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Performing Smartness Differently - Strategic Enactments of a Global Imaginary in Three European Cities

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Zusammenfassung

In der wissenschaftlichen Literatur zu Smart City dominieren normative und präskriptive Ansätze. Die meisten der analytisch orientierten Publikationen fokussieren auf transnationale Unternehmen, die damit verbundenen globalen Vorstellungen einer Smart City und assoziierte neue Technologien. Im Vergleich dazu werden die real-existierenden Smart Cities selten untersucht. Dies gilt umso mehr hinsichtlich der öffentlichen Governance-Arrangements von Smart City-Politiken. Unsere Studie vergleicht drei EU-Städte in dieser Hinsicht, die danach streben, eine Führungsrolle in der Entwicklung von Smart City einzunehmen. Darüber hinaus werden urbane Landwirtschaft und BürgerInnen-Beteiligung spezifisch auf ihr Verhältnis zur Politikentwicklung im Rahmen von Smart City untersucht. Basierend auf einer Analyse von policy-Dokumenten, des Mediendiskurses, von Interviews und teilnehmender Beobachtung, werden drei Governance-Arrangements von Smart City-Politiken identifiziert: hierarchische Governance durch die Regierung in Barcelona zwischen 2011 und 2015, geschlossene Ko-Governance durch die Exekutive der Stadt und Nicht-Regierungs-Akteure in Wien sowie seit 2015 in Barcelona, und offene Ko-Governance in Berlin. BürgerInnen-Beteiligung steht in Barcelona seit 2015 im Zentrum, und ist potenziell in Berlin von Bedeutung. Die Smart City-Governance in Wien ist durch nicht-hierarchisches Verhandeln innerhalb der Verwaltung gekennzeichnet. Es handelt sich dabei um eine innovative Meta-Governance ohne BürgerInnen-Beteiligung. In allen drei Städten spielen internationale Dynamiken eine wesentliche Rolle für die Auseinandersetzung mit Smart City, doch wird Smart City auf je spezifische Arten umgesetzt: abhängig von örtlicher Geschichte, den jeweiligen sozialen Kräften und ökonomischen wie politischen Bedingungen. Die sinnhafte Bedeutung von Smart City variiert erheblich. Sie reicht von einer umfassenden urbanen Nachhaltigkeits-Strategie mit klimapolitischem Fokus in Wien und einer umfassenden Internationalisierungs-Strategie in Barcelona zwischen 2011 und 2015 bis zu einem limitierten technologie- und business-orientierten Ansatz in Berlin und einem limitierten Digital City-Konzept in Barcelona seit 2015, das auf partizipative Demokratie und technologische Souveränität hin ausgerichtet ist. Im Gegensatz zur Literatur heben wir die Handlungsmacht von städtischen Exekutiven hervor und die ortsspezifischen Umsetzungen globaler Smart City-Vorstellungen. Gegenwärtige Smart City-Politiken stehen mehr in Kontinuität mit bisherigen Politiken der Stadtentwicklung in unseren Fallstudien-Städten, als dass sie einen Bruch darstellen.

Keywords: Smart City – Stadtentwicklung– Öffentliche Governance – Governance-Arrangement

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Anregungen für Wien

Auf Basis der Ergebnisse dieses Berichts, und in Übereinstimmung mit den allgemeinen Intentionen der Smart City-Strategie in Wien, formulieren wir die folgenden Anregungen:

- BürgerInnen könnten als politische Subjekte angesprochen werden, was gegenwärtig nicht der Fall ist. Stattdessen werden BürgerInnen in der Smart City-Strategie vor allem als KonsumentInnen verstanden. Wenn BürgerInnen als politische Subjekte angesprochen werden, so könnte dies die Identifikation mit der Strategie vertiefen und die Beiträge dazu erweitern.
- In dieser Hinsicht sind die Erfahrungen mit der gegenwärtigen Digital City-Strategie in Barcelona von großer Bedeutung. Sie könnten genauer auf mögliche Anwendungen in Wien hin in den Blick genommen werden.
- Das könnte den extensiven Einsatz digitaler Technologien zur Unterstützung der BürgerInnen-Beteiligung umfassen, zusammen mit aktiven Politiken, um Digital Gaps zu schließen, wie das in Barcelona versucht wird.
- Darüberhinaus könnten zivilgesellschaftliche Gruppen (NGOs etc.) und die Vertretungen der ArbeitnehmerInnen-Interessen aktiver und umfassender in die Entwicklung der Smart City-Strategie einbezogen werden. Dies könnte die Legitimität der betreffenden Politiken erhöhen und zusätzliches Wissen integrieren.
- Ungeachtet der Vorzüge der Smart City-Strategie in Wien, die in diesem Bericht hervorgehoben und analysiert werden, könnten die "Erzählungen" und Labels der Stadtentwicklung auch unter dem Gesichtspunkt der Attraktivität für die BürgerInnen betrachtet werden. Angesichts der sozialen Vielfalt Wiens wird jede einzelne "Erzählung" zur Entwicklung der Stadt, und jedes denkbare Label dafür an bestimmte Grenzen stoßen.
- Eine stärkere Unterstützung von urbanem Gärtnern in der Stadt könnte in Betracht gezogen werden, indem der Zugang zu Land vereinfacht wird, und indem die Transformation der Stadtlandschaft hin zu einer "Stadt nach dem Erdöl" aktiver und kreativer gestaltet wird. Ein sozial ausgeglichener Zugang zu Gartenflächen sollte dabei soweit wie möglich gewahrt sein. Dies könnte auch bedeuten, das gegenwärtige Modell der eingezäunten Gemeinschaftsgärten zu überdenken. Das Angebot an Selbsternte-Feldern könnte in Anbetracht ihres bedeutenden Potenzials ausgeweitet werden.
- Die potenzielle Rolle von Ernährung und Landwirtschaft für eine Smart City und ihre Bedeutung für eine "Stadt nach dem Erdöl" scheinen bislang nicht ausreichend gewürdigt. Regierung und Verwaltung der Stadt könnten sich stärker der Frage widmen, wie Maßnahmen zu einem aktiveren Bodenschutz getroffen werden könnten, um Bodenschutz und Bevölkerungszunahme stärker zu harmonisieren. Das ist für den Klimaschutz und die Anpassung an den Klimawandel von Bedeutung, aber auch aufgrund der zunehmenden

Nachfrage nach Land für verschiedene Zwecke sowie zur Sicherung der Versorgungssicherheit mit Lebensmitteln. Die laufenden Versuche in der Zivilgesellschaft zur Gründung eines Ernährungsrates und die Aktivitäten der Initiative *ÖkoKauf* in Zusammenhang mit Ernährung könnten vielleicht verbunden werden. Dies könnte das Bekenntnis der Stadt Wien zum *Milan Urban Food Policy Pact* stärken. Soziale Innovationen in der Produktion und Verteilung von Nahrungsmitteln wie Solidarische Landwirtschaft, *food sharing*, und *food coops* sollten weiter unterstützt und erheblich ausgeweitet werden.

