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The rising importance of the "Smart territory" concept: definition and implications

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ABSTRACT

The "Smart territory" concept emerges strongly not only as an extension of the smart city concept but also in opposition to it. The "smartization" of cities can produce a digital gap in the territories, particularly in rural areas that do not have the services and capabilities that citizens in urban areas enjoy. This is the first study fully focusing on the concept of 'smart territory', its relevance and the reasons for its emergence. It is also a wake-up call about the benefits of its momentum in the field of digital public policies, particularly in Europe. The beginning of the EU programming period 2021–2027 represents a good opportunity to include clear initiatives for smartization in the Territorial Cohesion Policies, expanding their wider scope and operationalization to different geographical areas.

1. Introduction

Research on smart cities has received increasing attention from scholars and practitioners in recent years (see Anthopoulos, 2015; Bibri & Krogstie, 2017; Yigitcanlar et al., 2018, as examples of literature reviews). The debate on its definition is still ongoing, involving academia, public administrations and industry players. To date the definition of this concept is even more complex as everything becomes smart (smart buildings, smart villages, smart destinations, among others) and the spatial scope also evolves including new regional initiatives, networks of municipalities, and even smart countries (Angelidou, 2014; Palomo-Navarro & Navío-Marco, 2018).

The "Smart territory" concept emerges strongly not only as an extension of the smart city concept but also as opposed to it. The "smartization" of cities can produce a digital divide between and within geographic areas, particularly in rural areas. In the current climate of metropolitan fever, areas in the shadow of metropolitan regions tend to be neglected (Borsekova et al., 2018). Despite this debate, the growing interest in smart territories is scarcely reflected in research agendas[1]. This justifies the brief study presented here.

Therefore, our goal is to explore the emergence of the smart territory concept and the motivations that have driven its increasing use, as well as revising its definition and anticipating the implications that the diffusion and use of the concept may cause. We propose as research question, therefore, what they are and how they appear. We will raise different issues given the interest that the concept has for the economy, territorial development, sustainability and public policy[2]. Unleashing smart territories facilitates their integration into the digital world; it anchors the population in the territory and provides local opportunities.

2. The concept of "Smart territory"

In the multiple smart city definitions, it is common to refer to the use of ICTs to provide intelligence to cities (Caragliu et al., 2011; Nam & Pardo, 2011; Silva et al., 2018, among others). The European Parliament (2014) proposed a simple definition that includes different conceptions: The smart city is one that seeks to solve public problems through solutions based on technology in the framework of a partnership between different participants, both public and private.

By extension, the "Smart territory" can be defined as a geographical space, which seeks to solve public problems through technology-based solutions within the framework of a partnership between multiple participants from different sectors. The key to the movement of smartening territories lies, therefore, in applying similar ICT tools that have been used in urban areas and apply them to a wide variety of geographical contexts. This can range from rural lands to natural protected areas, and include many issues, such as food security, lighting, waste management and ecosystem services (Louman and Campos Arce, 2015; de Melo, & Hossain, 2018).

The most significant aspect of the concept is to establish a geographic framework and propose policies that are able to encompass a comprehensive context, consistent with the nature of the sought objectives (Garcia-Ayllon & Miralles, 2015). This implies the extension of the concept of smart city to a more comprehensive geographic scope, such as the surrounding territory, which is also more consistent with the very purpose of sustainability and efficiency of smartisation (Garcia-Ayllon & Miralles, 2015).

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The spatial element is therefore essential in comparison to other initiatives with different geographical scopes, as summarised in Table 1. The term smart territories is undoubtedly more holistic and comprehensive than other concepts such as smart villages (Zavratnik et al., 2018) or smart islands (Angelidou, 2014). The smart village is more limited and conceptually different than the aggregate construct of a "rural area" or "countryside" (Visvizi, & Lytras, 2018a, 2018b). "Smart territory" could encompass all of them, based on the polysemic and multi-faceted character of the concept "territory".

However, at the same time smart territories could be seen as opposed to smart cities by association with non-urban spaces. Recent proposals claim that there is a need to focus on the development of cheap and sustainable services for non-metropolitan areas and the countryside in general (Ferretti et al., 2016). The overarching goal is to promote and maximise the potential of decentralized areas, as the latter are still experiencing problems in obtaining and retaining access to goods and services due to their limited availability connectivity and smart services (Velaga et al., 2012; Wang et al, 2019).

