

# FIRST STEPS TOWARDS DIGITAL RURAL DEVELOPMENT AND SMART VILLAGES IN HUNGARY

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## ABSTARCT

In the academic literature on the territorial aspects of digital transformation and related smart policies, the co-called 'smart city approach' is still over-represented. This should come as no surprise, since the innovations that characterize the 4th industrial revolution were originally developed in urbanized areas and/or sought to address problems of a metropolitan nature. However, as the benefits of smart solutions can not only be felt in urbanized areas, but can also play a major role in reducing the disadvantages of rural areas, researches on rural digitalization has increasingly used the terms 'smart rural area' and 'smart village' since the 2010s, along the lines of 'smart city'. In parallel, the European Union, the spread of the smart village approach has been observed since the 2014-2020 budget period, too: the *EU Action for Smart Villages*, which was set up in 2016, the *Thematic Group on Smart Villages*, launched in September 2017, and the *Smart Villages. Bled Declaration for a Smarter Future of the Rural Areas in EU*, which was adopted on 13 April 2018, highlight some of the key milestones.

The disadvantages of rural areas does not pose problems primarily at the technological level, although the deployment of certain ICT technologies (such as 5G networks) in low population density areas may, for example, be difficult due to the low expected return on investment. It may be more important to remove the societal barriers to digitalization through the creation of basic digital skills (so-called 'digital literacy') and the institutionalization of complex processes based on these skills (on-line learning, working and services; a wide variety of networking partnerships etc.) that are essential for the effective functioning of the digital society.

The paper starts from the above mentioned definitions and problems of digital rural development as we know them from international and Hungarian literature, and based on these, it tries to present the emergence and evolution of the smart village approach in Hungary, outlining its first results and most important challenges. In methodological terms, the study is a kind of discourse analysis, a description and analysis of the progress of the smart village approach in the Hungarian development policy discourse. Although the postmodern/critical discourse analyses often highlight the repressive nature of power politics, I will take a different path. At this stage of my research, the smart village approach is conceived as a win-win game, from which can benefit both the central level, which plays a key role in the institutionalization, and local actors, who are largely interested in making their rural settlement/region smarter.

The starting point of my discourse analysis is that the history of digital rural development in Hungary so far can be divided into three more or less overlapping phases:

a) *the preceding phase*, where bottom-up good practices at local level, which are still scattered, should be highlighted;

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- b) *the preparatory phase*, during which the issue of digitalization is slowly gaining ground in the public administration and spatial development discourse, but the importance of policies specifically targeted at the smart village approach is still in the background;
- c) finally, *the phase of maturation*, where the smart village approach becomes a dominant actor in rural development policies.

As for the preceding phase, it is clear that in an era when the smart village does not yet play a dominant role in policy discourse, the role of innovators who are early to heed the call of the zeitgeist can be particularly important. Consequently, common feature of the preceding phase is that the innovations in question are project-based, focusing on the implementation of a single idea. This is why we need to pay even closer attention to more complex experiments than the previous ones, where the focus is not primarily on an innovation, but on creating and improving the resilience of the municipality and/or the region based on innovative (and preferably technology-driven, in line with the spirit of the smart village definitions) solutions. As the most significant example of such complex bottom-up rural innovations in Hungary, I would like to draw attention to the Alsómocsolád centered North-Hegyhat Micro-regional Union (Baranya county), whose participants on 10 October 2018 declared their intention to create Hungary's first 'smart region',

What is analyzed in the most detail in the presentation of the preparatory phase is the Digital Success Program, launched by the Government Decision No. 2012/2015 (XII. 29.) on the Digital Success Program to be implemented by the Government on the basis of the results of the national consultation on the Internet and digital developments (InternetKon). We will also complement our analysis with some of strategic and operational results of the preparatory phase relevant to digitalization, such as the strategy document Digital Agricultural Strategy of Hungary 2019-2022 or the Field Monitoring Laboratory project at the Széchenyi István University of Győr. I will demonstrate that their connection with digital rural development and the smart village approach – compared to, for example, the digitalization efforts in Hungary in general and/or the digital agricultural development – is rather loose. However, this is not their main importance. What is really important is that if digitalization in general becomes the focus of policy discourse at the preparatory phase, its impact will sooner or later (in the next phase of maturation) spread to the smart village approach.

In my paper, I argue that the smart village approach has recently reached a stage of maturity in Hungary. The emergence of the so called 'smart village' in the academic and professional discourse is of course not without precedent. I will discuss in detail the history of the telecottage movement from the first half of the 1990s, and the institutionalization process of the Digital Success Program points, as a result of which there were already 1725 Digital Success Program points (institutions well equipped with modern multimedia tools, focused on improving the digitalization mostly in rural small settlements) in Hungary at the beginning of 2022. However, in the opinion of the author, November 2020 could mark the very beginning of this phase, as that is when Alpár Gyopáros, the government commissioner responsible for the development of modern settlements, announced at the Civitas Sapiens'20 smart city online conference that the Government of Hungary would announce the Digital Village Program. In my paper, I will a special focus on this most promising (and, perhaps, the first) result of the phase of maturation that is just beginning. I will look in detail at how the Digital Village Program is trying to be more than a financial (grant) support system for digitalization, and how the Program's managing and operating institutions, such as the Digital Success Nonprofit Ltd. and others, can contribute to these goals. I would like to touch upon the role of my workplace, the University of Public Service in the Digital Village Program, especially the Digital Spatial Development Specialist and Digital Spatial Development Referent training courses. I will also discuss two other sub-actions of the Digital Village Program, the role of the 'digital maturity probes' and the Civitas Sapiens Smart City Marketplace in making our