- Wie unsere Forschung illustriert hat, ist der hohe Anteil von Gemeindebauten eine Komponente der internationalen Reputation von Wien. Die kritische Wohnsituation in Berlin, und – in noch weit höherem Maße – jene in Barcelona zeigen, wie wichtig ein hoher Anteil von Gemeindebauten ist. Der Anteil von Gemeindebauten könnte weiter erhöht werden.
- Der Fokus auf öffentlichen Verkehr, Radverkehr und Fußwege in der Smart City-Strategie Wiens sollte weiter aufrecht bleiben, und diese Mobilitätsoptionen sollten gegenüber Elektro-Autos bevorzugt werden.

Abstract

In the scholarly literature on smart city, normative and prescriptive approaches dominate. Most publications with analytic goals focus on transnational corporations, the related global imaginary of a smart city, and on associated new technologies. In comparison, actually existing smart cities have seldom been investigated. This is even more the case for public governance arrangements of smart city policies. Our study compares three EU cities in this regard, which are attempting to take a lead in smart city development. In addition, urban agriculture and citizens' participation are specifically investigated in their relation to smart city policy-making. Based on policy document and media discourse analysis, interviews, and participant observation, three governance arrangements of smart city policies are identified: hierarchical governance by the government in Barcelona between 2011 and 2015, closed co-governance by the city executive and non-governmental actors in Vienna and since 2015 in Barcelona, and open co-governance in Berlin. Citizens' participation is in the center in Barcelona since 2015, and is potentially important in Berlin. The Viennese smart city governance arrangement is characterized by non-hierarchical bargaining within the administration and signals innovative meta-governance, without citizens' participation. In all three cities, international dynamics play a crucial role for engaging with smart city, but it is enacted in particular ways according to place-specific history, social forces, and economic and political conditions. The meaning of smart city varies thus considerably: a comprehensive urban sustainability strategy focused upon climate policy goals in Vienna; a comprehensive internationalization strategy in Barcelona between 2011 and 2015; a limited technology- and business-oriented approach in Berlin; and a limited digital city frame geared to participatory democracy and technological sovereignty in Barcelona since 2015. Contrary to the literature, we highlight the agency of city executives, and the place-specific enactments that global smart city imaginaries undergo. Current smart city policies express more continuity than rupture with regard to urban development policies in our case study cities.

Keywords: smart city – urban development – public governance – governance arrangement

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Executive summary

Smart city has become a buzzword in policy discourse, a strategic urban development concept, and a burgeoning field of research. Besides many publications with a prescriptive leaning addressing urban management problems, that are either sympathizing with or criticizing smart city, this subject has primarily been investigated with regard to globally operating corporations, power effects implied in new urban visions and technologies, and possible pitfalls and dangers associated with these. Important as these contributions are, nuanced investigations of actually existing smart cities still are scarce, and spatially explicit, socially and politically contextualized research has only begun recently. This report links to research into actually existing smart cities by comparing smart city policies and public governance arrangements in three EU cities, which are suggested to be smart cities or where policies attempt to gain their recognition as smart cities: Vienna, Berlin, and Barcelona. Municipalities in each of these cities claim a leading position in smart city developments, but are very different in political, economic, and social terms –as well as in the content, role and history of their smart city policies and projects. A combined qualitative and quantitative discourse analysis of representative newspaper articles allows to elucidate the difference of public discourses on smart city in content and types of relevant actors. The recent urban development of these cities together with their histories can explain such differences, while processes of Europeanization and global dynamics help to understand common features.

In this way, our study allows us to answer the two core questions of our research: (1) what is the relevance of the smart city concept and its articulations by different actors in a city, (2) how are varying interpretations of smart city concretized in various policies –especially considering the exemplary cases of housing, mobility, urban gardening and agriculture, and citizens' participation as a cross-cutting issue. Specific strategies of urban gardening and agriculture –where existing– are investigated in this regard. Our general findings are: (1) smart city shows diverging relevance, content, and effects depending on local conditions and history, (2) while smart city refers to a global imaginary, which has been and is constructed in global arenas, intermediate and local arenas decisively shape the concrete meanings and relevance of smart city in a particular context.

The core concept of our analysis is the *policy arrangement*, which denotes how the making of a policy is organized. It consists of a governance arrangement in addition with a certain policy content. A policy arrangement has four dimensions: (1) actors and their alliances, (2) power resources of actors to enforce their goals, (3) the rules of the game of policy-making, including access and responsibility rules, and more generally the way of interaction, (4) discourse, which consists of narratives, metaphors, and concepts that transmit the meaning of a policy. We apply the concept of the governance and policy arrangement to the development of smart city policies in Vienna, Berlin and Barcelona and investigate specifically how power is distributed within the city executive, which we understand to be composed of government and administration. In the literature,

it has been suggested to distinguish policy arrangements according to the distribution of power in constellations of executive and non-executive actors. Thus, in hierarchical governance, power is concentrated in the executive and the dominant form of interaction is government coercion, while power is pooled between executive and non-executive actors in closed co-governance, where restricted cooperation prevails. In open co-governance, power is diffused and governance is rather loosely coordinated, more open for new actors, and in general characterized by flexible collaboration of a relatively large number of actors. In a self-governance arrangement, non-executive actors govern their own affairs. Resources may still be concentrated in the executive in this arrangement, but they are mobilized by non-executive actors to govern their own affairs, and the executive rather supervises that certain rules and boundaries are respected.

Vienna: A closed co-governance arrangement prevails and is related to smart city in terms of a rather broadly conceived sustainability strategy focusing on resource conservation and climate protection. The arrangement is dominated by the administration, especially by the urban planning department and public utility companies owned by the municipality, while government actors are important in situations of conflict and as source of legitimacy. Steered by the administration, business actors and research institutions are part of the governance arrangement, while civil society agents and labor are not. Governance is characterized by non-hierarchical bargaining and rests on a significant degree of self-organization and spirited engagement with the issue on the part of various administration officials. In this way, smart city signals an innovation in meta-governance in Vienna, which is partly becoming more project-like, flexibly cutting across departmental boundaries. The decisive influence of a well-funded and skilled administration is reflected by a smart city strategy document that stands out by its coherence, comprehensiveness, and complexity, re-enacting long-standing policy goals with enhanced ambition. High technology plays a rather secondary role so far in comparison with smart city strategies in other cities. Housing is included in this strategy, and general social aspects are addressed as well. The governance arrangement is embedded in multiple levels of policy-making reaching from the city of Vienna to the national level and the EU.

Viennese media discourse on smart city is shaped by a sustainability narrative. In this discourse, technology (only) appears as one part among other elements of solutions for a diverse range of problems that are understood as being interconnected. The normative focus of this narrative is on quality of life and ecological soundness. Sometimes, participation is addressed. Smart city is conceived as a planning tool or framework and as a guiding vision for an integrated form of urban development, which sometimes is called systemic or holistic within this narrative. Technology is addressed quite selectively. Thus, some technologies are seen rather critically, and a significant role is assigned to low technology or non-technological means. Although ecological concerns play a dominant role in this narrative, it includes social, economic, and participation issues as well. The media discourse is closely related with the narrative of the smart city strategy. The media discourse is characterized by a broad range of speakers, which connect different themes.

