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Discourses and practices of the smart city in Central Eastern Europe: insights from Hungary's 'big' cities

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ABSTRACT

This paper intends to fill a gap in critical smart city scholarship regarding the Central Eastern European (CEE) context. To this end, smart city understandings and practices in Hungary's five (non-capital) major cities are examined through a discourse-analytical focus on relevant municipal planning documents, existing interventions and key actors' interpretations. The paper concludes that although smart city building in Hungary in many ways aligns with trends in the Global North and South, there are also notable differences that need to be contextualized in the country's historically shaped trajectory of urban (policy) development, especially its post-socialist institutional path-dependencies.

KEYWORDS

Smart city; discourse; urban policy; Hungary; Central Eastern Europe

Introduction

In the past decade, 'smart' has become a universally sought-after feature for cities across the world and 'smartification' a widely accepted urban policy imperative. Understandings of the smart city have largely centred around the idea that the embedding of ('smart') information communication technologies (ICTs) into the urban fabric will help tackle urban management issues (Kitchin 2014; Grossi and Pianezzi 2017) and improve cities' environmental and economic performance, as well as residents' quality of life. In addition, the use of technology-based tools has also been presented as a promise for the improvement of public administration and urban planning (Jiang, Geertman, and Witte 2019), as well as for creating more inclusive forms of governance (Kleinhans, Van Ham, and Evans-Cowley 2015; Joss, Cook, and Dayot 2017). This paper approaches the smart city phenomenon through the lens of critical smart urbanism (Verrest and Pfeffer 2019) that has warned from taking the above-sketched idealized visions of smart urban futures at face value. Instead, it has been proposed to regard smart urbanism as a 'seductive and normative' (Luque-Ayala and Marvin, 2015) discourse selectively combining ideas that (re)imagine cities in the digital age, and as a set of corresponding urban (policy) practices enacting these imaginations. Critical scholars assert thus that rather than plausible and neutral, smart city visions always embody selective and hence particular political and policy visions (Kitchin 2014;

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Engelbert, Van Zoonen, and Hirzalla 2019). Recently, this lens has been productively applied to shed light on how the smart city concept is understood and translated into practice in the Global North (see, e.g. Crivello 2015; Shelton, Zook, and Wiig 2015; Taylor Buck and While 2017; Coletta et al., 2019) and Global South (Datta 2015; Guma and Monstadt 2020).

The present paper has the primary aim to expand the empirical scope of the critical smart city literature by zooming in on how and which aspects of smartness have been mobilized and operationalized in the course of smart city building in Hungary's five major cities. By doing so, the paper intends to (start) fill(ing) the knowledge gap (although see Hýllová and Slach 2018; Sikora-Fernandez 2018) concerning smart city understandings and practices in Central Eastern Europe. Furthermore, by studying Hungary's (non-capital) 'big cities' (*nagyváros*) (Faragó 2009) that appear 'only' as minor cities in the international context (see, e.g. Lux 2015), the paper also addresses the existing bias towards metropolitan areas in the literature (see Karvonen, Cugurullo, and Caprotti 2018, p. 5; Joss et al. 2019). Second, in line with calls for accounts of smart city building based on in-depth fieldwork rather than document analysis alone (Kitchin 2015), the paper assumes that although they are insightful, text-oriented discourse-analytical perspectives on smart city development (e.g. Joss, Cook, and Dayot 2017; Joss et al. 2019; Engelbert, Van Zoonen, and Hirzalla 2019; Haarstad 2017) shed insufficient light on the role of agents in the field. To properly situate smart cities in space and time (Shelton, Zook, and Wiig 2015), it is also crucial to consider how key actors, embedded in a field shaped by policy constraints and opportunities, invest the smart city with different meanings. Hence, this paper argues that exploring the contextualised self-interpretations of actors (Glynos and Howarth 2008) is key to elucidating the local manifestations of the smart city phenomenon.

The remainder of the paper is organized as follows. First, a conceptual framework is sketched of local smart city building as a situated discourse and practice, unfolding in a multiscalar setting. Subsequently, the paper briefly discusses the original research projects on which the present study is based, as well as issues of methodology, to be followed by remarks on the case study context. The fourth, main section discusses the main findings of the in-depth, qualitative analysis of smart city discourses and practices in Hungary's major cities. This analysis shows that in many respects, smart city development in Hungary fits generally observed trends, but there are notable differences that can only be accounted for in the context of the country's historically shaped urban policy field. We provide a discussion of the main insights derived from the analysis and conclude with some suggestions for future research.

Smart city building as a situated discourse and practice

A key tenet of the critical smart city literature has been that 'urban problems and their proposed smart solutions are socially constructed' (Verrest and Pfeffer 2019, 1337). In this scholarship, the smart city has often been conceptualized in terms of a discourse, that is, as an (always selective, hence political) ascription of meanings to digital technology use in urban policy and management (e.g. Pollio 2016; Haarstad 2017; Joss, Cook, and Dayot 2017; Joss et al. 2019; Engelbert, Van Zoonen, and Hirzalla 2019). As Haarstad (2017, 424) pointed out, 'the "smart city" seems like a textbook

example of an "empty signifier"', that is, a concept lacking any substantive meaning. Indeed, smartness has been associated with various qualities – such as 'sustainable', 'liveable' and/or 'innovative' (Joss et al. 2019) –, and arguably, the wide appeal of the smart city concept is related to this ambiguity and versatility as the concept can act as 'a sort of ideal collector of topics, questions and issues which already existed in urban discourses' (Crivello, 2015, p. 919). However, as critical discursive perspectives have highlighted, actual smart city policies always privilege some aspects over others; the smart city is a 'political entity' that implies choices based on a set of selective rationalities (Vanolo 2014; Engelbert, Van Zoonen and Hirzalla 2019).

While the worldwide engagement with smart city development might have been primarily fed by tech giants' corporate storytelling (Söderström, Paasche, and Klauser 2014), the 'smart city is more than "mere" discourse' (Joss et al. 2019, 5) in the sense of smart city 'talk'. Rather, the smart city becomes meaningful through discourses understood as relational systems of signifying practices (Torfing 2005) – the elaboration of smart city strategies, the establishment of smart city working groups and the implementation of actual smart city projects, amongst others – that articulate different rules, norms, resources, practices and subjectivities in particular ways (Howarth 2010). 'Actually existing smart cities' (Shelton, Zook, and Wiig 2015) are thus 'both *constituted by* and *constitutive of* prevailing ideas, policies and practices in and about smart cities' Engelbert et al (2019, p. 348, emphasis original). This process of constitution is contingent and context dependent. On the one hand, the spread of the smart city concept is exemplary of global urban policy mobilities (Crivello, 2015; Cowley, Joss, and Dayot 2018), leading to the formation of a 'global discourse network' (Joss et al. 2019) in which smart city-related ideas and (best) practices circulate. On the other hand, actual manifestations of the smart city continue to differ as 'localized discourses absorb and rework the circulating discourse into particular geographical, cultural and organizational settings' (Joss, 2019, 6). In this process of reworking, aspects of the smart city that 'fit' established institutional structures and resonate with prevailing policy discourses, as well as with the agendas and strategies of relevant actors, become selectively combined and adapted (cf. Cowley, Joss, and Dayot 2018). Thus, to reveal (whether and) how smart city ideas become actually implemented, '[t]he articulation of [...] signifiers must be analysed as embedded in [...] particular institutional practices' (Müller 2010, 15). Here, it is crucial to consider the discourses, practices and institutional-regulatory frameworks 'at' different scales that play a mediating role and shape local smart city building efforts: 'smart city strategies [...] should be conceptualized as part of a wider multiscalar political setting' (Smigiel 2019, 338). In the European context, smartness has become a 'highly desirable "urban adjective"' (Engelbert, Van Zoonen, and Hirzalla 2019, 352) due to the availability of large grants, and the European Union's (EU) smart city agenda – promoting the idea smart in terms of innovativeness, knowledge, and research (Haarstad 2017) – has become an important source of local smart city discourses (see, e.g. Pollio 2016, for Italy; or Haarstad 2017, for Norway). In addition to the supranational scale, the nation-state has significant economic, social and environmental interests in promoting the spread of smart technologies (Taylor Buck and While, 2017) and national smart policies also play an important role in framing urban development (policy) challenges and their 'solutions' (Pollio 2016; Ho 2017). Furthermore, the national context plays a role more broadly–

that is, beyond smart city-related policies – as a relevant scale of urban regulation, discursive framing and strategy-making (Varró and Bunders 2020).

In line with the above, the starting point of the paper is that in order to account for actually existing smart cities, we need to contextualize smart city understandings and practices by linking the selective combinations that the latter entail to the specificities of the (multiscalar) setting in which they emerge. Building on this premise, the present paper intends to expand the often rather agent-less, text-oriented discourse-analytical perspective on smart city policies (e.g. Joss, Cook, and Dayot 2017; Joss et al. 2019; Engelbert, Van Zoonen, and Hirzalla 2019; Haarstad 2017). Textual re-presentation certainly plays an important role in constituting the smart city; however, privileging this aspect risks de-contextualizing the process of meaning making. In order to properly contextualize smart city building, one also needs to attend the agents of it, and this inquiry can usefully start with an interrogation of the key intermediaries – municipal officials, smart city experts – that play an important role in translating smart city ideas into practice (Bunders and Varró, 2020). To date, however, there has been little if any consideration of relevant local actors' voices that 'fill' the smart city meaning in the CEE context. This paper addresses this lacuna and, following Glynos and Howarth (2008, 156), adopts 'a perspective that seeks "from within" to make intelligible the meanings and reasons' that key actors of smart city building in Hungary's major cities give for their actions and practices. By doing so, the paper seeks to grasp how key actors shape the smart city amidst constraints and opportunities emanating 'from' different (global to local) scales such as the conditionalities of smart city-related funding schemes at the EU and the national level, budgetary constraints, the possibility to join smart city networks, and locally existing development priorities, amongst others.