villages smarter. The former is a group of methodological tools (analysis and processing of existing strategies, analysis of local statistical data, in-depth interviews with opinion leaders, on-line questionnaires) which aiming at measuring the digital maturity of settlements, attempt to provide personalized recommendations to the municipalities concerned on the most optimal path to becoming a smart village. As for the latter, the Civitas Sapiens Smart City Marketplace is a quality-assured platform through which suppliers, developers and potential customers of smart city (and even smart village) products can find each other more quickly and easily than before.

In examining the emergence and evolution of the smart village approach, I would not neglect to present the perspective of the stakeholders, i.e. local actors interested in the digitalization of rural areas, willing and able to take action. I will point to the continuity between the local actors of the first two phases and those who are successfully participated in the first ever launched 'The Digital Village of the Year' competition of the Digital Success Program. Through examples of the Alsómocsolád-centered North-Hegyhat Micro-regional Union (and municipality Nagypáli, Zala county), I will seek to answer how the concept of 'smart village' is perceived by the stakeholders from the beginnings, and what possible conclusions (e.g. the diffusion of the bottom-up good practices embodied towards the Digital Village Program) can be drawn from this. On the other hand, other experiences of the competitions (e.g. the HUF 1 million prize for the winners) should remind us that the bottleneck to the success of the Digital Village program is still financial: a serious financial contribution (e.g. the arrival of EU rural development funding for 2021-2027) is needed to be the program truly fulfilled.

## POINTS FOR PRACTITIONERS

The results of the paper can be used by practitioners, especially the local actors in two ways. On the one hand, it can help them to understand the concept of digital rural development, and that of smart village, in particular the requirements that the Digital Village Program's managers/operators have for local actors at the actual phase of maturation of the Hungarian digital rural development, as a prerequisite for successful participation in the Program. On the other hand, the demonstration of good practices in digital rural development can provide useful guidance for rural municipalities that have only achieved modest results in this field so far and would like to know how to create and operate a truly 'smart' village in the current era of the 4th Industrial Revolution, beyond simple compliance with the requirements of the Digital Village Program.

*Keywords:* smart villages, rural development, digitalization, innovation

## 1. Introduction

According to a now commonplace interpretation, humanity has reached the threshold of the so-called 4th industrial revolution. The 4th industrial revolution itself can be most easily approached by using the concepts of "digitization" and "digitalization". (Rolandi et alii 2021, 2.) 'Digitization' is the key concept of the third industrial revolution from the 1970s to the present day and can be defined as the technical transformation of analogue information into digital form. In contrast, 'digitalization' is becoming inescapable in the forthcoming 4th industrial revolution, and refers to the interconnectivity of rapidly evolving information and communication technologies (henceforth ICT) and the resulting socio-technological context that increasingly permeates our everyday lives.

The innovations that characterize the 4th industrial revolution were originally developed in urbanized areas and/or sought to address problems of a metropolitan nature (a classic example is the case of digital innovations to tackle traffic congestion). Accordingly, the concept of the *smart city*, based on the application of ICT solutions, has become a dominant element of the scientific discourse related to the 4th industrial revolution from its very beginning. (Sallai 2018, 16.) The urban development challenges associated with the accelerating pace of technological development are increasingly becoming part of the practice of urban planning. (Bajnai - Németh, 2021.) At the same time, however, it soon became clear that the benefits of ICT solutions cannot be limited to urbanised areas. Moreover, the problems associated with urban and rural (non-urbanised) areas no longer exist in their pure form in today's world, or are intertwined; thus, development policies that focus exclusively on the 'city' or 'rural areas', are probably out of date. This phenomenon, known as *hybridization*, is compounded by the specific problems of rural areas at a lower level of socio-technological development, which are linked to what is known as *peripheralization*. (Matern et al. 2020.) The peripheral location of rural areas does not pose problems primarily at the technological level, although the deployment of certain ICT technologies (such as 5G networks) in low population density areas may, for example, be difficult due to the low expected return on investment. It may be more important to remove the societal barriers to digitalization through the creation of basic digital skills (so-called 'digital literacy') and the institutionalization of complex processes based on these skills (on-line learning, working and services; a wide variety of networking partnerships etc.) that are essential for the effective functioning of the digital rural society. The creation of these specificities, which are perhaps less lacking in urbanized areas, justifies the existence of a sub-discipline within rural development, which could be called *smart village discourse*, along the lines of the smart city discourse. Although publications related to certain elements of the smart village discourse appeared in the academic sphere after the turn of the millennium (Atkočiūnienė - Vazonienė 2019, 506), the real turnaround only occurred after rural development policy makers started to take a keen interest in the narrower (technological) and broader (social) issues of digitalization. In the European Union, this breakthrough has been a major one since the 2014-2020 budget period: the *EU Action for Smart Villages*, which was set up in 2016, the *Thematic Group on Smart Villages*, launched in September 2017, and the *Smart Villages. Bled Declaration for a Smarter Future of the Rural Areas in EU*, which was adopted on 13 April 2018, highlight some of the key milestones. (Szalai - Fabula 2021). Viewed in this context, The European Network for Rural Development (ENRD), which is the key driver of European rural development policy, defines the concept of a smart village as „*Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to improve their economic, social and/or environmental conditions, in particular by mobilising solutions offered by digital technologies*”. (ENRD)