Berlin: The smart city governance arrangement is characterized by open co-governance of a constellation of business actors and research institutions on the one hand, and government members and respective administrative bodies on the other. A network of business and research actors has a driving role, to which government responds, especially through the urban planning and the economy departments. Non-hierarchical bargaining between business, research, and government actors prevails. The effectiveness of smart city policies is impeded by a lack of cross-departmental cooperation and it has a limited role narrowly focusing on technology, especially on e-mobility and e-government. It is one urban development strategy among others, connected to employment policies through the support of industrial modernization and internationalization. However, consumer convenience also plays a role. The smart city strategy is thematically rather balanced and leaves some room for further deliberations. In correspondence with the high overall level of citizens' participation in Berlin, a further opening of the governance arrangement is envisaged, but has not yet taken place. In contrast to Vienna, a limited number of civil society organizations and labor representatives participated in the strategy's development. Smart city policies react upon EU policies, but their multi-level character is much less developed than in Vienna.

The media discourse on smart city in Berlin is characterized by a "pro-growth" narrative, where technology or smart city in general are understood as means for the goal of economic growth, together with a "pro-technology" narrative, which frames technology as end in itself or natural process or unquestioned requirement (sometimes with reference to business promotion). The media discourse is dominated by two politicians and is thematically not as diverse as in Vienna.

Barcelona: While smart city was the key urban policy of the government between 2011 and 2015 (mayor Xavier Trias), it has been reduced in scope and relevance, and re-oriented towards a tool for participatory democracy, job creation in neighborhoods, and technological sovereignty in general since 2015 (mayor Ada Colau). Given the wide variety of meanings of smart city, the current digital city policy under Colau may be interpreted as a strongly reshaped smart city policy. The smart city policy arrangement under Trias was of the hierarchical governance type. Respective policies were essentially developed within a closed circle of the government. Business actors, especially corporations, but also some SMEs were decisively important, though not for policy formulation. In this period, smart city was very much oriented towards international business audiences and geared to enhance the reputation of Barcelona as a globally renowned conference location. The key concern was economic growth through high technology in order to create jobs. The outlook of the strategy was comprehensive, but did not include housing. The arrangement was part of a multi-level policy-making constellation including the provincial government, regional associations, and national ministries. In 2015, the government of Ada Colau came into office, which had developed in the context of social movements protesting austerity and corruption that were inter alia engaged with housing issues. Smart city or digital city policies are now part of a closed co-governance arranagement, since the program of the governing party *Barcelona en Comú* was developed in

extensive neighborhood assemblies and the government put much efforts into increasing substantial citizens' participation. However, the government also enacts policies top-down, though it then puts its performance to direct discussion in neighborhood assemblies. The Colau government is attempting to infuse the notions of the commons, open data, transparency and technological sovereignty into the international smart city discourse. Overall, its perspective is focused upon social improvements, participatory democracy, solidarity economy and remunicipalization.

In contrast to the environmental narratives of smart city, those that put economic and consumer interests at their center, dominate in Barcelona, i.e. a "pro-growth" and the rather unspecified "opportunity and challenge" narrative. The pro-growth narrative is basically pro-business. Here, technology is not the prime focus or ultimate goal, but rather economic growth (with technology as its means). Moreover or alternatively, international recognition as a strong urban economy or business location and competitiveness may be in the center of utterances within this narrative. Further side effects or benefits of growth in relation to smart city may be mentioned, such as citizens' benefit –according to the idea of so called win-win, with business being the prime concern however. The narrative of opportunity and challenge is somewhat similar, but deviates from pro-growth insofar as it is a very general narrative constructing smart city in terms of possible conveniences (including cost reductions) and –at the same time– in terms of challenges, problems, tedious requirements, necessary efforts, or trade-offs, which have to be dealt with, including concerns of data security or large investments. It characteristically includes all utterances with a (sole) focus on consumer convenience (such as energy bill reduction). Its main feature is its very narrow focus. These results refer to the meaning of the notion of smart city that was most prominent under the Trias government, while actors under the Colau government referred to it much less frequently. Hence, the current framing of digital technology-focused policies by the current government –which may be seen to be related to the notion of smart city– is not captured here.

General findings: Though not for identical reasons, the most pressing political issue of each of the case study cities has been the provision of affordable housing since some years. This issue can be accomodated with smart city policies in three ways: (1) the meaning of smart city can be broadened so that it is able to integrate social policy goals in efficiency terms, i.e. aiming to provide good or high quality housing with the same amount of money or even less than usual; (2) the meaning of smart city is narrowed so much that it does not imply an overarching urban development policy; (3) the demand for high quality and affordable housing is neglected. Against the backdrop of strong social movements like in Barcelona and Berlin, or an entrenched social democratic consensus like in Vienna, only the first two options have proven valid so far, the second one in Berlin and the first one in Vienna –where smart housing basically means smaller flats with equal comfort, together with enhanced concern for the urban planning contexts of housing projects. Although the discontent with the Trias government in Barcelona had more dimensions than housing alone, it is not by chance that the current government has strong roots in the housing activism that spread in the city after 2008.

As much as the Trias government attempted to distance itself symbolically from the previous political period by adopting the smart city label for its urban development approach, the current government signals political distinctiveness by introducing the digital city label, which narrows down smart city to the technological component, and the notion of technological sovereignty, which relates to the concern for closing digital gaps, local job creation and democratization.

In each city, smart city policies are related to certain constructions of the citizen, who is conceived of as passive consumer and passive or active provider of data, but not as political subject. In this regard, the current government in Barcelona marks at least a discursive change concerning the role of digital technologies, because these are conceived as means for a democratization of the city, facilitating a political role of citizens. However, material changes would have to be investigated further. Housing issues are only related decisively to smart city in Vienna, especially as far as energy consumption is concerned, while mobility in smart city terms plays an important but varied role in all three cities. Within the context of smart city, mobility is mainly seen as a public transport task together with an increasing role of bike use and walking in Vienna, but is more related to the expansion of e-mobility in Berlin as well as Barcelona. Urban agriculture and gardening only play a role in the smart city concepts of Vienna and partly of Barcelona, but hardly so in practice.

To date, smart city policies in our case studies are less of a rupture or radical break with the urban development patterns and dynamics since the 1980s than part of the on-going modernization of social relations that are contingent upon local histories and power relations whose trajectories reach into decades before the advent of the so called entrepreneurial city. In contrast to much of the smart city literature, our results show how city executives actively navigate constraints and decisively shape smart city due to local forces and with regard to contextual opportunities.