Spatial inequalities have characterised the digital era since its beginning: scholars have coined the concept of 'rural-urban digital divide' to describe the uneven geographic distribution of connectivity and digital skills (OECD, 2001). Not only has the diffusion of digital infrastructure been slower in rural areas than in urban areas due to the cost of broadband networks. Rural communities and businesses have also struggled to develop the skills necessary to leverage the full potential of digital technologies (Salemink et al., 2017; Scheerder et al., 2017).

Minimising such spatial inequalities is crucial for rural development, as smart technologies are expected to enhance the productivity of rural businesses, promote sustainable growth of rural economies and favour the inclusion of rural communities in cultural, social and political activities. As a result, the smartisation of rural areas has become a priority of cohesion policies.

To date, though, public efforts for the diffusion of smart technologies have been quite fragmented in the EU and nationally, as the European Commission (2019) itself admitted. Although collaboration between multiple actors from different sectors and geographical areas is one of the core tenets of the EU multilevel governance system (Gerli et al., 2019), the emphasis on such coordination has been limited in current policies for the smartisation of cities and rural areas. This risks to intensify the competition between metropolitan areas and decentralised regions, that is considered one of the most visible results of the "new regionalism" policy in the EU (Havlík, 2018).

The concept of smart territory proposed here goes beyond this rigid urban/rural dichotomy and forces policymakers to design and implement policies that do not prioritise cities over rural areas or vice versa. Additionally, the smart territory concept comprehensively encompasses the digital evolution of all new settlement phenomena. Terms such as "peri-urbanisation", "metropolization" and "rurbanisation", or models such as the "urban countryside" with new ways of life and lifestyles that are neither rural nor urban (Bedini & Bronzini, 2016) are also partially covered.

Adopting the concept of smart territory, future interventions could overcome the hierarchical approach implicit in many EU programmes to create truly cooperative and holistic smart policies, wherein public authorities at different administrative and geographic levels work together on projects that benefit larger territories. Otherwise, "smartness" runs the risk of only being a tool for urban branding (Vanolo, 2015) rather than contributing to cohesive and sustainable development policies.

3. Reasons for its emergence

The concept of smart territory arises from the juxtaposition of two elements of growing interest:

Table 1
"Smart" definitions

Term	Definition	References
Smart City	A Smart City is a city seeking to address public issues via ICT-based solutions on the basis of a multi-stakeholder, municipally based partnership	European parliament, Mapping smart cities the UE http://www.europarl.europa.eu/RegData/etudes/etudes/join/ For a review: Albino et al., 2015. See also: Gil-Garcia et al., 2015; Caragliu et al., 2009, 2011); Chourabi et al. (2012); Giffinger et al. (2007). Nam, & Pardo (2011); Anand & Navio-Marco (2018).
Smart Village	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.	European network of Rural Development https://enrd.ec.europa.eu/smart-and-competitive-rural-areas/smart-villages/smart-villages-portal_en For a review: Zavratnik, Kos & Stojmenova (2018). See also: Somwanshi et al. (2016); Visvizi, & Lytras (2018a, 2018b); Wolski & Wójcik (2019).
Smart Building	A building that connects its various subsystems together via information technology operating independently while sharing information to optimise performance.	Rameshwar, Solanki, Nayyar & Mahapatra (2020). For a review: Ghaffarianhoseini et al. (2018). See also: Snoonian (2003); Jia et al. (2019).
Smart Island	Different authors emphasize the territorial specificities on an island (insularity) as a unique asset to differentiate it from other geographical areas and emphasise ICT usage to address the challenges they pose.	Smart Islands Declaration: http://www.smartislandsinitiative.eu/pdf/Smart_Islands_Declaration.pdf See also; Angelidou (2014); Priano et al., 2016; Desogus et al., 2019.
Smart Destination	An innovative tourist destination built on an infrastructure with state-of-the-art technology, which guarantees the sustainable development of tourist areas, facilitates the visitor's interaction with and integration into his or her surroundings, increases the quality of the experience at the destination, and improves residents' quality of life.	Xiang et al., 2015; Lopez de Avila, 2015. For a review: Shafiee et al. (2019). See also: Ivars-Baidal et al., 2019; Jeong & Shin (2019); Cimbaljević et al., 2019; Gretzel & de Mendonça (2019).
Water Smart Territories	The European Commission has started to apply the concept in water management as a thematic area. The main goal of this thematic area (WST) is to strengthen the innovation capacity of European regions beyond resource efficiency, in order to facilitate new investments based on open innovation infrastructures and new technologies for sustainable water management by clusters in regional ecosystems. Water industry challenges will be addressed through advanced technological solutions to tackle European water territories and society needs.	European Commission: Water Smart Territories https://s3platform.jrc.ec.europa.eu/water-smart-territories

Source: compiled by the authors

1) The "Smart" phenomenon. In smart cities, "smartness" refers to a

[1] Just a search on the WoS of "Smart Territory" as a measure to verify the lack of publications with impact: 18 in comparation with "Smart City" 6930 or "Smart Village" 90 (April 2020).