## 2. Methodology

As I mentioned in the introduction, I understand the academic dialogue and professional practice related to the so-called smart village approach as a kind of discourse (the 'smart village discourse'). In methodological terms, the following study is therefore a discourse analysis, and a brief preliminary reflection seems indispensable for a more precise understanding. In the simplest approach, the social sciences consider discourse as an institutionalized way of thinking. And since the notion of institutionalization and the institution itself are closely intertwined with the concept of domination (the permanent institutionalization of power), and power is traditionally seen as repressive, attempts to define it often seek to understand the functioning of discourse in the context of the expectations and rules constructed by those in power. A classic example is Michel Foucault's theory of discourse, according to which "*we must conceive discourse as a violence which we do to things, or in any case to practice which we impose on them; and it is in this practice that the events of discourse find the principle of their regularity.*" (Foucault, 1981. 67.) Although Foucault's theory cannot yet be considered critical in the literal sense of the word, since he considered repression to be an inescapable feature of discourse, the theories and analyses of discourse conceived in the postmodern spirit have mostly followed the critical path, ranging from feminist critique (Butler 1997) to interpretations that seek to expose the postcolonial order of discourse (Said 1978).

In what follows we will take a different path. Hereinafter, the smart village approach is conceived as a win-win game, from which can benefit both the central level, which plays a key role in the institutionalization, and local actors, who are largely interested in making their rural settlement/region smarter. Thus, while we do not exclude the possibility of complementing the smart village discourse with a kind of critical analysis at a later stage of the research, here and now we focus our attention on the consensus components of the Hungarian smart village discourse, trying to describe/understand its functioning in as much detail as possible. The description can be seen as '*thick*' (cf. Geertz 1973) in the sense that we attempt to describe and understand the phenomena involved within the context of the discourse itself, and understanding is made possible by dismantling and unravelling the superimposed and entangled conceptual systems. (Glózer n.d.) The focus of this dismantling and unravelling process must naturally be the key concept of discourse, the smart village. Our analysis is therefore concept-centered and - since it grasps the key concept in question as a product of the zeitgeist in its development - also historical, in a way that Reinhard Koselleck's research "*directs itself to the semantics of central concepts in which historical experience of time is implicated.*" (Koselleck 1985, XXIV) Between the academic discourse and the professional practice that is attached to the smart village approach, the professional practice that has a fundamental influence on the development of our rural settlements and regions will be preferred in my discourse analysis.

## 3. History of the smart village approach in Hungary

Due to its semi-peripheral location, Hungary is not among the pioneering countries in terms of either academic discourse or policy/professional practice related to smart rural development, and therefore the focus on smart villages in Hungary is only somewhat delayed. On this basis, the history of smart village approach in Hungary can be divided into the following three phases, which more or less overlap in time:

(a) *the preceding phase*, where the emergence of good practices at local level should be highlighted;

b) *the preparatory phase*, during which the issue of digitalization is slowly gaining ground in the policy discourse, but the importance of policies specifically aimed at the smart village approach is still in the background;

c) and finally, *the phase of maturation*, where the smart village approach becomes a dominant actor in rural development policies.

### 3.1. The preceding phase

The preceding phase can be best understood in the light of *Tímea Boda's* comment. Analysing the specificities of development in disadvantaged rural areas, the author notes, "*we must not forget the person who seeks paths and connections, who gives meaning to these terms, who gives them content, and who can act as an innovator in a given environment, building on given resources*". (Boda 2013, 106.) It is clear that in an era when the smart village does not yet play a dominant role in policy discourse, the role of innovators who are early to heed the call of the zeitgeist can be particularly important. The lack of supportive policies means that the good practices they put in place are not yet generalized, but mobilizing local resources and using various EU and national funds - not yet specifically dedicated to smart development - can already achieve significant results in this period. For example, the recent study by *Petra Kinga Kézai* and *Márta Konczosné Szombathelyi* on European and national patterns of rural innovation (Kézai - Konczosné 2021, 66), using the typology developed by Mahroum and his co-authors (Mahroum et al. 2007), refers to three subtypes of innovation patterns offered by rural spaces, depending on whether they are triggered by rural, urban or universal demand. As far as the innovation patterns generated by rural demand are concerned, the automated mobile banking service introduced in the Alcsútdoboz area of Fejér county under the name of Takarek Smart Point in 2017 can be explicitly placed within the framework of the smart village approach, but the mobile post office in the Ózd area of Borsod-Abaúj-Zemplén county and the local currency, the 'Rigac', introduced in the village of Alsómocsolád (Baranya county) also have their own 'smart' characteristics, even if innovation in the latter cases is not primarily technological. Among the innovation patterns created by urban demand, the 'Village for rent' project in the municipality of Megyer (Veszprém county) in 2006 – which involved the renovation and subsequent publicising of abandoned houses in the village with EU funding – was too dependent on the mayor-innovator, and after his resignation the innovation itself seems to have ceased. Another interesting experiment is the memorial forest created in 2014 in Agostyan, Tata (Komárom-Esztergom county), where the ashes of deceased loved ones are placed in a biodegradable, environmentally friendly urn at the roots of a pre-selected memorial tree in the forest. Finally, the Renewable Energy Innovation Eco-Center, opened in 2007 in Nagypáli (Zala county) as a promotion center, is a good example of innovation patterns created by universal demand. Through pilot projects, training courses and practical advice, it organises temporary exhibitions, conferences, lectures and workshops on biomass, biogas, solar and wind energy, and on the potential uses and methods of implementing energy crops.