Policy suggestions for Vienna

On the basis of the findings of this report, and in accordance with the general intentions of the smart city strategy in Vienna, the following suggestions are made:

- Citizens may be called upon as political subjects, which is currently not the case. Instead, citizens are mainly constructed as consumers in the smart city strategy. Referring to citizens as political subjects may enhance the identification with and contribution to smart city.
- To this end, experiences in Barcelona and its current digital city strategy are highly relevant and may be studied in closer detail in view of possible applications in Vienna.
- This may include the extensive use of digital technologies to foster citizens' participation, together with active policies to close digital gaps as it is attempted in Barcelona.
- Moreover, civil society groups (NGOs etc.) and labor representatives may be included more actively and more extensively in the further development of the smart city strategy. This may increase the legitimacy of related policies and may integrate additional knowledge.
- The merits of the smart city strategy in Vienna notwithstanding, which are highlighted and analyzed extensively in this report, urban development narratives and labels may also be seen under the lens of their attractiveness for citizens. Considering the social diversity of Vienna, any single urban development narrative or label will encounter limitations.
- A more extensive support of urban gardening in the city may be considered by making access to land easier, and by more actively and creatively shaping the transformation of the urban landscape on the way towards the "post-oil city". Social equality in access to gardening plots should be ensured to the highest degree possible. This may involve re-considering the current model of fencing community gardens. Self-harvest fields may be expanded in view of their considerable potential.
- The potential role of food and agriculture for smart city and the importance of these topics with regard to the "post-oil city" do not appear to be tackled sufficiently so far. The city executive may explore the possibility of introducing more active soil protection measures to accommodate soil conservation with immigration. This is important for reasons of climate change mitigation and adaptation, but also in view of increasing demands for agricultural land for various purposes as well as food security issues. The connection between ongoing attempts to establish a civil society-led food council and the food-related activities of the *ÖkoKauf* initiative may be explored and could be fruitful. Sucha connection may also strengthen the commitment of the municipality to the *Milan Urban Food Policy Pact*. Social innovations in food production and provisioning such as Community Supported Agriculture, food sharing, and food coops may be further strengthened and considerably expanded.

- As our research has shown, the large share of public housing is one component of the international reputation of Vienna. The critical housing situation in Berlin and, even more so, in Barcelona, illustrates its relevance. The public housing stock may be further increased.
- The focus on public transport, bike use and walking in the smart city strategy of Vienna should be further pursued, and these modes of mobility should be favored over e-cars.

1. Introduction

1.1. State of the art

The concept of smart city has made an impressive career since about 2008, reflected in a rapidly growing number of academic contributions relating to the term (Colding/Barthel 2017), even surpassing the widely used notion of sustainable city in frequency in this literature in recent years (de Jong et al. 2015). Sustainability is becoming more and more subsumed under the label of the smart city (Caprotti et al. 2017). In the wake of lobbying by a quite heterogeneous and fluid, but obviously powerful alliance of different actors who are constructing a "coherent pro-urban discourse" (Caprotti et al. 2017, 367), smart city has not least left strong imprints on *The New Urban Agenda* presented at the UN-HABITAT III conference in Quito in 2016. The fuzziness of the term and its inconsistent use has been often criticized (Hollands 2008, Cocchia 2014, Angelidou 2014, Albino et al. 2015, Meijer/Rodríguez Bolívar 2016, Glasmeier/Nebiolo 2016, Anthopolous 2017), and it has been pinpointed that this fuzziness impedes the evaluation and discussion of smart city plans (Watson 2015). However, systematic reviews have shown that in the academic literature, smart city has a rather circumscribed meaning, which owes its immediate conceptual roots to the planning discourses of new urbanism, compact urban development, and smart growth (Gibbs et al. 2013), together with the idea of the intelligent city focusing on urban space and Information & Communication Technology (ICT) (Vanolo 2016). In the academic literature, smart city is predominantly used with a strong technological leaning towards ICT, which clearly differentiates it from the otherwise related notion of the sustainable city (de Jong et al. 2015, Ahvenniemi et al. 2017; cf. Glasmeier/Nebiolo 2016). However, it is suggested that smart city might supplement the older notion of the sustainable city by incorporating sustainability concerns (de Jong et al. 2015, Haarstad 2016). A shift from economic to governance issues in relation with the notion of city smartness has been stated (White 2016). Moreover, certain definitions appear to establish themselves as standards (Cocchia 2014). For instance, the definition by Caragliu et al. (2011) is quite often used, declaring "a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance" (op. cit., 70). Smart city often appears to be a floating instead of an empty signifier (Wolfram 2012). Considering its use in the academic literature, smart city, at the bottom line, thus denotes an urban fabric characterized by ICT effectively "contextualized and embedded in wider physical and social systems, thus allowing it to be at the service of people, business and government" (de Jong et al. 2015, 34). Certainly, this does not capture the full scope of the concept, its variability, and of course does not provide an answer to what smart city actually means for whom and to which effect. For instance, Kitchin (2014) suggests that smart city technologies such as smart grids, apps, sensors, smart meters, and integrated management platforms are understood, first, as ubiquitous computing services enhancing the legibility and management of

cities by urban governments, further boosted through their functioning as data collection devices, and allowing for the real-time analysis of urban systems; second, as increasing opportunities for the knowledge economy in terms of creative cities and economic innovation –implying a certain tension between top-down and corporatized centralization and bottom up, decentralized grassroots approaches to technology.

Smart city has been seen with critical eyes because social and environmental issues are often perceived to be only weakly represented (Colding/Barthel 2017, McFarlane/Söderström 2017). Others argue that urban ecology is understood by smart city approaches in a fundamentally flawed way (Mundoli et al. 2017). Nevertheless, smart city can often be distinguished from similar, technologically oriented urban development concepts such as digital city by the embedding of ICT in social, ecological, and economic relations (Cocchia 2014, de Jong et al. 2015, Ahvenniemi et al. 2017). Notably, these criticisms as well as findings mostly relate to the global discourse and have a certain bias towards academic approaches. However, research on smart city is also pursued in non-academic institutions, with a much more techno-centric understanding than in the academic discourse (Mora et al. 2017), especially by corporations (Albino et al. 2015). Moreover, the discourse on smart city is differentiated also within academic fora. For instance, regarding urban governance, interpretations of smart city that focus on technology can be distinguished from those underscoring human resources or collaboration (Meijer/Rodríguez Bolívar 2016).

Research has increasingly investigated how corporations understand smart cities. An important strand of criticism refers to their influence in this regard, interpreting smart city as a market creation strategy of companies such as IBM (Söderström et al. 2014, Kitchin 2014). Thus, smart city perspectives have been argued to be incompatible with a strong sustainability agenda as in terms of degrowth (March 2016), and to support so called green growth with disregard for wider impacts (Viitanen/Kingston 2014). However, closer investigations of how corporations promote smart city have cast doubt on accounts of their influence that tend to neglect the constraints under which big business operates, the many obstacles corporations face and the agency of city executives they are confronted with (McNeill 2015). Much less than the perspective of corporations have cities' views in relation to these been studied. Investigating cities' needs in connection with the philanthropic IBM *Smarter Cities Challenge* program, Alizadeh (2015) finds that although IBM is explicitly offering multi-dimensional and cross-cutting solutions to a range of urban challenges, cities mostly focus on only one topic, e-government being most prevalent. Alizadeh (2015) suggests that the strain in national budgets and increased international competition may force cities to engage in smart city initiatives such as the IBM *Smarter Cities Challenge*. In a more general vein, Wiig (2015) and Pollio (2016b) have argued that the increasing interest in smart city solutions –at the expense of sustainability policies, as Crivello (2015) suggests, especially with respect to Italy– can be explained by the effects of the economic downturn after 2008. This downturn has also triggered the promotion of smart growth (Cooke/De Propris 2011) and EU smart city agendas (Haarstad 2017),

while relegating formerly quite prominent creative and cultural economy policies into the background at the same time (Cooke/De Propris 2011). Smart city imaginaries have been deployed most visibly in Southern Europe to mobilize inspiration in order to combat the economic crisis by a multi-faceted capitalist revitalization, Rossi (2015) argues (cf. March/Ribera-Fumez 2014b, Leontidou 2015), where the crisis also has hit urban areas most severely (cf. Grossi/Pianezzi 2017).