Notes on the original research projects and methodology

The present paper is based on empirical material collected during two parallel, complementary research projects on smart city policies and development in Hungary, carried out by one of the authors each. Both projects have been grounded in the understanding of the smart city as discourse and practice and have applied an iterative research strategy using qualitative methods. The first (ongoing) project, focusing on the impact of the smart city concept on urban development policy and practice in Hungary started in 2017, involving the analysis of relevant texts (national policy documents, reports, guidelines and legal texts), the media coverage of smart cities and smart city building, and the websites of relevant institutions. Furthermore (repeated), semi-structured interviews (19 in total) have been conducted in the period between April 2017 and July 2020 with key figures of national policymaking, with municipal policymakers, as well as policy consultants, civil society actors, and a representative of an ICT company. Furthermore, three informants provided extensive responses by mail. The second project (September 2019 – February 2020) zoomed in on actual smart city building policies and practices in Hungary's five second-tier cities. In addition to the in-depth content analysis of the selected cities' relevant policy documents and their media coverage related to smart city development, 12 semi-structured interviews were conducted with local policymakers and smart city experts, as well as with actors involved in national policymaking, private sector representatives and academics. Additionally,

the second project included participant observation at smart-city related conferences and events.

Drawing on the experiences and insights gained from the above projects, for the preparation of the article the authors collectively carried out an in-depth discourse analysis of selected municipal policy documents, as well as a focused re-interpretation of the interviews with local actors[1] (15 in total) involved in smart-city building in the five cities, in order to distil the main ways in which the smart city has been interpreted and enacted in the cities under study. The document analysis focused on statutory municipal development documents: settlement development concepts (*Településfejlesztési Koncepció*, hereafter TFK) that offer a conceptual vision for the long term (15–20 years), and integrated settlement strategies (*Integrált Településfejlesztési Stratégia*, ITS). Furthermore, smart city strategies (where these exist) and non-statutory planning documents dealing with the introduction of data-driven urban development tools – most notably Sustainable Urban Mobility Plans (SUMP) and Sustainable Energy and Climate Action Plans (SECAP)[2] – were included into the analysis. The analysis started with each of the two researchers closely re-reading the documents and making an overview of the ways in which notions of 'smart', '*okos*' (the Hungarian equivalent of smart), *intelligens* (intelligent) and *digitális* (digital) appear, and what they are associated with in different cities' documents. The resulting, independently established labels were then compared, refined, and brought together in one single set of codes (see *Table 1*) which served as the basis for the overview of smart city understandings presented in the next section.

Overall, the methodological approach taken here diverges from other, mainly textually oriented discourse-analytical accounts in three notable ways. First, text analysis took a different form than the partly quantitative, software-aided inquiries into smart city discourses that have measured the relative weight of meanings by counting the co-occurrences of certain terms (Joss, Cook, and Dayot 2017; Joss et al. 2019). We opted for the manual, micro-level analysis of texts[3] that allowed to acknowledge that interpretations of smartness do not solely 'reside in' expressions containing the term smart and that associations with smart urban development are not necessarily made explicit. Second, the coding process was not exclusively inductive (that is, data-driven), as we assumed that a researcher is 'always-already within a meaningful objects and practices' (Heidegger, quoted by Howarth 2005, 322): his/her a priori knowledge – of the dimensions along which smart city development is commonly discussed (Giffinger et al. 2007; Sikora-Fernandez 2018) or of the codes used by existing discourse-analytical studies on smart cities (Joss et al. 2019), as well as insights gathered during fieldwork – unavoidably influence which themes are recognized as relevant. Third, it was considered crucial to make use of reactive forms of data collection, such as interviews and participant observation to get a grip on what 'moves' agents and on how they

Table 1. Codes emerging from the discourse analysis of policy documents.[4]

Environmental sustainability	Education	Social cohesion and policy
Urban management	Governance	E-government
(Public) transport management	Liveability/Quality of life	
Healthcare	Public safety	
Tourism	Economic development	

interpret their own situation and practices (Howarth 2005; Müller 2010). This did not mean taking actors' own self-interpretations at face value; rather, as researchers, we provide second-order interpretations of actors' self-interpretations by linking them to wider structural anchors and locating them thus in a particular social-institutional context (ibid.). To minimize researcher bias, investigator triangulation (as discussed above) and informant feedback were used at key points of the analysis.

Case study focus and national urban policy context

Concentrating one-fifth of the country's population and dominating its economy and political and cultural life, Hungary's capital Budapest has been 'the lonely star of the Hungarian urban system' (Egedy, Kovács, and Kondor 2017, 18) since the establishment of Hungary's state borders at the end of World War I. We decided to omit Budapest from our analysis and to focus on the cities at the next level of the urban hierarchy – Debrecen, Szeged, Miskolc, Pécs and Győr – to analyse the patterns of smart city discourses and practices in Hungary. Although there are some non-negligible differences concerning their sizes, economic development profiles and trajectories (see overview in *Table 2*), we assumed that by focusing on these non-capital major cities, we can carry out a more consistent transversal analysis revealing the convergences and divergences of smart city discourses and practices in Hungary. Furthermore, as alluded to in the introduction, such a focus was expected to fill the knowledge gap in smart city research on second-tier, minor cities.

Concerning the policy context in which the cities in question have operated, similar to other CEE countries, EU cohesion policy and the prospects of funding have been important drivers of the 'Europeanization' of development policies in Hungary and triggered an adjustment to the requirement of strategic planning (Dąbrowski 2014). Accordingly, Integrated Urban Development Strategies (*Integrált Városfejlesztési Stratégia*, hereafter IVS) – operational urban development strategies for the medium

Table 2. Hungary's 'big cities' and their economic development profiles.

City (number of inhabitants)	Economic development profile
Győr (132,038)	• The centre of Hungary's strongest economic region, dominated by German automotive manufacturers and their suppliers
Pécs (142,873)	• Stalled development after post-1990 deindustrialization • (Largely unsuccessful) attempts to ground economic development in the health, environmental and cultural industries (in the latter e.g. as European Capital of Culture, 2010)
Szeged (160,766)	• Longstanding centre of food industry and agriculture • Strengthening collaboration between local scientific research and industry, including IT
Debrecen (201,432)	• Prospering economic centre of the Northern Great Plain region due to FDI • Focus on automobile industry, agrobusiness, biotechnology and IT • Hosts the largest university in the country
Miskolc (154,521)	• Centre of an old industrial region • Post-1990 the composition of manufacturing became diversified (automotive industry and electronics) and traditional industries significantly upgraded

Source: Authors' compilation based on Rácz (2008), Faragó (2012), Lux (2014), Molnár et al. (2018) and EDC (2019); https://ec.europa.eu/

term (7–8 years) – were introduced in 2007, and they were a prerequisite for obtaining funding from Regional Operative Programmes in the EU budgetary period 2007–2013. In 2012, the IVS was replaced by the ITS that became a condition of access to funding (from the Territorial Operative Programme) in the 2014–2020 EU programming period. Yet, the institutionalization of strategic development at the sub-national level has stayed superficial, for several reasons (Dąbrowski 2014). First, there has been a lack of institutional capacity at the local and regional levels (ibid.), which has remained unaddressed as the EU Commission came to prioritize absorption capacity (Faragó and Varró, 2016). This approach has also reinforced centralizing tendencies and, coupled by the reluctance of central government to hand 'down' decision-making powers, has left little room for bottom-up strategy making (Dąbrowski 2014). Relatedly, although Europeanization in the field of local development has brought about an explicit concern with partnership, a lack of institutional and organizational capacity, as well commitment by local government, accompanied by the constant time pressure that has characterized EU-funded project realizations, has kept citizen participation at the level of empty formality (Bajmócy et al. 2016).

In the post-2010 period, centralization in Hungary has intensified; stripped most of their previous competences and increasingly limited in their financial and discretionary freedom, municipalities had restricted opportunities to engage in integrated local development (Pálné Kovács 2019). Most recently, municipalities saw their financial room for manoeuvre further curtailed as a result of the halving of local tax for small and medium-sized businesses (a vital source of local government revenue) from 1 January 2021, announced by central government as a measure to manage the economic crisis induced by the COVID-19 pandemic. Cities with county rights[5] – including those under study here – have been relatively less affected by centralization measures (Pálné Kovács 2019) and have had more funding at their disposal, including dedicated funding from the Territorial and Settlement Operative Programme (TOP), as well as under the Modern Cities Programme (a development programme aiming to turn cities with county rights into regional economic centres). Yet, even Hungary's major cities have struggled with the economic and institutional weaknesses under post-socialism (Lux, 2015); their lack of development know-how and skilled personal (ibid.), and their – in international comparison relatively – sparse financial means and the limited scope of municipal functions have undermined their capacity to proactively shape their local business environment (Somlyódyné Pfeil 2019). Furthermore, although in policy rhetoric it has been recognized that city regions constitute a key factor of national economic competitiveness, no coherent urban policy has been put in place (ibid.). Rather, the country's (largely implicit) national urban policy has been shaped a shifting constellation of (often insufficiently cooperating) ministries and national agencies.