A common feature of the examples mentioned above is that the innovations in question are project-based, focusing on the implementation of a single idea. This is why we need to pay even closer attention to more complex experiments than the previous ones, where the focus is not primarily on an innovation, but on creating and improving the resilience of the municipality and/or the region based on innovative (and preferably technology-driven, in line with the spirit of the smart village definitions) solutions. As the most significant example of such complex bottom-up rural innovations in Hungary, I would like to draw attention to the

North-Hegyhat Micro-regional Union, which was established in March 2014 by the local governments, economic actors, institutions and civil organizations of five Baranya County municipalities (Alsómocsolád, Bikal, Mágocs, Mekényes, Nagyhajmás), but can hardly be separated from the innovator role of László Dicső, mayor of Alsómocsolád. On 10 October 2018, its participants declared their intention to create Hungary's first 'smart region' in the so-called Smart Hegyhát Declaration. The basic strategic document of the cooperation is the *Smart Hegyhát Strategy - Hungary's Smart Village Regional Pilot Program. The Draft Detailed Strategy of the Smart Hegyhát Program* (hereafter: Smart Hegyhát Strategy), published in March 2019. The introduction of the document defined the smart village as "*a community-based initiative to harness the potential of information technologies in rural areas.*" (Smart Hegyhát Strategy 2019, 3) On this basis, the smart village is presented as a community that can demonstrate the true values of rural life and recreate them at a higher level. The first and most tangible result of its work could be the demographic rebalancing and the reversal of past trends of ageing and depopulation.

In order to understand the essence of the smart village discourse in Hungary, it is worth examining how local actors themselves perceive the problems in question, and possible directions for solutions. In close connection with these problems, the Smart-Hegyhat Strategy identifies 10 current overarching objectives<sup>2</sup> of the North Hegyhát Micro-regional Union, and 14 potential areas of use<sup>3</sup> of its digital ecosystem. (Smart Hegyhát Strategy 2019, 26.) The projects related to the objectives/areas of the Smart Hegyhát Strategy are planned to be implemented within a five-year timeframe. For example, the 2020 Action Plan of the Smart Hegyhát Strategy (hereafter: Action Plan 2020) foresaw the launch and/or implementation of 24 projects at the beginning of the year. Of these, only one (digitalization of local history collections and country houses) can be considered as a development project that has already been launched. Most of them (15 projects) are projects started with the launch of the Smart Hegyhát Strategy, but a good number (8 projects) are new projects that could be launched or are to be launched in the Action Plan. (Action Plan 2020, 3) Although the COVID-19 crisis was not necessarily the most favourable context for realising the vision of becoming a smart area, it is important to note that some results have already been achieved, partly related to and building on the developments already made. Good examples are the ERASMUS+ project 'Preparing for active ageing', which aims to develop digital literacy among older people, and the 'NetreFel!/Go online!' training program related to the above mentioned ERASMUS+ project, whose online learning material can be successfully used in other communities, too; (GoOnline! 2020) or the high quality operation of DJP points linked to the Digitális Jólét Program/Digital Success Program (three in Alsómocsolád and 1-1-1-1 in the other four municipalities). (Digital Success Points) But the mention of the so called DJP points takes us to the second, preparatory phase of the development of the smart village approach.

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<sup>2</sup> Namely: (1) Support for disadvantaged youth; (2) Involvement of the future generation in planning, shared vision; (3) Aware skills development and skills retention; (4) Communication, cooperation, coordination; (5) Strengthening the local economy, keeping incomes local; (6) Development of regional attractions for joint exploitation of tourism potential; (7) Increasing energy efficiency, environmental sustainability through new technologies; (8) "Born to be healthy" - health, work capacity, active ageing; (9) Social inclusion, reducing housing and energy poverty; (10) Public safety, public confidence.

<sup>3</sup> Namely: (1) digital ecosystem health; (2) social care; (3) public education; (4) education; (5) community development; (6) settlement and area development, marketing; (7) local economic development; (8) traffic development, transport; (9) environmental protection, maintenance; (10) built environment, utilities, public space; (11) energy supply, lighting; (12) public safety, security; (13) public management, local administration; (14) 'Smart Hegyhát Program'.