This documents the agency of city executives with regard to the smart city discourse, although under conditions that are not of their own making. Thus, Wiig (2015) suggests that the strive of cities for international competitive edge is driving their engagement with the smart city discourse and technologies. According to his investigation of the IBM *Smarter Cities Challenge*, cities use the label that IBM is providing through such cooperation to signal economic attractiveness as a business location, but not necessarily to implement smart city policy measures as recommended by IBM. In the European context, Crivello (2015), in her investigation of Turin, highlights the motivation to gain EU funding by adopting the smart city label. On the other hand, Pollio (2016b) has pinpointed the function of the smart city narrative within the further devolvement of welfare and other national state policies in the course of recent economic crises, discussing the humanization of cities as a way of making them responsible for the effects of such crises, amounting to their reification (White 2016). Likewise, McNeill (2015) emphasizes the emergence of smart city policies within IBM as responding to a structural crisis of the organization in need of new outlets for its products, and Watson (2015) makes a case that smart city imaginaries are constructed upon marketing strategies of a recession affected "elite group of international architecture, engineering and planning firms based in North America and Europe" more broadly (op. cit., 38; cf. Paroutis et al. 2014, for IBM). Marvin/Luque-Ayala (2017) take this genealogy one step further arguing that smart city technologies originally were prefigured by companies of the military-industrial complex that sought new markets after the Cold War had abated, against the backdrop of systems thinking and modeling of the 1960s, and that such technologies were partly transferred into urban environments via their application in business organizations since the 1980s.

The coupling between the corporate-managed design and implementation of technology with often high hopes to solve a range of different urban challenges in the smart city discourse has provoked the criticism that the smart city concept follows a deterministic approach to technology guided by private interests, and is shaped by a reductionist as well as solutionist agenda that is depoliticizing urban development, with a concomitant lack in public deliberation regarding smart city agendas. Certain problems have been outlined on the basis of such diagnoses ranging from socio-technical lock-ins impeding alternative city futures to data privacy issues, the dangers of surveillance, authoritarianism, and lack of political accountability, unreflected and biased policy choices hidden under the veil of seemingly neutral technologies, as well as their instability and vulnerability (Townsend 2013, Kitchin 2014, Hollands 2015, March 2016). Smart technologies are understood to standardize and simplify the reality of a city to a scaleable commodity by some (McNeill 2015,

Glasmeier/Nebiolo 2016, Caprotti et al. 2017) or may even construct "a new rationality for a regime of control" (Marvin/Luque-Ayala 2017, 3; cf. Krivý 2016) connected with a very thin conception of the urban (McFarlane/Söderström 2017) morphing into an outright "fantasy city" (Watson 2014, 2015), and showing the imprints of a Northern bias while illustrating a dangerous "return to positivist dreamlands" of the 1950s and 1960s (Söderström et al. 2014). A disregard of the possibility of further increasing inequality by smart city concepts has recurringly been mentioned (Watson 2014, 2015). The lack of accountability that may be inherent to technology-intensive modes of urban governance has been analyzed also with regard to corporate power, which is increasingly involved in urban development (Grossi/Pianezzi 2017). Accordingly, a comparison of 15 smart city strategy frameworks by Angelidou (2017) finds a lack of concern for privacy and security issues, as well as citizens' participation, a failure to accomodate to local needs and a subordinated role of social and welfare issues. In addition to that, Calzada/Cobo (2015) criticize the possible information overload and loss of face-to-face communication further bolstered by smart city ideas in the context of digital divides. Moreover, the lack of evidence of environmental progress through smart city solutions and the importance of faith in their potential have been outlined (Haarstad 2017), or the alleged environmental benefits of smart city technologies have been outright questioned (Hollands 2008, March 2016) as well as its purported social improvements (Glasmeier/Nebiolo 2016). Repeatedly, the embedding of smart city within market-friendly, technocratic and corporate-driven policies typical for neoliberalism (Kitchin 2014), including austerity (Lombardi/Vanolo 2015, Pollio 2016a, b; Joss et al. 2017; cf. Coletta et al. 2017, 15) has been analyzed. Following this line of inquiry, some have focused more specifically on smart city discourse and technologies in the context of the entrepreneurial city and place branding (Hollands 2008, 2015, Yigitcanlar/Lee 2014, Wiig 2015, Anthopoulos 2017) or even on entrepreneurial urbanization (Datta 2015a, Watson 2014, 2015) and the effective mirroring of a business organization by the city through a "computational urbanism" (Marvin/Luque-Ayala 2017). Linkages between smart city and social innovation intended to replace national welfare policies (Pollio 2016b) have been investigated as well as smart city and neoliberal governmentality (Vanolo 2014) or environmentality (Gabrys 2014) being related to new notions and subjectivities of citizenship (Luque-Ayala/Marvin 2015, Joss et al. 2017, Cardullo/Kitchin 2017), functioning in essentially performative ways (White 2016, Shelton 2017). Smart city concepts and plans have been interpreted as reviving older, high-modernist notions of urban organicism and technocratic utopias without democratic participation (Shelton et al. 2015, Datta 2015a, Pollio 2016b, Glasmeier/Nebiolo 2016, Vanolo 2016, Grossi/Pianezzi 2017, McFarlane/Söderström 2017) or as strengthening even older practices of urban legibility (Klauser et al. 2014, McNeill 2016) and expertocracy (Caprotti et al. 2017), with further depoliticizing consequences (Söderström et al. 2014, Marvin/Luque-Ayala 2017). Some have investigated in depth the relations between smart technologies and power (Klauser et al. 2014, Klauser/Albrechtslund 2014, Marvin/Luque-Ayala 2017), while others have highlighted smart city as an example of the "production of narratives promoting the city and addressed to global elites", which "implies a concern with the importance of

a city in relation to other cities rather than the extent to which it functions for its citizens", where "form and aesthetics of the built environment are what really count" and developers "pretend that here is a city with no poverty and unemployment, where global capital is welcome and can operate without constraint" (Watson 2015, 37; cf. Watson 2014).