[2] For example: In Spain, the Ministry of Energy, Tourism and Digital Agenda published in December 2017 a National Plan of Smart Territories (2017-2020) with 170 million

et al., 2015). Currently, the "smart" term has spread widely and any project Involving ICT, especially the Internet of Things (D'Angelo et al., 2017) merits the adjective. Moreover, there is a need to reconsider whether smartness is perceived as overemphasised and overcooked in relation to cities. There is a risk that the term may soon be seen as being past its sell-by date (Anand & Navío-Marco, 2018).

2) The concept of "territory". A "territory" can be defined as a geographic space with a special identity (Medeiros, 2016). Scholars have recently emphasised "the resurgence of territory" (Painter, 2010) as the concept has increasingly attracted the interest of researchers from different disciplines, such as political geography (Storey, 2009), regional development (Bærenholdt, 2009), and even globalization (Sassen, 2000). Over the years, the conceptualisation of "territories" has evolved towards a more dynamic perspective that places more emphasis on socio-economic relationships rather than geographic boundaries. Accordingly, Painter (2010) defined territories as the "product of networked socio-technical practices" rather than "timeless and solid" geographical units. Likewise, Medeiros (2016) noted that territories differ from regions, as the former do not necessarily indicate specific and well-defined administrative entities and can refer to different scales of analysis (from suburban to supranational level). Accordingly, the territorial dimension of a policy is not linked to a specific geographical unit but refers to its ability to promote the cohesion and development of a certain geographic area, as integration between territories is not static, but changes over time to reflect socio-economic developments.

The concept of territory has also gained momentum among EU policymakers (e.g. Colomb & Santinha, 2014), replacing the term "spatial" in the jargon and focus of the EU institutions (Medeiros, 2016). In particular, since 1988, the EU Commission has adopted policies for "territorial cohesion", which entail the definition of a long-term development strategy to address inefficiencies and inequalities constraining the development of y in certain territories (Nosek, 2017).

EU policymakers have lately recognised that geography matters for the sustained future of the EU[3] (European Commission, 2017a, 2017b, 2017c; Pelucha et al., 2017). This has reflected in the European Territorial Agendas (2007, 2020), which champion an inclusive, sustainable, smart Europe of diverse regions and promise more targeted support for the EU citizens living in those places which have been "left behind" (European Commission, 2010; Walsh, 2012; Pelucha et al., 2017).

The EU Urban Agenda (Medeiros & Rauhut, 2020) also acknowledges the polycentric structure of Europe and emphasise the need of cities to cooperate within their functional areas and with their surrounding regions. Medium-sized towns are, therefore, seen as territorial cohesion anchors, connecting and reinforcing territorial and urban policies in order to maximise their added value for other communities in the surrounding rural and peripheral areas (European Union, 2007).

4. Implications and conclusions

To date, the plethora of smart concepts (see Table 1) has hindered a systematic and holistic effort to bring together the knowledge gathered from academic research and practical experience. This paper focuses on the concept of smart territory that has recently emerged amid interesting debates. On the one hand, the nature of "smartness" and the massive dissemination of intelligence in public and private life reflect major socio-economic changes driven by ICT. On the other hand, the rural-urban digital divide as a further source of spatial inequalities and the territorial focus of the new cohesion policies in the EU invite to reflect on the geographic scope of current policies in support of smart technologies.

This research challenges the narrow and rigid geographic scope of existing initiatives that tend to develop around the urban/rural dichotomy. This approach perpetuates the hierarchical relationship between cities and the countryside, one that has long characterised rural development policies and undermined their outcomes (Pemberton, 2019). Furthermore, this approach is likely to exacerbate existing spatial inequalities due to the uneven diffusion of digital skills and infrastructures (Park, 2017).

Therefore, we propose the concept of smart territory as an alternative approach for urban planners, policy representatives and decision makers involved in the development and implementation of smartization policies. Future interventions in support of smart technologies should be designed around territories, defined by socio-technical relationships rather than administrative boundaries. A focus on smart territories will force policymakers and practitioners to adopt a holistic approach to tackle both urban and rural problems with a consistent and coordinated set of solutions, enabled by digital technologies. For example, Bedini and Bronzini (2016) identify new areas of urban planning which can be better addressed with the support of "smart territories": the recovery of areas around historic cities, the redefinition of urban borders, the reconnection of open spaces enclosed with the countryside, and the reconstruction of a fruitful and nurturing relationship between city and countryside in the digital world, are some of the possibilities.