### 3.2. The preparatory phase

The beginnings of the preparatory phase can be traced back to 2015, when, following the rejection of the Internet tax raised in the previous year - which caused the disapproval of the majority of Hungarian society - the Government of Hungary first conducted a national consultation on the Internet (the 'InternetKon'). And then, taking into account the results of the InternetKon, it faced the problem of digitalization in the Government Decision 2012/2015 (XII. 29.). Perhaps, the most important result of the Government Decision is that "*based on the opinion of Hungarian citizens, the Government launches the Digital Success Program for the development and improvement of Hungarian society and the Hungarian national economy.*" The novelty and fresh approach of the Digital Success Program (Digitális Jólét Program - henceforth: DJP) can be approached from several angles. The most important is the fact that the implementation of the DJP is to take place "*in the broadest possible professional and social consultation.*" According to the Government Decision, this meant a call for the establishment of effective consultation forums and channels with market players involved in the development of the digital ecosystem as well as with professional and civil society organizations, under the direction of the Prime Minister's Commissioner responsible for the coordination and implementation of government tasks related to the DJP. From a strategic point of view, this entailed, as a first step, the revision of the National Infocommunications Strategy 2014-2020 and, from the operational side, the implementation of the tasks stemming from the DJP. The aim is to implement the digitalization of the domestic economy and society, with a key role for "*ensuring widespread accessibility and affordability of the internet*". In order to achieve this, the Government Decision was not content with certain declarative objectives (such as „*the promotion of competition in the broadband and superfast internet services market*”), but did not shy away from more specific incentives, such as the inclusion of internet services in the list of products subject to a reduced VAT rate of 18%. From the point of view of the smart village approach, perhaps point 2 j) of the Government Decision deserves the most attention. This provided for the launch of a consultation mechanism involving service providers, municipal representatives and other stakeholders, which could lead to the establishment and operation of a free public broadband wireless Internet service (wifi) in at least one public building and at least one public space in every municipality. This point could be interpreted as the first serious sign of government commitment to the digitalization of peripheral settlements, which, together with other sections of the Government Decision which not relevant only to rural areas, such as the development of the digital competitiveness of small and medium-sized enterprises, could serve as a basis for a more systematic smart village policy in the future.

Within the framework of the DJP, several important sectoral digitalization strategies were already adopted in 2016 (Hungary's Digital Education Strategy, Hungary's Digital Export Development Strategy, Hungary's Digital Startup Strategy), followed by the Digital Success Program 2.0. in July 2017. The latter was intended to provide a systematic framework for the DJP's actual and planned new programs. (DJP 2.0. 2017, 3-4) In truth, the link between the DJP 2.0. strategy document and the digitalization of the countryside is still rather weak, in line with the specificities of the preparatory phase. Thus, the DJP 2.0 - apart from the fact that the digital Hungary obviously includes the countryside - does not go into detail about the problems of digitalization of the countryside. For example, the chapter on the Digital Work Program, which aims to develop digital competences, identifies people living in "*rural white spots*" as a target group with potential reserves, but only as one example, among those who have dropped out of tertiary education, women, career changers and workers leaving the public sector. (DJP 2.0. 2017, 62) At the same time, the tourism dimension is emerging as a promising direction, albeit still rather on the fringes of the smart city approach. As the DJP

2.0 puts it, "*given the government's commitment to the development and catching-up of smaller settlements and underdeveloped rural areas, and to cross-border initiatives (EGTCs), it is necessary to take into account the settlement structure of certain priority areas, especially tourism areas, in order to enable them to participate in Smart City-style developments*". (DJP 2.0. 2017, 121)

For the above reasons, the only exception to the scope of our analysis is point 3.4.2 "*Digital agricultural strategy; support for the digital development of agricultural regions*". However, in order to be able to make a nuanced assessment of the links between the digital agricultural strategy envisaged in the pages of the DJP 2.0 and the smart village approach, please allow me to make two comments. On the one hand, the digital agricultural strategy is clearly dominated by a sectoral approach: in point 3.4.2, the term 'rural areas' is not once described. Nevertheless, the use of the term 'agricultural areas' [highlighting by me - B.T.L.] in the title of the chapter suggests that the digital agricultural strategy could be developed in such a way as to incorporate the digital rural development and smart village approach. On the other hand, it should not be forgotten that – since the rural development discourse takes it as evidence that rural areas can be considered a complex system, i.e. one that includes not only agricultural activities – the strategy document Digital Agricultural Strategy of Hungary 2019-2022, which is envisaged in the DJP 2.0. and was finally adopted in August 2019, does not in itself mean that we are entering the phase of maturation. Nevertheless, the Digital Agricultural Strategy is worth evaluating in a complex way. At the very least, the Executive Summary at the beginning of the text argues that "*the implementation of the actions of the strategy will directly increase the digitalization of the countryside [and not only rural agriculture - B.T.L.], the diffusion of digital technologies and services in homes, backyard farms, the economy and public life, contributing to the development of the quality of life in rural areas*". Immediately afterwards, where the document writes that "*digital technology, with its potential for online sales, also opens up new income channels,*" not only in agricultural production but also in "*tourism*", it goes even further in pointing beyond the narrow sectoral approach. (Digital Agricultural Strategy 2019-2022, 7) Of course, there is no need to overdo it. The Digital Agricultural Strategy is a sectoral program that is about the digitalization of agriculture and that further develops and deepens the objectives of the five main areas identified by the DJP 2.0, such as applications supporting production processes, farm-level production management systems, systems supporting product path integration, professional background systems, administrative background systems (DJP 2.0 2017, 70-71). So if we want to know what has been achieved so far in terms of the objectives of the Digital Agricultural Strategy, we need to look for examples from the agricultural sector.