Contrary to the importance of the smart city label within discourse, studies document a relatively weak material progress of many smart cities towards their self-declared aims so far (Yigitcanlar/Lee 2014, Datta 2015a, de Wijs et al. 2016, 2017; Glasmeier/Nebiolo 2016, Meijer/Rodríguez Bolívar 2016, Bilbil 2016, Van Winden/van den Buuse 2017, Anthopoulos 2017, Cowley et al. 2017, Taylor Buck/While 2017). In these accounts, smart city amounts to a "self-congratulatory surface" (Hollands 2008, 313), an "inflated rhetoric" (Wiig 2015, 266) and "empty rhetorical device" (op. cit., 271; cf. Wiig 2016), sometimes being stuck in a tension between fast track plans and bottlenecks of local resistance against dispossession (Datta 2015a, cf. Mundoli et al. 2017), at times amounting to a "fantasy city" (Watson 2015, 37), or, rather, evincing the "peripherality of the smart city" (Cowley et al. 2017, 19). This discourse-materiality mismatch is related to a partly uncritical scholarly perspective on smart city (Luque-Ayala/Marvin 2015). However, investigations into the phenomenon have become more nuanced since about 2010 (McFarlane/Söderström 2017; cf. Kitchin 2015, Wiig/Wyly 2016), with the social science literature being mostly critical with regard to current smart city approaches (Haarstad 2017).

Some studies have drawn attention to an allegedly apolitical remodeling of the urban as being "governed by code" instead of spatial form (Söderström et al. 2014, 315; Klauser et al. 2014, Barns 2016, Barns et al. 2017). Thi remodeling is making extensive use of (linearly constructed) rankings (for a general criticism, see Shore/Wright 2015) implying the idea of "a one best city" (Meijer/Rodríguez Bolívar 2016, 402), which often gives global consulting firms much power to decide upon politics (Glasmeier/Nebiolo 2016) or shape political discourse (White 2016, Barns et al. 2017). Although some cities have set up their own public companies for establishing physical infrastructure of digitized urban governance (Barns et al. 2017), the technological capabilities of many city administrations are limited –not least due to privatization agendas–, which repeatedly leads to a stronger engagement of private business with concomitant governance changes, since "[t]hese firms are often scaled globally, which contrasts sharply with the localised nature of urban government" (op. cit., 6; cf. McNeill 2015). Paradoxically, the very same privatization agendas have, at least in certain cases, also limited the accessibility to data that digitized urban governance must rely upon (Barns et al. 2017). Finally, the rhetorical devices of the humanization and personalization of the city (Pollio 2016b), the assumption of a so called urban age that is reifying cities to seemingly natural, self-contained entities, and an anticipatory logics of future crises supporting the global smart city imaginary have been analyzed (White 2016).

Despite its scepticism, the critical literature partly endorses the possibilities that may be offered by smart city technologies and strategies (in general: Allwinkle/Cruickshank 2011, Kitchin 2016) such as by March (2016) in a degrowth perspective, or concerning certain management tasks if complemented with further instruments, policies, and practices that are sensitive to the complexity of the urban system (Kitchin 2014), or for substantive citizens' participation (Hollands 2015, Calzada/Cobo 2015) and social justice in the spirit of a knowledge- instead of a technology-intensive city (McFarlane/Söderström 2017). Luque-Ayala/Marvin (2015) underscore the need to avoid simplifying black and white logics approaching differencies in the development of smart technologies, reaching beyond bottom up and top down categorizations (cf. regarding big data: Shelton 2017). Unlike the dominant smart city narrative, alternative approaches will hardly amount to a unitarian single narrative due to their heterogeneity (Söderström et al. 2014, McFarlane/Söderström 2017). Haarstad (2016) takes issue with the criticism of smart city as corporate-led and technocratic, emphasizing the need to take a closer look empirically, stating that "[r]ather than being a hegemonic project with 'neo-liberal' underpinnings, smartness is a highly mobile concept that is contextualised in different ways in different cities, around which urban actors mobilise to lend support for their projects" (op. cit., 208). McNeill (2015) can also be read as a corrective to overly simplistic readings of corporate dominance in smart cities. Further still, Rossi (2015) interrogates the totalizing view of the post-political city attempting to demonstrate the "potential politics" –in the sense of Virno and Hardt– of the variegated economics of smart urbanism despite its shaping by global corporate power in the context of a disastrous economic crisis.

1.2. Research into the actually existing smart city

Research on smart city is rapidly evolving. However, empirical studies are in shorter supply than theoretical contributions (Alizadeh 2015) despite the fact that smart city research has started with an empirical leaning (Cocchia 2014). Most social science studies on smart cities are theoretical and target the wider smart city discourse (Haarstad 2017). Some even have a speculative flavor tending towards the dystopian since local enactments of smart city policies often lag behind the promotion of global, corporate-dominated imaginaries (Cowley et al. 2017).

In recent years, the concrete processes of formulation, enactment and performance of smart city policies have been identified as being in need of research, and a few studies have attempted to fill this gap, though mostly through quantitative means (De Wijs et al. 2017). Wiig (2015) analyzes smart city policies in Philadelphia in terms of policy mobility and has interpreted this case as an example of smart city functioning to mask entrepreneurial governance promotion. In contrast, the Turin smart city that Crivello (2015) describes –also using a policy mobility lens– rather illustrates how a city may adopt the smart city label in order to acquire funding for pre-existing projects and strategies, while Rossi (2015) emphasizes the role of the smart city imaginary in Turin to inspire a

multi-faceted capitalist revitalization against the backdrop of a general lack of positive narratives of prosperity and societal well-being –and the related threat for political actors of loosing their legitimacy–, which is going beyond the support and influence of corporate power. This imaginary focuses on local entrepreneurship and smart regional development, but reaches out to an "associative social economy" (op. cit., 12). Using Genoa as a case, Grossi/Pianezzi (2017) understand smart city policies as the result of economic downturn, the ascent of corporate actors to whom urban development is increasingly handed over, and an unwillingness to correct a mismanaged urbanization that creates geo-hydrological risk. Contrary to many findings that indicate or suggest a driving role of corporate investments, Bilbil (2016) underscores the lack of private investment and legal regulations as key problems in smart city development in Turkey, but this study is based on document analysis and quantitative analyses only. Haarstad (2017; cf. Haarstad 2016) shows that sustainability is weakly represented in EU smart city policy documents, but that it may be more important on the city-level, taking Stavanger in Norway as his case, underscoring that the presumably ubiquitious smart city discourse is in fact constructed in more specific ways depending on actors, policy levels and context. March/Ribera-Fumaz (2014b), examining Barcelona, find that environmental management becomes depoliticized by smart city policies. Datta (2015a) offers quite another perspective by analyzing the provincialization of global imaginaries in the greenfield smart city of Dholera in India, describing how entrepreneurial urbanization enacts a modernized version of post-colonial city-making by dispossession and state-led "lawfare" against peasants (cf. Datta 2015b, Jazeel 2015). The heterogeneous, non-linear, fragmented, and contingent process of smart city-making is also illustrated in a very different context by Dublin and its transition from an accidental to an articulated smart city promoting an "experimental urbanism" characterized by "civic paternalism" with the offically unintended effect to reproduce its fragmented, accidental nature in this way (Coletta et al. 2017). Cowley et al. (2017) point to the wide range of governance arrangements of smart city policies in the UK, which furthermore are specifically narrated in local city discourses, and analyze a variety of modalities of publicness enacted by related smart city activities. Cowley et al. (2017) and Joss et al. (2017) lend support to the argument that smart city policies have entered a new phase going beyond the initial visions dominated by corporations, either responding to criticism or due to the constraints and contingencies of local situations. Repeatedly, this type of study has illustrated the agency of city-makers and city administrations that use smart city labels and imaginaries strategically to harness support for pre-existing plans, strategies, and projects, acquire funding, or signal attractiveness to global business (Datta 2015a, Crivello 2015, Haarstad 2016, 2017, Coletta et al. 2017).