The heightened concern with smart city development, emerging parallel to Hungary's attempts to develop its digitalization policies in line with the EU's Digital Agenda (European Commission 2010), has fed hopes that the smart city concept could potentially help catalysing a move away from a(n EU) funding-driven approach towards a 'European-style', i.e. long-term oriented, participative planning culture (Varró and Bunders 2020). Accordingly, the 2017 revision of the 2012 government decree on local-level planning documents contained a definition of the smart city[6] and stipulated that

smart cities are those that elaborate their ITS based on the smart city methodology of the Lechner Knowledge Centre (LKC). The smart city methodology of the LKC – the background institution of the Department of Spatial Planning and Urban Management of the Prime Minister's Office in the fields of architecture, spatial planning and related IT services – has conceptualized smartness as a horizontal, integrative dimension of technology-aided, inclusive governance (see the series of documents containing hands-on guidelines at http://okosvaros.lechnerkozpont.hu/hu). While widely known, these (non-binding) guidelines have had, as yet, limited effect in practice; given the lack of (financial) incentives and the lack of institutional and human resource capacity, amongst others, few municipalities have embarked on the revision of their ITSs following the LKC framework (Varró and Bunders 2020).

In view of these contextual factors, some further remarks need to be made concerning the (makers of) policy documents that will be at the centre of this paper's analysis. As elsewhere in Central Eastern Europe, EU accession has paved the way to the 'projectification' of regional and local development in Hungary. This gave rise to the 'project class': a new administrative and economic elite (consultants in the form of agencies and individuals) possessing the managerial, intellectual and scientific knowledge necessary for the extensive documentation of projects (co-)financed by the EU (Kovách and Kučerová 2006). Relatedly, local development strategies – in Hungary ITSs in particular – have tended to be (project-based) wish-lists prepared by consultancy firms according to a template (Dąbrowski and Piskorek 2018), largely paying lip service to 'European' approaches and procedures (Maier 2012), and regarded by stakeholders as a formality to get access to EU funds (Dąbrowski 2014). The ensuing similarity of local planning documents (which we will discuss below) underlines the necessity of complementing a text-oriented analysis by the analysis of policy practices as well as interviews of key actors. Concerning these latter, it should be noted that with the increased outbound mobility of Hungarian students in the past couple of decades (Pusztai et al. 2016), an ever-growing proportion of the architects, economists, sociologists and geographers working in the planning profession (Polyák 2015), especially in bigger cities, has gained a first-hand study experience abroad, mostly in the EU. Furthermore, as professionals, they have become involved in international (EU) policy networks as well as in what González (2011, 1398) calls '"urban policy tourism", that is, short fact-finding trips [...] to other cities to learn about their transformation'. As a result – although compared to their 'Western' counterparts, Hungarian practitioners in general have certainly faced more constraints to becoming genuine transfer agents of globally circulating smart city ideas (Varró and Bunders 2020) –, urban and planning professionals in (especially more resourceful) bigger cities have taken up a more and more active and confident role in (re-)interpreting such ideas and in adapting them to their home contexts.

Smart city discourses and practices in Hungary's major cities

Hungarian cities' smart city building ambitions have appeared in various statutory and non-statutory planning documents from the mid-2010s, accompanied by the creation of new institutional structures and practices (see *Table 3*). This section discusses the notions with which the smart city has been primarily associated with

Table 3. Discourses and practices of smart city building in Hungary's five major cities.

Cities	Antecedents and beginnings of smart city thinking	Organizational framework of smart city development	Relevant strategic documents (year of acceptance/ publication)	Key dimensions of the smart city	Accomplished keysmart city projects[7]
Debrecen	· Explicit engagement with the smart city idea started in 2015	· Since 2015 smart city working group in the urban and economic development centre of the city, EDC Debrecen Nonprofit Kft.	· *TFK (2014–2020)* (2014) · *ITS (2014–2020)* (2017) · *SUMP* (2016) · *SECAP* (2017) · *Smart city strategy* (2019) · *Debrecen 2030* (2020)	· liveability · economic development · environmental sustainability/energy efficiency · cost-efficient urban management · (public) transport management · education	· e-tickets introduced on public transportation · community-based traffic navigation application (Waze) · smart pedestrian crossing · smart cameras for spatial surveillance and traffic monitoring · bicycle sharing service at four campuses · 'Smart City Meetup' community meetings
Szeged	· Published Szeged Local Agenda 21 in 2011	· Municipality · no unit dedicated to smart city development	· *TFK* (2014) · *ITS (2014–2020)* (2017) · *SUMP* (2017) · *SECAP* (2018) · *Smart city vision and concept* (2016)	· economic development (building a competitive, knowledge-based economy) · environmental sustainability/resource & energy efficiency · (public) transport management · liveability	· cashless payment for municipal services · real-time passenger information and passenger counting system · on-board ticket vending and WiFi on public transportation · battery powered trolleybuses
Miskolc	· First Hungarian city to join the Green Cities for a Sustainable Europe movement in 2011 · Joining the Triangulum project of the EU's Smart Cities and Communities programme as a follower city in 2015 · Joined the Covenant of Mayors for Climate and Energy in 2015 · Cooperates with the Under2 Coalition[8]	· Municipality jointly with Miskolc Holding Local Government Asset Management Corporation · mayor's commissioner responsible for IT services & smart cooperation	· *TFK (2014–2030)* (2014) · *ITS* (2014) · *SUMP (revised version)* (2016) · *SECAP* (2019)	· environmental sustainability/energy efficiency · economic development · education · intelligent transport · urban management	· geothermal central heating · biogas production · solar energy plant · smart metering · real-time passenger information system

(*Continued*)

Table 3. (Continued).

Cities	Antecedents and beginnings of smart city thinking	Organizational framework of smart city development	Relevant strategic documents (year of acceptance/ publication)	Key dimensions of the smart city	Accomplished keysmart city projects[7]
Pécs	· Joined the Covenant of Mayors in 2013	· Municipality jointly with Pécsi Urban Development Nonprofit ZRt. · no unit dedicated to smart city development	· *TFK (2014–2030)* (2014) · *ITS* (2014) · *SUMP* (2017) · *SEAP* (2014)	· environmental sustainability · (cooperative) governance · efficient urban management	· public safety mobile application · community bike sharing system · real-time passenger information system
Győr	· Intelligent Győr Strategic and Operative Programme (2001) · smart city idea (from 2013), linked to the ambition to turn European Youth Olympic Festival (EYOF) into a 'green Olympics'	· Municipality · no unit dedicated to smart city development	· *TFK (2014–2030)* (2014) · *ITS* (2014–2020) *(revision, 2019)*	· energy- and cost-efficient urban management · sustainable transport · liveability	· mobile application for reporting urban management problems · community bike sharing system · district heating · street lightning · real-time passenger information system · fast charging stations in parking garages

Source: Authors' compilation based on municipal policy documents and interviews

in planning documents in Hungary's big cities. As the overview presented in *Table 3* shows, environmental sustainability, the improvement of (public) transport, quality of life (or liveability) and urban management figure most dominantly in the case of every city. In addition to that, economic development and education are mentioned frequently, whereas governance-related concerns, although they do appear, are relatively less prominent. In what follows we aim to show how, on the basis of which (implicit) assumptions and along what local motivations the more frequently mentioned five aspects of the smart city have been mobilized[9] and to what extent they have been translated to actual practices. Furthermore, we discuss the aspect of (smart) governance, despite the fact that it has been accorded relatively less importance. The overview also considers the factors explaining the prominence of certain aspects and understandings (or the lack of them), and it shows that state centralization, cities' strong dependence on EU funding and their lack of significant economic base, governance capacity and human resources have played a significant role. Finally, the discussion also sheds some light on the role of key actors in reinforcing the impact of these structural factors.

To begin with the three most often recurring aspects – that is, environmental sustainability, the improvement of (public) transport and liveability – their prominence has been strongly interlinked and can be largely tied to the local (re)framing of development objectives within the broader opportunity structures offered by EU funding priorities and corresponding national operational programmes. As to the local (re-) framing of objectives, the focus on climate change and energy efficiency often appears as a longstanding and obvious aspiration for the cities concerned. Indeed, for many cities, the concern with smart city building emerged in connection to existing commitments to improving (environmental) sustainability and related ambitions to join international initiatives. The smart city vision of Szeged (2016, 22)[10] notes that the city's development 'has carried in itself the development potential of the smart city concept for decades', given local government's long-standing concern 'making the city liveable and sustainable'; in the case of Miskolc, a municipal official argued that energy neutrality was an important objective 'there is a climate crisis [...] the city has to be "greened", because this is the only way'. The emphasis on transport is closely connected to environmental sustainability objectives. However, it is also linked to the widely shared assumption that the quality of transport is vital to a city's liveability; as a representative of Győr noted, 'in its 2008–2009 IVS strategy, Győr approached the concept of the smart/intelligent city from the perspective of urban liveability: how can Győr offer an adequate quality of life to its inhabitants. [...] the reduction of traffic congestion in the centre [...] has been set as an aim in line with this perspective.' Recently implemented transport-related projects – e-ticketing, smart road crossings and by now ubiquitous real-time passenger information systems – have been presented in each city as smart solutions that enhance the quality of life.