One such forward-looking initiative is the research project of the Field Monitoring Laboratory at the Széchenyi István University of Győr, specifically at its Faculty of Agriculture and Food Sciences in Mosonmagyaróvár. Its primary objective is to lay the foundations for digital agriculture in Hungary, in the field of arable crops, as yet also referred to in the project's name. The research, and the hoped-for turnaround associated with it, could be implemented in three steps, with some simplification: a) data collection using various IoT tools; b) data processing using Big Data-based technologies; c) and finally, institutionalization of an agricultural information and advisory service. The term IoT (Internet of Things) is generally used to refer to the dominant role of new types of hardware for capturing data and transmitting them over the Internet. It is clear that such devices, typical of the 4th industrial revolution, can be used to make agricultural production more efficient. In the experimental farm of Széchenyi István University – a 6 hectare maize and a 15 hectare wheat field – a wide range of IoT tools are being used to collect relevant data that were previously only available manually, and were much more difficult and/or costly to obtain. Most notable here are the intelligent sensors of the Zaragoza-based Libelium Telecommunication Company, which

provide continuous information on, for example, the state of soil and groundwater, which are crucial to the success of agricultural production. Intelligent sensors are complemented by other IoT devices and technologies, such as unmanned aerial drones, robots with interfaces or a wide range of remote sensing technologies. Collecting data using IoT tools alone does not make agricultural production more efficient: it is not enough to collect data on a previously unknown scale, but it must also be processed according to a suitable criteria. To describe the complex technological environment for this, the literature likes to use the term Big Data. In Hungary, it is now possible to interconnect these data sources using the LoRaWAN network technology made available by Antenna Hungária PLC, which can serve a very large number of low-power devices over a long range, and the network servers of the Swiss company LORIOT enable cloud-based data provision. The data under study will then be received, stored and analysed by the software platform designed by the Field Monitoring Laboratory. Of course, there is still a long way to go from the Field Monitoring Laboratory, which is the first Hungarian Agro-IoT project, to the digitalisation of Hungarian agriculture. The IoT-related data collection and Big Data-based processing of agricultural activities at the experimental farm of Széchenyi István University is only a "test run", which will hopefully lay the technological foundations for the institutionalization of a future nationwide agricultural information and advisory network. (Nyéki – Neményi 2021)

In the previous sections, we have only referred to some strategic (DJP 2.0, Digital Agricultural Strategy) and operational (Field Monitoring Laboratory) results of the preparatory phase. We have seen that their connection with digital rural development and the smart village approach is still rather loose. However, this is not their main importance. What is really important is that if digitalization in general becomes the focus of policy discourse at this stage, its impact will sooner or later spread to the smart village approach. In the following, we will discuss the initial steps of this process in the context of the phase of maturation.

### 3.3. The phase of maturation

The fact that in the DJP 2.0. strategy document the problem of rural digitalization has been less emphasised does not of course exclude that already in preparatory phase there are not negligible opportunities for rural areas committed to digitalization, future smart villages. A clear example is the North Hegyhát Micro-regional Union, which was mentioned earlier in connection with the preceding phase, as a typical bottom-up community driven by innovator(s), but some of its results (e.g. the establishment of three DJP Points in the region) clearly show that the smart village approach was not alien to the initial efforts of the DJP. The isolated good practices (the preceding phase) and the initial efforts of the DJP in this direction (the preparatory phase) could therefore already have been cross-fertilising each other at that time. However, their antecedents go back much further than the Government Decision 2012/2015 (XII. 29.) and/or the DJP 2.0 strategy document. Perhaps, the first relevant antecedent is the telecottage movement, which has been linked to the specific bottom-up formations that have been emerging since the first half of the 1990s. According to the definition of the Hungarian Telecottage Association, a telecottage is *"a people- and society-oriented innovation, which aims to develop and shape the community and society, and through these to improve the quality of life of the people living in the settlement. It is also a place that provides the opportunity to organize community programs, tools and assistance for everyday life, for the management of affairs, for the creation of a community scene. Telecottages can function as a community information service, and can be understood as a single community information network"*. (Telecottage) In practice, this means an institution well equipped with modern multimedia tools, set up in disadvantaged settlements where such