Far from being inconsequential, smart city as label, discourse and set of technologies may not produce the results intended, or not exactly so, and may not be set into motion for the reasons officially mentioned. The discourse of smart city may express as much as it may veil. Furthermore, a summary view on these studies complicates the rather uniform narratives of smart city's global imaginary as it is constructed in several publications mainly addressing the views of globally active

corporations (Kitchin 2015). Such a view may thus relativize both the claims of corporations and those of critical scholars and runs counter to a reification of smart city (Shelton et al. 2015). Evidence starts to accumulate, that in the process of translating a global, corporate-dominated imaginary into locally embedded politics and practices, significant permutations occur, which may account for an "often opportunistic nature of smart city activity", pointing "to the often complicated governance arrangements in place" (Cowley et al. 2017, 8), which "gives rise to unique local forms, but simultaneously holds these hostage to broader societal and economic agendas" (op. cit., 20). This said, the materiality of smart city-making may lie well beyond the homogeneity, totality, and efficiency a certain global imaginary attempts to convey, although it remains consequential.

Localized investigations have started to enrich our knowledge about smart city discourse and practices, but remain restricted since they hardly endorse a comparative perspective in themselves, with very few exceptions such as Cowley et al. (2017). Probing in-depth into smart cities, they go beyond rapid appraisal approaches to smart city comparisons with a very limited empirical grounding and scope of analytical questions (Angelidou 2017, Anthopoulos 2017) or quantitatively oriented large-scale statistical comparisons of city profiles (e.g., Giffinger et al. 2007, Dall'O' et al. 2017; see for a critical discussion of different approaches: Giffinger/Haindlmaier 2010). However, they are constrained by the difference of perspectives on mostly single cities, although they are partly linked with the examination of higher level discourses and policies. Sometimes, the empirical case is strongly subsumed to a wider theoretical claim. In addition to these limitations, a significant lack in this type of research is policy-making. While there are some informations to be found on how smart city policies are enacted, and by whom, and sometimes with considerable detail (Crivello 2015, Coletta et al. 2017), the overall focus is on the content of the policies, and their critical evaluation, and not so much on their relation with politics or politics as such.

Certainly, there is still much to be learned from more contextualized research, especially when it is organized in a comparative manner. We thus take on the twofold challenge Coletta et al. (2017) identify for smart city research: first, to consider evolving smart city landscapes across entire city-regions, the interrelationships between smart city initiatives, the role of political and administrative geographies, and the formation and work of smart city initiatives; second, to compare general patterns and localized contingencies. Furthermore, Kitchin (2015) emphasizes the need to investigate the morphings of smart city due to criticism, as Joss et al. (2017) have recently illustrated with respect to the British smart city standard, and Cowley et al. (2017) in their analysis of UK smart city policies. Responding to this twofold challenge also reflects wider changes in recent discussions about urban politics and policies, which throw a sceptical light on over-generalized, de-contextualized notions of either neoliberalization or network governance. Rather, governance can take on quite different forms and may be fraught by power asymmetries, and local actors may resist the hegemonial forces of neoliberalization or buffer the force of international economic crises (Blanco 2015). Moreover, political processes in a city may be understood as a set

of complementary, contradictory or fragmented patterns of political interaction rather than a unified whole that corresponds to only one type of regime or governance arrangement. Thus, temporal shifts between more hierarchical government-like and less hierarchical governance-like forms of political interaction may occur in both directions (Arnouts et al. 2012, Blanco 2015).

2. Research questions, theoretical background and methodology

2.1. Research questions

Against this theoretical backdrop, we will answer the following questions by a comparative case study of Vienna, Berlin, and Barcelona: (1) what is the relevance of the smart city concept and its articulations by different actors in a city, (2) how are varying interpretations of smart city concretized in various policies –especially considering the exemplary cases of housing, mobility, urban gardening and agriculture, and citizens' participation as a cross-cutting issue. In this way, we put the concrete meanings of smart city in specific places into the center of our focus. The relevance of smart city and its articulations will thus be considered with regard to both the public sphere and the city administration. Specific strategies of urban gardening and agriculture –if existing– will be regarded in view of their possible relation with smart city. This will allow us to better understand the delimitation of smart city development in the three case study cities in terms of actors settings and its rules of decision-making as much as it will enable us to probe into the perception of smart city by non-technological and non-profit actors. For such actors have often been left out of the discussions of smart city in the literature and in the making of smart city policies.

Answering our research questions involves to know how the public governance of smart city development unfolds over time, what its conditions are and which effects in terms of institutionalizations and conflicts may be identified. These conditions crucially involve power relations and the interests that are reflected by smart city policies.

Taking the findings of our literature review into consideration, we hypothesize that smart city will show different relevance, content, and effects depending on local conditions and history. A central open question that emerges from the discussion of the scholarly literature on the subject concerns the issue of the hegemonial status of smart city. On the one hand, studies have suggested that smart city merely or predominantly serves as a marketing tool, or that it is used rather as a label for quite different policies that represent more of continuity than change, while on the other hand, substantial shifts in power relations between big ICT corporations, municipalities and citizens have been argued to take place along the way of becoming a smart city. Usually, it is assumed in this type of argument that ICT corporations assert a dominant role in this relation and that citizens loose in power. We reframe this dichotomy by asking whether smart city imaginaries and policies are a tool for and the expression of a new hegemonial constellation in a city or rather a shift in discourse that

does not or not yet go along with a shift in the fundamental regime of power in a given city. This latter case, however, may well entail visible changes in power relations or governance mechanisms, if a smart city discourse affects institutional discourses and cooperation patterns. Basically, we argue that smart city is a floating or even empty signifier with the specific functionality that it can be appropriated by various actors and for different ends. The significance of smart city as a semantic object that may be appropriated in various ways, we hypothesize, depends more on local than global conditions. Global arenas –places where the imaginary and the notion of globality are produced and reproduced– have constructed smart city by merging different discourses reaching from sustainability and the compact city to the digital city, smart growth, and systems thinking, as our literature review has shown (see above). Local arenas, together with intermediate arenas such as the European Union, and the interaction between such levels shape the concrete meanings and relevance of smart city in a particular context, we hypothesize.

2.2. General theoretical background

Following a method of difference (Odell 2001), we compare Vienna, Berlin and Barcelona in order to probe into particular national and urban settings where smart city was high on the agenda (Barcelona), is a top priority (Vienna) or should become such a priority, according to certain actors and documents (Berlin). We select these cities to allow for investigating the relation between global, local and intermediate arenas of policy-making by focusing on specific places and to enable us to produce "dense case studies" (Flyvberg 2006, 238) with "rich ambiguity" (Flyvberg 2006, 237). Sharing Blanco's insight about "the explanatory limits of the big narratives and the need to reconnect them to the empirical analysis of the complexities of local politics and practices" (Blanco 2015, 126), we adopt a combination of a context-sensitive and discursive-institutionalist policy analysis taking into account actors, power relations (grounded in specific resources), policy discourse, the rules of the game of policy-making, and socio-economic structures. Although we will refer to the urban regime perspective that Blanco suggests as an analytical lens for comparative urban studies in the discussion of some of our results, we rather opt for a finer grained approach, because we are dealing with a limited policy arena –that of smart city development– rather than with urban regimes in general, all the while recognizing that smart city policies may have the characteristics of an overarching urban regime in certain cities.