The beginning of the programming period 2021–2027 represents a good opportunity to apply this approach to fulfil the expectation of the EU in placing more emphasis on territorial cohesion, at a time when the European Commission announces more locally-led policies (European Commission, 2018). The introduction of this approach could help to enhance, at least to some extent, strategic thinking in territorial policymaking to support more digital and inclusive societies. For example, a poignant challenge such as rural depopulation could be better addressed if urban and rural stakeholders collaborate to design smart solutions enabling equitable access to essential public services across rural, suburban and urban areas within the same territory.

In order to achieve these goals, future initiatives to support smartness across the EU should encourage local authorities to coordinate their interventions. In order to obtain EU funding, local actors should be required to design their projects so that the adoption of digital technologies benefits the entire territory and generates synergies to tackle both urban and rural problems. The governance of these initiatives should also be coordinated and shared across multiple local actors, to make sure that the interests of various stakeholders are taken into account when designing and implementing smart territories (Kummitha & Crutzen, 2017).

As noted in Gerli et al. (2019) the success of this model is affected by the human and financial resources available locally. Consequently, future policies in support of smart territories must make sure that the actors involved in these policies are equipped with adequate skills and sufficient funding to manage such complex projects and effectively contribute to their governance. Bridging the gap in digital skills within and across territories is also key to maximise the outcomes of smart technologies and realise their potential for territorial cohesion (Briggeman & Whitacre, 2010). This reinforces the need to adopt a human-centric approach to smart territories that should be place-tailored and designed around the problems of local communities rather than the agenda of technology providers (Kummitha & Crutzen, 2017).

Previous research has suggested that the operationalization of territorial cohesion might be easier and more productive on a smaller scale (Zaucha & Böhme, 2020). Smart territories can further sustain territorial management using digital capabilities to create a flexible geographical framework where different geographic units can be treated, managed and monitored in a homogeneous way (Van Eupen et al., 2012) albeit respecting their differences. Promoting the operationalization of smart territories can enable the smart management of many services (waste, cleaning, utilities and transport are examples). This can result in a better quality of life, increased citizen participation, and can encourage social and political reflection that promotes digital inclusion, inclusive delivery of public services and new forms of participation in decision-mak-

[3] The Territorial Agenda 2020+ is being conducted through an intergovernmental process, which started in late 2017. The TA 2020 provides strategic orientations for territorial development and underlines the territorial dimension of the Europe 2020 Strategy for smart, sustainable and inclusive growth (ESPON, 2019).

As an example of operationalization, the region of Castilla-Leon in Spain has recently launched an initiative called "Smart rural territory"[4] to be applied in subregions and districts, with the support of the European Regional Development Fund (ERDF). It has developed a software platform to help the local administrations to manage public services (from waste management to parking, from environmental monitoring to bike renting) in an integrated, replicable, coordinated and smart way. Likewise, the Italian national Agency for Digitisation has been working on a "Smart Landscape Platform" that can be used by local administrators to develop smart services and applications for the governance of their territories. This measure is included in a broader strategy that aims to overcome the "smart city" model by promoting integrated initiatives that expand smart technologies to key logistic nodes and industrial zones (AGID, 2019).

By introducing and defining the concept of smart territory, this paper lays the groundwork for further research on the operational aspects of this new approach to smartness, in particular with regard to its governance and the coordination of the multiple interest groups with a stake in smart territories. From a theoretical perspective, this paper also calls for further research on the intersection between smartness and space. We expect that the academic and political discussion on the "territorial dimension", linked to the smart phenomenon, will lead to a greater awareness of the importance of the geographical analysis of policies to better understand the territorial impacts in all the dimensions of territorial development.

As a result, all the institutions involved (from supranational to local) now have the opportunity of looking at their territories as "living organisms" (Yan et al., 2018) using intelligence to create a close bind between people, infrastructures and the environment. These movements towards the so-called "smarter territories" are creating a myriad of opportunities for improving people's lives, bearing in mind the wellness of present and future generations, with a more efficient use of resources.

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CRediT authorship contribution statement

Julio Navío-Marco: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Writing - original draft, Writing - review & editing. **Beatriz Rodrigo-Moya:** Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing. **Paolo Gerli:** Formal analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft, Writing - review & editing.

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