tools were difficult or impossible to access. Inspired by the global telecottage movement, the history of telecottages in Hungary began in 1994, when 15 individuals founded the Hungarian Telecottage Association, based in Csákberény, Fejér County. The first telecottage program was launched in 1995 with the support of The United States Agency for International Development (USAID), coordinated by the Network for Democracy Program, and 31 telecottages were established as a result. From then on, more and more telecottages were established until 2003, when the association signed an agreement with government agencies to implement the Public Web Program, which aims to develop network services, including access to electronic services and content (especially e-government), and digital literacy. (Introduction to the telecottage 2013) The most important direct results of the Public Web Program were the introduction of the eHungary point service, operating in a public, multifunctional community service space with the presence of eAdvisor(s), and the connection of about 300 telecottages to the network service system. In 2014, a total of 1276 eHungary Points were already registered, more than 80% of them in municipalities with less than 10,000 inhabitants. Two thirds of the host institutions were libraries, municipalities, telecottages or community centers. (Varga, 2015.) According to Government Decree No. 127/2017 (VI. 8.), DJP Points were established on the basis of the existing network of eHungary Points, and it soon became clear that – beyond the change of name – the institutionalization of the DJP points gave a new impetus to digitalization, including the digitalization of rural areas. In addition to the existing eHungary points – especially thanks to the Economic Development and Innovation Operational Program (GINOP) 3.3.1. grant – a number of new organizations have also been able to join the renewed network. The same tender has also enabled the technological upgrading of around 1500 DJP points (standardized equipment packages, bandwidth increase and free wifi broadcasting) and the modernization of human resources (training of DJP mentors to replace former eAdvisors). It is important to underline that the development of the renewed network of DJP points has also focused on improving the digitalization of disadvantaged rural settlements: for example, the most developed NUTS 2 region of Central Hungary did not benefit at all from the GINOP 3.3.1 grant. (Szilassi 2017, 35-36) At the time of writing (13 March 2022), the DJP point search engine of the DJP network website already contains the contact details of 1725 DJP points, mostly in rural small settlements. (DJP Point finder)

However, regardless of the spread of the DJP Points network outlined above, a real breakthrough – and the very beginning of the phase of maturation - can only be said to have taken place once the smart village approach is formulated and/or implemented in a systemic way, within the DJP framework or in another form. In the opinion of the author of these lines, November 2020 could mark the beginning of this phase, as that is when Alpár Gyopáros, the government commissioner responsible for the development of modern settlements, reported at the Civitas Sapiens'20 smart city online conference that the Government of Hungary would announce the Digital Village Program (Digitális Falu Program - henceforth: DFP). (Világgazdaság 2020) The DFP – which, in cooperation with the DJP, is already using a wide range of smart solutions to improve the attractiveness and livability of small villages – can be approached as a complement to the Hungarian Village Program. The latter was announced and made available by the Government of Hungary from 2018/2019 with the aim of improving the quality of life of rural settlements with less than 5000 inhabitants and the people living there, raising the quality of services and making available long-awaited, gap-filling developments. In accordance with Government Decree No. 1669/2018 (XII. 10.), Hungary's 2019 central budget allocated HUF 75,265,500,000 for the sub-programs of the Hungarian Village Program. It is true that these sub-programs were not yet linked to digitalization. The only exception is the sub-program "Renovation of the Mayor's Office",

which also provides support for the "Modernization of the information and telecommunications network". (Call for proposals 2019)

But let us return to the DFP. According to a 2021 interview with Attila Balla, Deputy Managing Director of the Digital Success Non-profit Ltd., who is also responsible for the DJP, although no one questions the benefits of digitalization of villages in principle, there is still resistance at local level due to certain misunderstandings. However, it would be a mistake to contrast digitalization with the more 'traditional' problems of rural areas (which are still considered more important by many local actors). On the contrary, digitalization should be seen as a tool that can effectively help to overcome the inherited handicaps of rural areas, too. The simplest way to show this is through the nine sub-actions of the Digital Village Program.<sup>4</sup> (Magyar Építők 2021) The majority of these sub-actions are vertical (i.e. relevant only for specific sectors, e.g. waste and energy management, air quality protection, etc.), but there are also horizontal ones which can help certain rural settlements and/or areas to become smarter on a complex way. Here I would like to mention 2 such sub-actions, and 1 special precondition in more detail:

a) The *training of professionals* capable of adapting the academic and professional discourse related to digitalization to local development policies is rightly called by Attila Balla the 'zero step' of the DFP. The various training programs for this purpose appeared in the offer of Hungarian higher education in the late 2010s. The first complex training course on smart city approach was the post-graduate training course *Digital Spatial Development Specialist*, launched by the Civitas Sapiens Workshop in cooperation with the University of Public Service, Edutus University and Moholy-Nagy University of Art and Design. The aim of the training was to train specialists who "*have comprehensive knowledge of the relationship between digitalization and localities, the smart city perspective and practice.*" (Digital spatial development referent webinar training 2021) Although the course, which requires a university degree as an entry qualification, has so far been completed by a number of key players in the field of digital spatial development,<sup>5</sup> the total number of students enrolled (52 diplomas awarded by autumn 2021) is hardly a breakthrough. (Balla 2021, Questionnaire 2022) This is why a simplified, online version of the the post-graduate training course – the *Digital spatial development referent* webinar training – could be of particular importance for the smart village approach. Those who successfully complete the 4-week training course, required secondary education as an entry requirement, will receive a certificate of completion of the Digital Spatial Development Referent training. The aim of the course is, according to the training promoters, "*to have a professional in each municipality who has completed the training and can thus successfully participate in the digitalization and smart transformation of the management of their own and the surrounding towns/villages.*" (Digital Spatial Development Referent Webinar Training 2021) According to the 2021 interview with Attila Balla, nearly 1300 Hungarian municipalities in Hungary and beyond the borders have registered for this webinar training, which was made available to all Hungarian municipalities from January 2021, in 1 month, laying the foundations for the development of a national network that truly understands the concept of digitalization.(Magyar Építők 2021)