The role of the EU's funding objectives in shaping the above framing of local smart development objectives is evident as all the cities explicitly align with the former in their planning documents. Indeed, as one of the largest net recipients of EU structural and cohesion funds as a proportion of GDP in the 2014–2020 period, Hungary has seen itself compelled to align with the investment priorities of the EU, including those concerning the shift towards a low-carbon economy and the promotion of climate

change adaptation and resource efficiency (European European Commission 2010b). Furthermore, the tying together of environmental sustainability, the improvement of (public) transport and liveability is strengthened by the way in which EU funding objectives have been translated into the TOP that allocated funding to integrated sustainable urban development actions between 2014 and 2020, including those with the aim to promote sustainable urban mobility. Indeed, the TOP regards sustainable urban mobility as a means to improve the quality of settlement environment, and to decrease carbon emissions (in this order), and mentions it under the second overarching objective of 'Business-friendly, population-retaining settlement and urban development; ensuring the conditions for quality of life and social cohesion' (Ministry for National Economy 2014, 20). The relative subordination of environmental sustainability concerns to liveability objectives that is implicit in this formulation also translates to the way cities deal with the possible tensions between the three aforementioned aspects: generally, it is not explicitly problematized that fulfilling existing liveability demands through particular transport investments might occur at the expense of long-term environmental goals. Illustrative here is the case of Debrecen, where the primary smart mobility objective concerns 'accelerating traffic, shortening waiting times and [...] more transparent and safer urban traffic' (EDC 2019, 16). To this end, the city has joined 'Connected Citizens', the 2-way, free data exchange programme of Waze, the world's largest, community-based navigation application (ibid., p. 17) in 2017. Remarkably, the aim of tackling traffic congestion is grounded in an assumption concerning the future increase in (individual) motorized transport, resulting from the city's economic growth and increased suburbanization. While the strategy does emphasize the importance of increasing the share of public or nonmotorized transport, and that of promoting and facilitating the use of electric vehicles, it nonetheless advances an understanding of smart that is geared more towards serving current interests and demands than towards challenging established practices and instigating a fundamental change to how the city is made to work.

While the previously mentioned three aspects have also manifested themselves in actual smart city practices, the prominence of the aspects of urban management and economic development in policy rhetoric has been translated into practice to a lesser extent due to a lack of knowledge, human resources and local data (in the case of the first), and due to cities' lack of capacity to devise and implement integrated local development strategies (see Pálné Kovács 2019). As to the aspect of urban management, that has appeared as the optimalization of the public sector through the introduction of real-time ICT systems that integrate public utilities and services. Szeged's ITS (2017, p. 198) notes, for example, that 'the idea of the smart city considers the city in terms of a unified (smart) grid that can operated more efficiently with modern technologies'. The TFK of Győr (2014) also speaks of 'organizing urban services into an intelligent system' (p. 13); the ITS of Debrecen refers to 'networked projects' (p. 62), amongst others regarding the development of public institutions, and *The smart city strategy of Debrecen* (EDC 2019) mentions data-based decision-making. To date, however, the data-driven improvement of public sector management has been rather limited. The Open Data Debrecen portal (opendata.debrecen.hu) – the first of its kind where the ambition is expressed to follow in the footsteps of London and New York in 'exploiting the hidden resource

[of data]' – is (as the smart city strategy itself admits) a rather rudimentary platform with limited data sets available (EDC 2019). In fact, one of the major challenge for such initiatives has been the lack of local data. In addition to that published data have not been updated regularly[11]. As a company manager noted, referring to the Hungarian context more broadly: 'I could not mention any Hungarian city that comes even close to being smart. They rediscover old technologies and use them only in a limited way'. Similarly, a respondent formerly working for the economic development company of Pécs noted that 'there [was] some progress. But different projects are not linked together; different systems are not integrated and not interoperable [...] decision-makers don't really see what such a[n integrated] system is capable of'. In Debrecen, Szeged and Miskolc, commonly considered to be at the forefront of smart city building, there has been a recognition from the part of the municipality of the need to invest in human resources ('they [the municipality] realized that they cannot get a grip on it, with their traditional thinking, so, they went to look for young people who understand this world', company manager Miskolc). However, the lack of knowledge and human resources was still mentioned by several interviewees as a problem, and also the fact that it is often a challenge to get the municipality on board (the apparatus sometimes 'moves along slowly'; smart city expert Debrecen).

The notion of urban smartness has also become closely bound up with the economic development ambitions of the cities under study – perhaps most explicitly in the case of Debrecen, where the smart city programme is mentioned as a component of local economic development (*Debrecen 2030*, 2020) and the city's 'digital maturity' is expected to yield a competitive advantage (EDC 2019). However, the planning documents of all cities generally converge on assuming that strengthening economic competitiveness is a key local policy imperative in a globalizing world, and this is to be achieved through the fostering of knowledge-based industries and the innovative use of new technologies. The latter is seen to play a pivotal role in improving the business environment development and thus attracting new investors, as well as boosting local businesses' competitiveness (Debrecen SECAP 2017; Miskolc SECAP 2019; Szeged SUMP 2017; Szeged ITS 2017). As a smart city expert in Debrecen argued, the introduction of the community-based navigation application Waze was motivated by the ambition 'to provide something beyond the basic things, something that puts the city on the map of Europe and makes it more noticeable'. Overall, however, relatively little has been achieved in terms of putting new technologies at the service of local economic development, although cities where a strong higher education sector has gone together with a solid economic base – as in Debrecen, which has, in addition, greatly benefited from the commitment of central government to strengthening the city's position as the centre of Eastern Hungary (see, e.g. Daily News Hungary 2020) – do have a potential to realize such ambition. However, cities' strong (EU) funding-orientation ('the energy of staff dealing with development issues is largely taken up by EU funding management', policy official Győr) remain an obstacle to developing a longer-term, strategic business perspective according to several smart city experts ('the majority of settlements is immune to this'). Indeed, explicit smart city-related strategy-making has often started after the implementation of first projects, and it is still driven by the

aim to secure funding ('opportunities to obtain funding came first', policy official Miskolc; 'the [smart] strategy is also meant to help find partners and channel financial resources', smart city expert, Debrecen).

The framing of the fifth frequently mentioned aspect of the smart city, that of education, has been strongly shaped by the aims of the Digital Welfare Programme that was introduced in 2015 to strengthen, in an attempt to comply with the EU's Digital Agenda (European Commission 2010), the competitiveness of the Hungarian ICT-sector and to facilitate sustainable economic growth, job creation and social equality (Varró 2019). According to this framing, smart – in the sense of digitally literate and skilled – urban citizens contribute to the EU's agenda of fostering innovation and competitiveness in the knowledge-based economy (cf. Haarstad 2017). Indeed, in most cities, the association of education with smartness has been rooted in the implicit but widely shared view that 'there is no smart city without smart people' (company manager, Szeged), where the latter are primarily understood to be responsible, technologically skilled and digitally literate. The ITS of Győr (2019) speaks of the improvement of digital skills as part of the broader investment priority area 'Facilitating access to ICT and enhancing the (quality of) ICT use' (p. 183). In the case of Debrecen and Miskolc, the development of digital literacy and the popularization of internet use figure as important objectives (EDC 2019; Miskolc ITS 2014; Miskolc SECAP 2019). The objectives are rationalized on economic grounds: they emphasize how digital literacy is key to enhancing the competitiveness of local residents on the labour market (ibid; Miskolc SECAP 2019) and speak of the 'intelligent citizen' in terms of 'efficient human resource' (Pécs, ITS 2014, 116). Although they are not explicitly mentioned in cities' official documents[12] there are numerous initiatives designed to teach young people programming skills. For example, Logiscool (a globally present, 'fun-based, international coding school', see www.logiscool.com) has affiliates (amongst others) in all the cities under study. However, given – in EU comparison – relatively low level of digital skills of the country (European Commission 2017), the educational dimension of smart city-building in Hungary still greatly relies on interventions aiming at the improvement of basic digital skills. These – such as widely organized free courses to improve basic computer skills, co-financed by the EU through Hungary's Economic Development and Innovation Operative Programme – are generally not explicitly mentioned as smart city projects, although they fit the stated objectives of smart city building.

