-economic situation of young people in Moldova by empowering youth and civil society. The training experience of the mobile team members will also be useful [11]. The results of the project rely on the physical mobility of trainees from different districts. They are intended to share best practices of training with local target groups, volunteers. The adaptation of digital distance learning tools will ensure sustainable cognitive mobility, contributing also to the digital transformation [12] of small and medium-sized enterprises, farms participating in infrastructure projects programs "National Fund for Regional Development" and "National Fund for Agriculture and Rural Development".

The initiation of inter-regional and international cooperation on online learning, for the benefit of certain localities of development regions could be done directly with the participation of the regional administration. This will help local authorities to participate in the coordination of voluntary mutual learning processes concerning the promotion and support of mobility, as a major component of education and training policies, with particular

attention to digital mobility, internships and youth in general.

The European practice of the project "MobiReg Regional Mobility" [13] on the organization of interregional physical and virtual mobility, designed for the three regions of cooperation in mobility, is of great interest for the involvement of universities and university innovation educational centres, in order to achieve their objectives. In addition, the innovative public-private partnerships [14] can work on the definition of procedures for interregional virtual, digital cooperation. Such cooperation will aim at promoting mobility modules, according to the needs of infrastructure projects in R.Moldova, and guarantee the recognition of the obtained online qualifications and competences [15]. It will also contribute to the development of other related and supportive measures and distance learning modules.

Digital benchmarking

Production methods are changing and improving all over the world, both in urban and rural areas. In addition to automation, the integration of systems and the use of artificial intelligence in production is increasing. These activities are often classified, by keywords, as "Intelligent Manufacturing" or "Industry 4.0," "Agriculture 4.0." Thus, the line between manufacturing and IT companies is increasingly blurred [16]. In this context, the considered best practice in education can motivate a series of future benchmarking projects, so that not only manufacturing companies, but also non-manufacturing companies registered in the regions of Moldova can be involved in infrastructure projects at sub-regional and local level. This will give them the opportunity to participate and share their experience regarding digital innovation in certain smart specialization priorities, sectors of the local economy, as well as in the training of company personnel and educational organizations.

The processes of digital transformation cannot

fail to affect university organizations [17], which play the role of key actors and agents that stimulate local innovation activity, competitiveness in the regions. The process of university modernization has historically emphasized the need to provide support structures to facilitate contacts and relationships between research groups and the external environment, in order to increase the quantity and improve the quality of collaborative research activities. Therefore, it is necessary to identify needs, challenges and opportunities for the internationalization of R&D [18] in order to attract investment, new technologies and innovation. As part of the technical support of the EU and the integration into the European Research Area, it is impossible not to talk about the compatibility of approaches in the management of digital transformation.

Public administrations have the responsibility and authority to identify local needs. The results of their initiation, innovative partnerships with universities, research organizations and NGOs - potential operators of public-private partnership projects, serve as the basis for the development, implementation and adaptation to local conditions.

The first steps towards internationalization can be "Internal Knowledge Transfer Offices" [19] - having the appropriate digital infrastructure connected to the territorial spatial data infrastructure. Universities create these internal innovation structures within a typical administrative culture. Although the advantages of such structures are undeniable, a number of national peculiarities have emerged that need to be considered as part of a holistic picture the development of the knowledge transfer system. One of the key roles of an "External Knowledge Transfer Office" structure is to promote and strengthen research partnerships. As the knowledge transfer system develops, it fosters a collaborative and creative working environment in which both multidisciplinary researchers and companies can work together to generate new

knowledge and technological innovation.

The results of cross-regional research on best practice and development options, according to [20], can lead partners from the Associated Country regions to new perspectives, approaches and opportunities, especially for manufacturing companies in rural areas. In general, however, research can target companies from all industries and regions. The goal is to identify companies of successful practices that best apply digital technologies in their field.

Software for project management

The data model of information exchange for management, control and consultation, involves achieving compatible cross-border interoperability of **national information systems** related to collaborative project management processes. Studies related to the development of information systems, territorial digital business ecosystems, standards, increasingly draw attention to the need to adapt project management methodologies, based on localized software. At the European level, we see our neighbours in the Southeast European region already integrating into the ISA² Programme, [21] an initiative of the European Commission that supports the development of digital solutions that enable public administrations, businesses and citizens across Europe to benefit from interoperable cross-border and cross-sector public services.

The management of knowledge transfer processes to localities in the regions of the Republic of Moldova remains the legislative prerogative of nationally and internationally accredited universities. Speaking of benchmarking best practices, it is proposed to consider the methodology of project management "OpenPM²" [22], developed by the European Commission. It aims to enable project teams to manage their projects effectively and to provide solutions and benefits to their organizations and stakeholders. Although the methodology is suitable for any type of project, it is ideal for projects related to the public sector or EU

programs and grants implemented in the regions. OpenPM² is a free version of PM², developed by the Commission in 2007. It includes elements of internationally recognized best practices, standards and methodologies. Note that PM² is an initiative supported by ISA² to bring the PM² methodology and its benefits closer to a wider stakeholder and user community. OpenPM² provides open access to PM², expanding the range of beneficiaries across Europe and enriching the methodology with additional best practices and examples. It aims to improve the competence of project management in the EU. Depending on the nature of infrastructure projects, the information system "SIMA" and the program "Academic Departmental Agreement" [23], initiated by researchers and IT4BA-Trimetrica Ltd innovation incubator resident, include distance learning modules and technological solutions of ESRI IT (USA), which has a representative office in the Republic of Moldova. The main objective of these initiatives is to provide the educational institutions with ESRI software products in order to be acquainted with their capabilities, to implement them in the curricula and to conduct scientific research. The 12 months license includes all the key components of ArcGIS platform: ArcGIS Enterprise, ArcGIS Desktop, ArcGIS Online, as well as a lot of web and mobile applications. The program is divided into three levels: 5, 50 and 100 users. The proposed innovative digital products, with the participation of the representatives of the American company ESRI in the Republic of Moldova - ArcGIS [24], will support researchers in the development regions, in the visualization (presentation in the form of a digital map) of large amounts of statistical information (created and updated data) with a geographical reference. Owning such a set of methodological and software, the innovative community has enhanced the synergies between the National Funds and the External Support Programs.

Conclusions

The implementation of digital solutions in the

rural areas **based on results** of international best practices, will contribute to:

- preparation of regions, local initiative groups for the digital transformation and mobility policies as part of regional, national action plans;

- solving the target policies [25] of potential smart villages projects in the regions of the associated countries EU;

- compatibility of localized software solutions in the planning of international mobility activities, as smart infrastructure, software and digital educational products, project management services, expertise are localized.

The beneficiaries of the proposed solutions in digital benchmarking can be regional SMEs, farms, companies with foreign capital, educational institutions. The following results are expected:

- compilation of consumer summaries for enterprises (example: Big Data research) [26];

- comparing performance with companies in the industry and with successful practices at the national and international level;

- developing incentives and ideas for business improvement with respect to digital technology and smart manufacturing.

Depending on the performance, the staff of the companies participating in the platform can be selected as candidates to participate in "Best Practices" projects at the national and international level, which will allow to:

- learn best practices from other companies at home and abroad;

- establish contacts with other staff, managers and experts from the industry and science (networking) in the country and abroad;

- participate in discussions about local, sectoral and international challenges and opportunities, as well as explore and find new approaches to business and career development.

The implementation of these approaches will have a positive impact on the cross-national and cross-regional compatibility of digital innovation,

guaranteeing the high quality of publicly available cross-border and cross-sector electronic services and easier exchange of information between national electronic registries, including cross-border exchange with EU registries related to rural development.

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