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<sup>4</sup> Namely: (1) Digital Maturity Probe; (2) Village Resettlement and Investment Platform; (3) Village Purchasing and Sales Community Digital Produce Market; (4) Waste App Waste Management; (5) Village Energy Community; (6) Village Career Bridge Program Village Labour Market Module; (7) Village Air Quality Measurement, Detection and Sanctioning; (8) Digital Village Development Specialist and Referent Training, Alumni Network; (9) Personal and Asset Protection.

<sup>5</sup> For example, according to a questionnaire sent out by the author, the mayor of the municipality of Alsómocsolád or a deputy state secretary and a head of department of the Ministry of the Interior.

b) The transformation into a smart village can also be greatly helped by the so-called '*digital maturity probes*' (településszondák), which attempt to provide personalized recommendations to the municipalities concerned on the most optimal path to becoming a smart village. The methodological tools required (analysis and processing of existing strategies, analysis of local statistical data, in-depth interviews with opinion leaders, on-line questionnaires) are complex and costly, and therefore – although it is currently possible to 'request a proposal' on the DJP website (Digital Maturity Probe) – it is difficult to imagine the generalization of this kind of research for disadvantaged rural municipalities without a higher level of central funding and/or grants. At present, therefore, the various digital maturity probes are still linked to and carried out in the framework of pilot projects in about 40 (mostly urban) municipalities.

c) Strictly speaking, the *Civitas Sapiens Smart City Marketplace*, a quality-assured platform run by DJP, is not one of the above-mentioned sub-actions, but rather the foundation for their success, through which suppliers, developers and potential customers of smart city (and even smart village) products can find each other more quickly and easily than ever before. The platform itself was launched by DJP in January 2022. (Smart City Marketplace Platform is launched 2022)

Of course, the above-mentioned sub-actions will only be able to achieve their goals if local actors who want to make their villages smart are able to mobilize the resources to make their vision a reality. This system to support smart villages is not yet in place, but the first important steps in this direction can already be mentioned. In 2021, DJP launched the Digital Village of the Year competition, with winners in four categories: Innovative Municipal Environment, Sustainable Natural and Built Environment, Innovative Social and Community Welfare, and Innovative Economic Ecosystem. The winners of the Innovative Municipal Environment and Sustainable Natural and Built Environment categories (Alsómocsolád and Nagypáli) have been a key players in the field of smart villages in Hungary from the beginnings. In their cases, success can already be interpreted as a kind of 'lifetime achievement award', a recognition of their successes to date, perhaps also contributing to the enrichment of the DJP's definition on smart village. The winners of the Innovative Social and Community Welfare and Innovative Economic Ecosystem categories (Füzérradvány, Borsod-Abaúj-Zemplén county and Rábapordány, Győr-Moson-Sopron county) are newer players. As for Füzérradvány, the focus was on making the municipality smarter in a general sense ('Digital media literacy' lectures for the older generation, provision of CCTV cameras, development of a solar energy system to supply the local church with energy), while in the case of Rábapordány, an automated pig farm, unique in Hungary but also a rarity in Europe, won the judges' approval. (Digital Village of the Year 2021) In their cases, the recognition certainly highlights the demands of the political discourse for smart villages, follow from the above mentioned ever-evolving/enriching smart village definition. Finally, in addition to the fact that participation in the competition (which will be announced again this year) motivates people to think about smart developments and helps them to learn the basics of project-based thinking, the HUF 1 million prize for the winners and the opportunity to participate in the digital maturity probe free of charge can also help the winners financially. (okosipar.hu 2022)

#### 4. Conclusion

As we have seen, smart villages do not have a long history in Hungary, but given that the breakthrough in the smart village discourse has only occurred in the last few years, even in the European Union, we should not be surprised. Rather, we should point out that at the time of writing, the first steps towards smart rural development have been taken in our country, too.

Good practices based on isolated initiatives and local innovators were soon joined by policies focusing on digital prosperity and, more recently, on the digitalization of rural areas. The Digital Village Program, announced in November 2020, could be particularly relevant in this respect, although it is likely to be a long way before it is truly fulfilled. In this respect, it is important to mention the HUF 4300-4400 billion in rural development funding available to Hungary in the 2021-2027 EU budget period, which - thanks to the government's commitment to a maximum national co-financing rate of 80% for rural development - could far exceed the HUF 1300 billion spent in the previous cycle. (novekedes.hu 2022) And if this is indeed the case, then the phase of maturation for smart villages in our country is truly in the brink.

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