Finally, it is worthwhile to consider the aspect of (smart) governance that has figured somewhat less prominently. To be sure, the core idea encapsulated in 'smart governance' – that there is a need for a transformation of government to make cities smarter (Meijer and Rodríguez Bolívar 2016) – has been implicitly present in all cities' documents, with a focus on the need for more inclusive governance. *The smart city strategy of Debrecen* (EDC 2019) designates 'Bringing society on board' as a horizontal objective; the smart city vision of Szeged (2016) speaks of the 'continuous involvement of residents and market actors' (p. 6). The ITS of Pécs (2014) – perhaps most ambitiously – envisages a 'smart city model' with 'cooperative governance' as one of its main pillars. Governance-related aims tend to remain vague, however, and they often appear as being instrumental to pre-given economic or technology-oriented objectives, reinforcing the user-centred view of inhabitants that

is apparent, for example, from proposing 'user satisfaction' as an indicator concerning the creation of a cost-efficient, innovative service network (see Debrecen SUMP, 2016). *The smart city strategy of Debrecen* (EDC 2019) notes that 'it is of key importance to create a community whose members help each other in creating great things by using the data' (p. 58); furthermore, feedback from residents is regarded crucial as '[t]his way, the level of acceptability by the local population increases [...], and they can also make suggestions' (p. 60). Overall, cities' funding orientation, as well as their lack of human resources and political commitment have prevented smart governance-related aims – however vague – from being translated into practice. In Debrecen, the aim of the 'conscious building of the Smart City community' (EDC 2019, 61) has translated so far into a Facebook page of Debrecen Smart City (the largest Smart City page in Hungary), and monthly organized, freely accessible presentations about Smart City Debrecen ('Smart City Meetup events'). However, the city's smart strategy 'was drawn up [...] with the *possibility of feedback provided* for companies, civil society associations, organisations and the general public' (EDC 2019, p. 3, emphasis added), making a genuine inclusion of the broader public questionable. Similarly, the smart city vision of Szeged lacked any broader consultation; those (aware of it and) interested could submit their remarks and ideas on the municipality's website or by e-mail. The continuing lack of inclusivity is actually considered insufficient by several key actors as well; as a policy official in Miskolc noted, 'we are weak when it comes to including the public; we lack an existing framework for this and this will be the big task for the coming period'. As referred to earlier, due to the lack of such an existing framework, citizen engagement has indeed remained at the level of 'informing' in Hungarian planning practice; stakeholders – especially marginalized groups – are generally not given the opportunity to further their own ends (Bajmócy et al. 2016).

What arguably plays an equally important role, however, is that key actors often do not accord a priority to making citizens more genuinely involved in the smart city. One of them spoke with admiration of the 'really developed' smart cities of South-East Asia, although noting that they are 'not too democratic cities' and 'there is a shadow side to it'. Another smart city expert argued that 'residents don't know what they want. If we make them choose from option A, B or C, then they do. [...] this is a bit cultural – in CEE people don't take the initiative, just wait and see; this also has to do with history' (smart city expert, Debrecen). This remark also underlines the need to consider how key actors – policymakers, smart city experts – have a broader role in shaping actual smart city development by willingly aligning with perceived structural constraints rather than trying to challenge them. A case in point – next to the above-mentioned one related to citizen involvement – is the formulation of transport policy objectives for the smart city. In Hungary – similarly to other post-socialist countries – governments have been 'keen to placate car owners and support motorised individual transportation rather than sustainable community solutions' (Mezei 2013). Car ownership is a status symbol (ibid.), and investments in road infrastructure continue to be motivated by short-term, politically motivated decisions, which often results in privileging spectacular interventions (Oszter 2017). Although smart city building has brought concerns with environmentally sustainable transport to the foreground, policymakers tend to refrain from proposing measures implying a radical change in the mobility behaviour of

people. As a smart city expert of Debrecen explained: 'Changing people's perspective is a challenge. There is a strong need to possess – making the implementation of car-sharing, for example, difficult. [...] Incentives that enhance bicycle use and bring us towards sustainability are more important, but real life is [different]; it suffices now to get to the third-fourth level, and then [to move upwards] slowly, step by step'.

Discussion

The understandings and practices of the smart city in Hungary's major cities clearly show some commonalities with globally observable trends, as well as some notable differences. In this section, we first revisit the convergences against the background of the findings of existing literature on smart city implementation in the Global North and South (e.g. Angelidou 2016; Haarstad 2017; Cowley, Joss, and Dayot 2018; Joss et al. 2019; Tomor et al., 2019). Subsequently, we discuss the divergences and the structural and agential factors shaping these and will argue that the actual manifestation of Hungary's smart urbanism can only be thoroughly grasped by considering the country's specific, post-socialist path-dependencies of urban (policy) development.

In Hungary's cities too, policy rhetoric has tied smart urban development to technological innovation and economic entrepreneurialism, and all cities' plans subscribe to the widely held shared 'socio-economic meaning of the regenerated, internationally competitive city' (Karvonen, Cugurullo, and Caprotti 2018, p. xvi). Due to its umbrella character, the smart city has also been willingly embraced as a concept that potentially helps addressing urban development challenges. As several analysts have pointed out, although environmental sustainability is often made to appear as a key component of urban smartness, this mostly happens following a 'tokenistic' approach (see Joss et al. 2019), whereby the tension with economic development objectives remains unaddressed (Haarstad 2017). This has also been the case in Hungary, where this tension has been primarily concealed by the common focus on liveability – a term that has played a key role in depoliticizing smart city development. Furthermore, actual interventions do not confirm (yet) that smart city building has significant sustainability outcomes (Tomor et al. 2019). Another point of convergence is the way in which a technology-centred view of the smart city is countered by an emphasis on residents but mostly understood as responsible and passive service users. References to inhabitants to users 'who understand, know and use the solutions and results of digitalisation' (EDC 2019, 52) are, indeed, reminiscent of the commonly observed trend regarding the skewed characterization of the public (Joss et al. 2019; Cardullo and Kitchin 2017). Relatedly, the framing of (the relevance of) digital literacy can be seen as indicative of education becoming a key setting for the production of 'smart citizens' who can participate actively in the big data dynamics of the smart city (see Williamson 2015, 3). Finally, even though smart city plans in the cities under study – albeit not all – evoke a vision of integrated urban development through ICT, smart city development in practice has proved to be – just as elsewhere (Coletta, Heaphy, and Kitchin 2019; De Wijs, Witte, and Geertman 2016) – unfolding in a piecemeal fashion and (as yet), often far less transformative than some initial claims suggest.

While the apparent gap between the ambitions of smart city visions and actual smart city developments might resemble developments elsewhere, in the case of Hungary this

gap and the unfolding of smart urbanism needs to be contextualized by taking into account the confluence of a range of factors including state centralization, a strong dependence on EU funding and a lack of significant economic base, governance capacity, human resources as well as a weak system of political participation. Hungary's major cities – in fact, sub-optimally scaled, often peripheral city-regions with an underdeveloped domestic business sector – have found it difficult to develop adaptive development strategies mobilizing endogenous resources (Lux 2015). Furthermore, in addition to the absence of critical mass and the lower density of city-regions' socio-economic space (ibid.), the generation of local innovation has been undermined by centralizing tendencies and the increasingly top-down nature of development policies. Indeed, successive waves of financial centralization and the simultaneously growing reliance on external (in particular EU) funding orientation have produced a caricature version of entrepreneurial municipality (Varró 2010). Coupled with the fragmented system of local government and the lack of municipal human resources, these trends have also impeded on the development of cities' governance capacity, understood as actors' ability to cooperate to solve collective problems (Phung Dang et al., 2016). In this context, ambitions to boost urban economic competitiveness through smart development have been building on shaky grounds. Although as centres of higher education and research, Hungary's big cities might succeed in strengthening their knowledge-based activities with a focus on smartification, overall – even though there are certainly differences between them – they lack the resources and capacities, certainly in comparison to many of their 'Western' counterparts, to proactively shape their local development trajectories (Somlyódyné Pfeil 2019). Indeed, the persisting reliance on external (EU) funding has implied that the very formulation of development objectives – in general and more recently related to smartness – has been more strongly shaped by the EU's authoritative framing of the smart city than elsewhere (cf. Haarstad 2017). Furthermore, cities' lack of management and human resource capacities, as well as their shrinking role in managing public services (especially in the wake of post-2010 centralization) makes any aspirations for a 'control room' model of the smart city (Barns et al. 2017) that enables the broader integration of infrastructure and service provision appear as unrealistic. Finally, the aforementioned structural constraints partly explain why – despite the attempts to instil a move towards more participative governance through smart city development, as expressed in the LKC's smart city methodology – there has been a striking lack of (incentives for) smart city bottom-up initiatives (cf. Angelidou 2016; Cowley, Joss, and Dayot 2018).

Importantly, however, even though smart city building in Hungary seems to have been overdetermined by multiple constraints, one should not overlook the role of local agency – that is, the way (the choices of) key actors shape the course of smart city development. Policy officials and smart city experts of Hungary's big cities have been largely socialized as members of the earlier discussed 'project class' and have not voiced much criticism about a project-focused approach, although they show an increasing concern with the longer-term financial sustainability of smart projects. Younger municipality staff with more international experience in particular seem to be well connected to the global epistemic community of 'urban technocrats', that is, smart city experts, policy officials, engineers who are convinced of the benefits of smartification (Kitchin et al. 2017). While they are well aware of best practice ideas circulating in 'the global

discourse network' (Joss et al. 2019) of the smart city, they do not assume that translating best practices in 'their' context is straightforward. As one of them noted: 'Someone from the West who has seen a lot comes here to tell how to do it, then you'll see the consequences. […] you must take into account local needs'. Furthermore, they face the challenge of convincing the municipal apparatus of the use of smart city development ('the city does not adapt easily', smart city expert Debrecen). Finally, although in Hungary too, 'urban technocrats' are critical of interpretations of the smart city as a technology-led utopia, they seem to have hardly any ethical-moral concerns regarding data-driven urban practices (cf. Varró and Bunders 2020). By commonly framing smart development in the (vague) terms of liveability, they have arguably contributed to depoliticizing smart urban development. While this lack of concern with issues of democracy fits impressions of urban technocrats elsewhere (see Kitchin et al. 2017), in Hungary the often-paternalistic vision of the public held by smart city professionals has 'productively' intersected with the common view of city administrators that including citizens is a chore, maintaining in the end a(n anyway) low level of citizen engagement.

Concluding remarks

Taking the example of Hungary's 'big' cities, this paper set the aim to expand the scope of the critical smart urbanism literature from a CEE perspective. Our analysis shows that although the smart city concept has served as a useful vehicle for (re-) engaging with urban sustainability challenges in particular, overall, it has not brought about any meaningful change in Hungary's urban policy practices, largely due to institutional path-dependencies and newly emerging trends of centralization. Yet, despite multiple constraints, local policymakers and practitioners could arguably contribute more themselves – in however small a way – to help realizing the concept's promise for a step change. This could be done, amongst others, by focusing less on the transformative potential of technology and by attending more to the human side of urban development, whereby inhabitants are recognized as citizens(-to-be-involved) rather than mere users to be satisfied. Related to this, there is a pressing task for critical smart city scholarship to zoom in further on the micro contexts and practices of smart city building to get a better grip on how the course of smart city building is being negotiated (by which actors) in a context characterized by lacking traditions of citizen engagement and an eagerness to catch up with 'Western' quality of life, and what room there is to problematize smart city development. More specifically, it would be worthwhile to examine in more depth how urban technocrats' socialization as members of the project class shapes smart city development practices.

In addition to this, the paper's account allows for pointing out some further possibly fruitful research avenues that can advance critical smart city scholarship from a CEE perspective. To be sure, Hungary cannot be assumed to 'stand for' CEE here. However, the legacy of socialism and the way in which CEE countries have become included into the capitalist space economy have produced similar sets of institutional dynamics and urban circumstances (Sýkora & Bouzarovski, 2011) – for example, a lack of strategic planning and the rise of centralized, state-led urban development influenced by

European Union policy frameworks and funding opportunities (see, e.g. Scott and Kühn 2012; Ion 2014). It is plausible to expect – and there is already some evidence (Óhegyi et al. 2017) – that comparable institutional trends and urban development conditions produce similar understandings of and challenges to smart city development across the region. However, it remains an important research task to explore systematically and in depth to what extent this is actually the case, and what role different aspects of governance (performance) play in smart city outcomes. The relevance of such an inquiry is further enhanced by the fact that digitalization, economic transformation, and energy transition remain top priorities to receive European Structural and Investment Funds post-2020, as a result of which smart city building can be expected to be put even higher on the agenda in CEE. Relatedly, it would also be worth exploring whether and how ideas and practices of smartification will emerge that target commonly perceived urban and regional development challenges in CEE – such as rural depopulation and an ongoing brain drain, or a relatively high dependence on FDI, for example –, and to what extent these will manage to feed into and shape the global and EU smart city discourse.

Finally, an interesting question that lay beyond the scope of the present paper but merits attention concerns the extent to which the differential ability of particular CEE cities to adapt to the challenges of globalizing space economy correspond to divergences in actual smart city building trajectories, and to what extent the latter are indicative of the forming of new inner peripheries in Europe (ESPON 2018). As it appears that the smart city concept is here to stay, addressing these questions will be crucial to critical smart city scholarship being able to explain the full breadth of this policy concept's global socio-economic and political implications.

Notes

1. To protect respondents in Hungary's politically sensitive context, full anonymity was granted to interview respondents, and broad respondent descriptors are used that are not fully revealing yet allow the contextualization of what has been said.
2. The elaboration of a SUMP is strongly encouraged by the European Commission and it has been proposed that it becomes a mandatory condition for access to regional and cohesion funds for urban transport measures. As to the SECAP, that expresses the formal commitment of the signatories of the Covenant of Mayors for Climate and Energy, a voluntary movement of European local authorities in the development and implementation of sustainable energy and climate policies.
3. Of course, this was facilitated by the fact that we had to do with a relatively small-scale corpus.
4. The order in which the codes are listed here does not indicate the frequency of their occurrence.
5. Since 2006, there have been 23 such cities: 18 county seats (counties are meso-level administrative units; the seat of the 19th county, Budapest enjoys special status) and five other cities.
6. Following this definition, smart cities are those 'settlement[s] or a group of settlements, which develop[s] its natural and built environment, digital infrastructure, and the quality and economic efficiency of its locally available services by adopting novel and innovative information-technologies, in a sustainable way, through the increased involvement of its residents' (Hungarian Gov. Decree No. 56/2017 (20.03)).
7. Not including pilot projects of limited duration.

8. The Under2 Coalition is a global community of state and regional governments committed to ambitious climate action in line with the Paris Agreement.
9. The discussion will thus not cover the aspects mentioned in *Table 1* that figure more sparsely.
10. For the sake of simplicity, in-text references to municipal policy documents do not contain the full title; the latter are indicated in the list of references (in a separate section).
11. In November 2020, the most recent data at opendata.debrecen.hu are from February 2019.
12. However, Logiscool courses figure as smart city best practice examples for on the website of the LKC.

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Ethics declaration

The paper reports the findings of a non-interventional study for which ethical approval was not required.

Informed consent

Informed consent was obtained from each study participant after they were told of the potential risks and benefits as well as the investigational nature of the study.

References

Angelidou, M. 2016: "Four European Smart City Strategies". *International Journal of Social Science Studies*, 4(2),18–30. 10.11114/ijsss.v4i4.1364.

Bajmócy, Z., J. Gébert, Z. Elekes, and J. Páli-Dombi 2016. "Beszélünk a Részvételről … Megyei Jogú Városok Fejlesztési Dokumentumainak Elemzése Az Érintettek Részvételének Aspektusából". *Tér És Társadalom*, 30(2),45–61. 10.17649/TET.30.2.2753.

Barns, S., E. Cosgrave, M. Acuto, and D. Mcneill 2017. "Digital Infrastructures and Urban Governance". *Urban Policy and Research*, 35(1),20–31, DOI: 10.1080/08111146.2016.1235032.

Cardullo, P., and R. Kitchin 2017. "Being a 'Citizen' in the Smart City: Up and down the Scaffold of Smart Citizen Participation". *SocArXiv V24jn*, Center for Open Science, 1–24. DOI: 10.31219/osf.io/v24jn.

Coletta, C., L. Heaphy, and R. Kitchin 2019. "From the Accidental to Articulated Smart City: The Creation and Work of 'Smart Dublin'". *European Urban and Regional Studies*, 26(4),349–364. 10.1177/0969776418785214.

Commission, E. 2010. "*A Digital Agenda for Europe*". Retrieved from https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52010DC0245R(01) on 26 November 2020
Cowley, R., S. Joss, and Y. Dayot 2018. "The Smart City and Its Publics: Insights from across Six UK Cities". *Urban Research & Practice*, 11(1),53–77. 10.1080/17535069.2017.1293150.
Crivello, S. 2015. "Urban Policy Mobilities: The Case of Turin as a Smart City". *European Planning Studies*, 23(5),909–921. DOI: 10.1080/09654313.2014.891568.
Dąbrowski, M. 2014. "Towards Place-based Regional and Local Development Strategies in Central and Eastern Europe? EU Cohesion Policy and Strategic Planning Capacity at the Sub-national Level". *Local Economy* 29(4–5), 378–393. 10.1177/0269094214535715.
Dąbrowski, M., and K. Piskorek 2018. "The Development of Strategic Spatial Planning in Central and Eastern Europe: Between Path Dependence, European Influence, and Domestic Politics". *Planning Perspectives* 33(4),571–589, DOI: 10.1080/02665433.2018.1513373.
Datta, A. 2015. "A 100 Smart Cities, A 100 Utopias". *Dialogues in Human Geography* 5(1),49–53. 10.1177/2043820614565750.
De Wijs, L., P. Witte, and S. Geertman 2016. "How Smart Is Smart? Theoretical and Empirical Considerations on Implementing Smart City Objectives – A Case Study of Dutch Railway Station Areas". *Innovation: The European Journal of Social Science Research*, 29(4),424–441. 10.1080/13511610.2016.1201758.
Egedy, T., Z. Kovács, and A. C. Kondor 2017. "Metropolitan Region Building and Territorial Development in Budapest: The Role of National Policies", *International Planning Studies*, 22 (1),14–29. 10.1080/13563475.2016.1219652.
Engelbert, J., L. Van Zoonen, and F. Hirzalla 2019. "Excluding Citizens from the European Smart City: The Discourse Practices of Pursuing and Granting Smartness". *Technological Forecasting and Social Change*, 142,347–353. 10.1016/j.techfore.2018.08.020.
ESPON 2018. *Inner Peripheries in Europe. Possible Development Strategies to Overcome Their Marginalising Effects*. Luxembourg: ESPON
European Commission 2010b. *Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth* [Communication from the Commission]. Brussels: European Union
European Commission 2017. "Europe's Digital Progress Report (EDPR) 2017 Country Profile Hungary". Retrieved from file:///C:/Users/vista/Downloads/HungaryEDPRcountryprofile.pdf
Faragó, L. 2009. "A Településhálózat És Annak Alakítása. A Városokról Folytatott Diskurzus Folytatása". *Területi Statisztika*, 12(3),257–263.
Faragó, L. 2012. "Urban Regeneration in a 'City of Culture' the Case of Pécs, Hungary". *European Spatial Research and Policy*, 19(2),103–120. 10.2478/v10105-012-0017-4.
Giffinger, R., C. Fertner, H. Kramar, and E. Evert Meijers 2007. *Smart Cities – Ranking of European Medium-sized Cities*. Vienna: Vienna University of Technology.
Glynos, J., and D. Howarth, 2008. "Structure, Agency and Power in Political Analysis: Beyond Contextualized Self-interpretations". *Political Studies Review*, 6(2),155–169. 10.1111/j.1478-9302.2008.00149.x.
González, S. 2011. "Bilbao and Barcelona 'In Motion'. How Urban Regeneration 'Models' Travel and Mutate in the Global Flows of Policy Tourism". *Urban Studies* 48(7),1397–1418. 10.1177/0042098010374510.
Grossi, G., and D. Pianezzi 2017. "Smart Cities: Utopia or Neoliberal Ideology?" *Cities*, 69,79-85. 10.1016/j.cities.2017.07.012.
Guma, P. K., and J. Monstadt 2020. "Smart City Making? The Spread of ICT-driven Plans and Infrastructures in Nairobi". *Urban Geography*, 1–22. 10.1080/02723638.2020.1715050.
Haarstad, H. 2017. "Constructing the Sustainable City: Examining the Role of Sustainability in the 'Smart City' Discourse". *Journal of Environmental Policy & Planning*,19(4),423–437. 10.1080/1523908X.2016.1245610.
Ho, E. 2017. "Smart Subjects for a Smart Nation? Governing (Smart)mentalities in Singapore". *Urban Studies*, 54(13),3101–3118. 10.1177/0042098016664305.
Howarth, D. 2005. "Applying Discourse Theory: The Method of Articulation". In D. Howarth and J. Torfing (edited by): *Discourse Theory in European Politics: Identity, Policy and Governance*. Basingstoke: Palgrave Macmillan, 316–349.

Howarth, D. 2010. "Power, Discourse, and Policy: Articulating a Hegemony Approach to Critical Policy Studies". *Critical Policy Studies*, 3(3–4), 309–335. 10.1080/19460171003619725.
Hungary, D. N. (2020) "Orbán Cabinet Approves Debrecen's Ten-year Development Programme – UPDATE" Retrieved from https://dailynewshungary.com/orban-cabinet-approves-debrecens-ten-year-development-programme/ Last accessed 9 February 2021
Hýllová, L., and O. Slach 2018. "The Smart City Is Landing! on the Geography of Policy Mobility". *GeoScape* 12(2),124–132. 10.2478/geosc-2018-0013
Ion, E. 2014. "Public Funding and Urban Governance in Contemporary Romania: The Resurgence of State-led Urban Development in an Era of Crisis". *Cambridge Journal of Regions. Economy and Society*, 7(1), 171–187. 10.1093/cjres/rst036.
Jiang, H., S. Geertman, and P. Witte 2019. "Smart Urban Governance: An Urgent Symbiosis?" *Information Polity*, 24, 245–269. 10.3233/IP-190130. 3
Joss, S., F. Sengers, D. Schraven, F. Caprotti, and Y. Dayot 2019. "The Smart City as Global Discourse: Storylines and Critical Junctures across 27 Cities". *Journal of Urban Technology*, 26:1, 3–34. 10.1080/10630732.2018.1558387.
Joss, S., M. Cook, and Y. Dayot 2017. "Smart Cities: Towards a New Citizenship Regime? A Discourse Analysis of the British Smart City Standard". *Journal of Urban Technology*, 24 (4),29–49. 10.1080/10630732.2017.1336027.
Karvonen, A., F. Cugurullo, and F. Caprotti 2018. "Introduction: Situating Smart Cities". In A. Karvonen, F. Cugurullo, and F. Caprotti (Edited by) *Inside Smart Cities: Place, Politics and Urban Innovation*. London: Routledge. 1–28.
Kitchin, R. 2014. "The Real-time City? Big Data and Smart Urbanism". *GeoJourna,l* 79(1),1–14. 10.1007/s10708-013-9516-8.
Kitchin, R. 2015. "Making Sense of Smart Cities: Addressing Present Shortcomings". *Cambridge Journal of Regions, Economy and Society*, 8(1),131–136. 10.1093/cjres/rsu027.
Kitchin, R., C. Coletta, L. Evans, L. Heaphy, and D. Mac Donncha 2017. *Smart Cities, Urban Technocrats, Epistemic Communities and Advocacy Coalitions SocArXiv Rxk4r*, Center for Open Science, DOI: 10.31219/osf.io/rxk4r.
Kleinhans, R., M. Van Ham, and E.-C. J. Evans-Cowley 2015. "Using Social Media and Mobile Technologies to Foster Engagement and Self-Organization in Participatory Urban Planning and Neighbourhood Governance." *Planning Practice & Research*, 30:3, 237–247. 10.1080/02697459.2015.1051320.
Kovách, I., and E. Kučerová 2006. "The Project Class in Central Europe: The Czech and Hungarian Cases". *Sociologica Ruralis*, 46(1),3–21. 10.1111/j.1467-9523.2006.00403.x.
Luque-Ayala, A., and S. Marvin 2015. "Developing a Critical Understanding of Smart Urbanism?" *Urban Studies*, 52(12),2105–2116. 10.1177/0042098015577319.
Lux, G. 2015. "Minor Cities in a Metropolitan World: Challenges for Development and Governance in Three Hungarian Urban Agglomerations". *International Planning Studies*, 20 (1–2), 21–38. 10.1080/13563475.2014.942491.
Maier, K. 2012. "Europeanization and Changing Planning in East-Central Europe: An Easterner's View". *Planning Practice & Research*, 27(1),137–154. DOI: 10.1080/02697459.2012.661596.
Meijer, A., and M. P. Rodríguez Bolívar 2016. "Governing the Smart City: A Review of the Literature on Smart Urban Governance". *International Review of Administrative Sciences*, 82 (2),392–408. 10.1177/0020852314564308.
Mezei, C. 2013. "Carsharing in Hungary – Starting from Scratch". https://worldstreets.wordpress.com/2013/11/25/carsharing-in-hungary-starting-from-scratch/ Last accessed 27 November 2020
Ministry for National Economy 2014. "Territorial and Settlement Operative Programme (TOP)". https://www.palyazat.gov.hu/download.php?objectId=53469 Last accessed 27 November 2020
Molnár, E., G. Dézsi, I. M. Lengyel, and G. Kozma 2018. "Vidéki Nagyvárosaink Gazdaságának Összehasonlító Elemzése". *Területi Statisztika*, 58(6). 610–637. 10.15196/TS580604.
Müller, M. 2010. "Doing Discourse Analysis in Critical Geopolitics". *L'Espace Politique – Online Journal of Political Geography and Geopolitics*. Retrieved from: http://espacepolitique.revues.org/index1743.html Last accessed 27 November 2020

Óhegyi, E., M. Bihunova, P. Dostal, M. Weber-Siwiriska, and M. Zaryn 2017. *Smart and Green, the Future of Visegrád Cities*. Budapest – Nitra: CEEweb for Biodiversity in cooperation with the Slovak University of Agriculture

Oszter, V. 2017. "Transport Policies in Hungary - Historical Background and Current Practice for National and Regional Level". *European Transport Research Review*, 9(20),1–14. 10.1007/s12544-017-0236-x.

Pálné Kovács, I. 2019. "A Magyar Önkormányzatok Korlátai A Helyi Gazdaságfejlesztésben". *Tér És Társadalom*, 33(2),3–19. 10.17649/TET.33.2.3088.

Phung Dang, T. K., I. J. Visseren-Hamakers, and B. Arts 2016. "A Framework for Assessing Governance Capacity: An Illustration from Vietnam's Forestry Reforms". *Environment and Planning C: Politics and Space*, 34(6),1154–1174. 10.1177/0263774X15598325.

Pollio, A. 2016. "Technologies of Austerity Urbanism: The "Smart City" Agenda in Italy (2011--2013)". *Urban Geography*, 37(4),514–534. 10.1080/02723638.2015.1118991.

Polyák, L. (2015) "Levente Polyák — Hungary". *disP — the Planning Review*, 51(1), 46–47, DOI: 10.1080/02513625.2015.1038060.

Pusztai, G., I. D. Fekete, Á. R. Dusa, and E. Varga 2016. "Knowledge Brokers in the Heart of Europe: International Student and Faculty Mobility in Hungarian Higher Education". *The Hungarian Educational Research Journal* 6(1),60–75. DOI: 10.14413/HERJ.2016.01.04.

Rácz, S. 2008. "Egy Regionális Központ Modernizációs Problémái – Pécs Példája". In A. Buday-Sántha and J. Zemplényiné Bartha (Edited by) *Évkönyv 2008*. Pécs: PTE KTK Regionális Politika és Gazdaságtan Doktori Iskola. 232–244.

Scott, J. W., and M. Kühn 2012. "Urban Change and Urban Development Strategies in Central East Europe: A Selective Assessment of Events since 1989". *European Planning Studies*, 20 (7),1093–1109. 10.1080/09654313.2012.674345.

Shelton, T., M. Zook, and A. Wiig 2015. "The 'Actually Existing Smart City'." *Cambridge Journal of Regions, Economy and Society*, 8(1),13–25. doi:10.1093/cjres/rsu026.

Sikora-Fernandez, D. 2018. "Smarter Cities in Post-socialist Country: Example of Poland". *Cities*, 78, 52–59. 10.1016/j.cities.2018.03.011.

Smigiel, C. 2019. "Urban Political Strategies in Times of Crisis: A Multiscalar Perspective on Smart Cities in Italy". *European Urban and Regional Studies*, 26(4),336–348. 10.1177/0969776418792049.

Söderström, O., T. Paasche, and F. Klauser 2014. "Smart Cities as Corporate Storytelling". *City*, 18., 307–320. 10.1080/13604813.2014.906716. 3

Somlyódyné Pfeil, E. 2019: "*A Városok Szerepe A Területi Kormányzásban. A Közszolg áltatás-szervezéstől A Várospolitikáig*". Budapest: NKE Közigazgatási Továbbképzési Intézet

Sýkora, L, and S. Bouzarovski 2011. "Multiple Transformations: Conceptualising the Post-communist Urban Transition". *Urban Studies*, 49(1),43–60. 10.1177/0042098010397402.

Taylor Buck, T., and A. While 2017. "Competitive Urbanism and the Limits to Smart City Innovation: The UK Future Cities Initiative". *Urban Studies*, 54(2),501–519. 10.1177/0042098015597162.

Tomor, Z., A. Meijer, A. Michels, and S. Geertman 2019. "Smart Governance for Sustainable Cities: Findings from a Systematic Literature Review", *Journal of Urban Technology*, 26 (4),3–27. 10.1080/10630732.2019.1651178.

Torfing, J. 2005. "Introduction. Discourse Theory: Achievements, Arguments, and Challenges", In D. Howarth and J. Torfing (Edited by). *Discourse Theory in European Politics: Identity, Policy and Governance*. New York: Palgrave. 1–31.

Vanolo, A. 2014. "Smartmentality: The Smart City as Disciplinary Strategy". *Urban Studies*, 51 (5),883–898. 10.1177/0042098013494427.

Varró, K. 2010. "Re-politicizing the Analysis of "New State Spaces" in Hungary and Beyond: Towards an Effective Engagement with "Actually Existing Neoliberalism"". *Antipode*, 42 (5),1253–1278. 10.1111/j.1467-8330.2010.00801.x.

Varró, K. 2019. "Tracing the (Hidden) Spatialities of Digital Agendas: The Case of 'Digital Hungary'." *European Spatial Research and Policy*, 26(2),135–150. 10.18778/1231-1952.26.2.07.

Varró, K., and D. J. Bunders 2020. "Bringing Back the National to the Study of Globally Circulating Policy Ideas: 'Actually Existing Smart Urbanism' in Hungary and the Netherlands'". *European Urban and Regional Studies*, 27(3),209–226. 10.1177/0969776419893731.
Verrest, H., and K. Pfeffer 2019. "Elaborating the Urbanism in Smart Urbanism: Distilling Relevant Dimensions for a Comprehensive Analysis of Smart City Approaches". *Information, Communication & Society*, 22(9),1328–1342.
Williamson, B. 2015. "Educating the Smart City: Schooling Smart Citizens through Computational Urbanism". *Big Data & Society*, 2(2),1–13. 10.1177/2053951715617783.

References

Debrecen ITS "(Debrecen Megyei Jogú Város Integrált Településfejlesztési Stratégiája)." 2017. https://www.debrecen.hu/assets/media/file/hu/7308/strategia.pdf, Last accessed 27 November 2020
"Debrecen Megyei Jogú Város" (2020): *Debrecen 2030*. https://www.d2030.hu/doc/DEBRECEN2030main.pdf Last accessed 28 September 2020
Debrecen SECAP "(Debrecen Megyei Jogú Város Fenntartható Energia-és Klímaakcióterve)" 2017. https://www.debrecen.hu/assets/media/file/hu/9347/debrecen-energia-es-klimaakcioterve-secap.pdf, Last accessed 28 September 2020
"Debrecen SUMP (Debrecen Megyei Jogú Város Fenntartható Városi Mobilitási Terve)" 2016. Last accessed http://portal.debrecen.hu/upload/File/Hirek/Mobilitasi_terv_%20tarsadalmi_egyeztetes.pdf, Last accessed 27 November 2020
"Debrecen TFK (Debrecen Megyei Jogú Város Településfejlesztési Koncepciója)" 2014. https://www.debrecen.hu/assets/media/file/hu/7309/koncepcio.pdf, Last accessed 27 November 2020
EDC 2019. *The Smart City Strategy of Debrecen*. Debrecen: EDC Debrecen Urban and Economic Development Center
"Győr ITS (Győr Megyei Jogú Város Integrált Településfejleszési Stratégia)" (2019. GYŐR MEGYEI JOGÚ VÁROS (gyor.hu) Last accessed 27 November 2020
"Győr TKF (Győr Megyei Jogú Város Településfejlesztési Koncepciója 2014-2030)" 2014. GYMJV-TFK-BIZ_0903 (gyor.hu), Last accessed 27 November 2020
"Miskolc ITS (Miskolc Megyei Jogú Város Integrált Településfejlesztési Stratégiája)" 2014. http://miskolcvaros2020.hu/sites/default/files/dokumentumok/miskolc_its.pdf, Last accessed 27 November 2020
"Miskolc TFK (Miskolc Megyei Jogú Város Településfejlesztési Koncepció)" 2014. http://www.baz.hu/telepules/Miskolc/miskolc_mjv_telepulesfejlesztesi_koncepcioja_miskolc.pdf, Last accessed 27 November 2020
"Miskolc SECAP (Miskolc Megyei Jogú Város Fenntartható Energia- És Klíma Akcióterv)" 2019. miskolc_secap_2019_09_24_2_final.pdf Last accessed 27 November 2020
"Miskolc SUMP (Miskolc Város Fenntartható Közlekedési Terve)" 2016. http://kerekparosmiskolc.net/wpcontent/uploads/2013/12/Miskolc_SUMP_MVK_131030_v%C3%A9gleges.pdf, Last accessed 1 July 2020
"Pécs ITS (Pécs Megyei Jogú Város Integrált Településfejlesztési Stratégia (ITS)" 2014. https://www.pvfzrt.hu/userfiles/dokumentumok/ITS20142020.pdf, Last accessed 27 November 2020
"Pécs SEAP (Pécs Megyei Jogú Város Fenntartható Energia Akcióterve)" 2014. https://www.pvfzrt.hu/userfiles/dokumentumok/Pecs_SEAP.pdf, Last accessed 27 November 2020
"Pécs SUMP (Pécs Megyei Jogú Város Fenntartható Városi Mobilitás Terve)" 2017. https://www.pvfzrt.hu/userfiles/dokumentumok/SUMP_2.pdf, Last accessed 27 November 2020
"Pécs TFK (Pécs Megyei Jogú Város Városfejlesztési Koncepció 2014-2030 (TFK)" 2014.https://www.pvfzrt.hu/userfiles/dokumentumok/PecsMJV_fejl_koncepcio_2014-09-2.pdf, Last accessed 27 November 2020
"Szeged ITS (Szeged Megyei Jogú Város Integrált Településfejlesztési Stratégiája)" 2017. Szeged MJV Integrált Településfejlesztési Stratégiája (ITS) módosításai » Szeged Megyei Jogú Város Önkormányzata (szegedvaros.hu), Last accessed 19 March 2021

"Szeged SECAP (Szeged Megyei Jogú Város Fenntartható Energia- És Klímaakcióterve)" 2018. https://energiaklub.hu/files/project/Energiaklub_Szeged_SECAP_HU.pdf, Last accessed 27 November 2020

"Szeged Smart City Concept and Vision (Szeged Megyei Jogú Város Smart City Jövőkép És Koncepció)" 2016. https://www.szegedvaros.hu/letoltheto-csatolmany/?ID=20557, Last accessed 27 November 2020

"Szeged SUMP (Sustainable Urban Mobility Plan of Szeged)" 2017. Retrieved from: SUMP SZEGED (sump-network.eu), Last accessed 27 November 2020

"Szeged TFK (Szeged Megyei Jogú Város Településfejlesztési Koncepciója)". Retrieved from: https://www.szegedvaros.hu/letoltheto-csatolmany/?ID=19546, Last accessed 27 November 2020

"Szeged TFK (Szeged Megyei Jogú Város Településfejlesztési Koncepciója)Szeged ITS (Szeged Megyei Jogú Város Integrált Településfejlesztési Stratégiája)". 2017 Szeged MJV Integrált Településfejlesztési Stratégiája (ITS) módosításai Szeged Megyei Jogú Város Önkormányzata (szegedvaros.hu), Last accessed 19 March 2021