Our methodology combines two different approaches to policy analysis, which we see as complementary: the context-sensitive historical-materialist policy analysis (Brand 2013, Kannankulam/Georgi 2014) and the discursive-institutionalist policy arrangement approach (Arts/Tatenhove 2004, Arts et al. 2006, Arnouts et al. 2012). Both approaches share the concern with power in policy analysis, which is integrated with interpretative policy analysis and a close investigation of institutions. They also converge on the importance of socio-economic structures and other factors external to a policy domain, while stressing the relative independence of policy

processes. In fact, the urban regime approach also acknowledges the importance of the socio-economic context (e.g., Blanco 2015), but takes broader and more complex constellations of policy arrangements into account than we intend to do in our analysis of smart city policy-making.

With regard to our research questions, the historical-materialist policy analysis and the discursive-institutionalist policy arrangement approach do not differ so much in how to conceptualize the policy process, but rather in the degree of complexity of conceptualizations. While the historical-materialist policy approach offers elaborated concepts for understanding socio-economic structures (Brand 2013), the policy process is the focus of the policy arrangement approach (Arts/Tatenhove 2004, Arts et al. 2006, Arts/Buizer 2009, Arnouts et al. 2012). While the policy arrangement approach explicitly recognizes the role of context, its conceptualization can be extended and refined by applying elements of the historical-materialist perspective in this regard. It has been recognized by the historical-materialist approach that in order to investigate policies in more detail, the refined concepts of other types of policy analysis are needed (Brand 2013, Kannankulam/Georgi 2014). Likewise, proponents of the policy arrangement approach have pointed out the need to closer theorize the interaction between actor and structure, and to further develop its theoretical, methodological and empirical aspects in general (Arts et al. 2006). Both have been primarily developed in and applied to the field of environmental governance, but are not limited to it.

Our central theoretical concept is the policy arrangement. Herewith, we understand the actors and their coalitions, their power relations (grounded in specific resources), rules of the game, and policy discourse, i.e., the ordering of a specific policy domain in these terms. Power relations rely on specific resources. The different resources of actors shape their power in terms of the mobilization, division and deployment of resources, leading to different degrees of influence on policy outcomes. We regard power as a complex phenomenon that involves not only the capacities, relationships and outcomes on the actor level, but also the asymmetric societal distribution of resources and the positions of autonomy and dependence that go along with it. The rules of the game include both formal and informal rules about legitimate norms, how issues are to be raised and agendas to be set, how interests are to be articulated and policies formulated, and how decisions are to be made and implemented. In this way, rules delineate a policy domain by defining the legitimate actors to be involved, their interrelations, and the relations to outsiders. As policy discourse we understand the interpretative schemes of policy actors, which define problems and appropriate solutions, and in doing so shape actor constellations and their power relations, as well as rules of the game (Arts/Tatenhove 2004, Arts et al. 2006). This view corresponds to the notion of discourse as understood by Hajer (1993). The policy arrangement is the temporary stabilization of the content and organization of a policy domain (Arts et al. 2006), which we understand as being equivalent to the notion of the policy arena. Because of the mutual interdependence of the components of a policy arrangement, any change in one of them entails a related change in the others (Arts et al. 2006; see Figure 1). Figure 1 depicts these relationships.

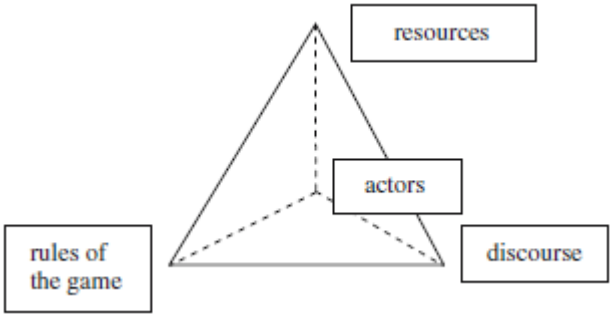

Figure 1: A symbolization of the interconnectedness of the components of a policy arrangement (Arts et al. 2006, 99).

The four dimensions of the policy arrangement guide the thick description of our cases. The analytical sections are structured by the type of material that we focus upon. First, the results of the media discourse analyses in terms of meanings and thematic networks are presented; second, the development of smart city in terms of the policy arrangement is described and analyzed. In this second part, the results of the media analysis play a certain role, but it is mainly based on the hard facts contained in media reports (events, utterances), together with interview information and scholarly background literature. In the last section of this report, we conclusively answer our research questions.

2.3. Methodology

General approach

Our research combines qualitative and quantitative methods that are applied to a range of different data sources to allow for triangulation and a broader scope of results. To triangulate findings appears to be especially necessary in a research setting that lacks the possibility of the participant observation of policy-making processes. Therefore, processes of power dynamics in fora that are usually closed to outsiders have to be inferred by indirect means. To this aim, we analyzed interviews that we led with a variety of actors, as well as policy documents and newspaper articles. While policy documents only were analyzed qualitatively, newspaper discourse was subject to both qualitative and quantitative analyses that the more extensive material enabled us to do.

Policy documents

Policy documents that outline the understanding of smart city by the executive of the respective city were coded and codes were further analzyed in order to construct their basic narrative. The categories of the narratives were gained inductively. Further information such as style of writing, visual elements and hard facts such as lists of participants in stakeholder workshops were analyzed

as well and contributed to the interpretation. The approach followed Keller (2010, 2011) in reconstructing the phenomenon structure of smart city that appears in the documents.

Interviews

Expert interviews (Meuser/Nagel 2009) were led to gather information about the development of smart city policies, the understandings of these policies by different actors, and their stakes in them, and how smart city in particular, and urban development in the case study cities in general are perceived by civil society actors. We attempted to gain access to a rather balanced set of actors in each of the cities following a pre-defined sampling scheme with some deviations according to local circumstances. The interviews were semi-structured and questions adapted to the particular role and expertise of respondents. We thus aimed at about 10 interviews in each city, with a rather balanced representation of members of the administration including public or public-private enterprises and agencies of the municipality on the one hand, and civil society actors on the other hand. We put a focus on housing, mobility, and urban gardening or agriculture for three reasons: first, these are specifically mentioned or even highlighted in the Viennese smart city strategy, which is the most extensive and elaborated among the three case study cities; second, we wanted to circumscribe the type of department or issue area that we selected our respondents from; third, we added urban agriculture and gardening for we were interested in how those civil society actors perceive urban development and smart city who are active in an issue area that barely has any relation to smart city except in the smart city strategy document of Vienna, as far as we know, but that is quite directly confronted with overall city development policies. Besides, urban agriculture and gardening are the object of recent EU policy and research initiatives indicating a certain policy relevance of these.

We did not conduct interviews with politicians because we assumed that we gain access to relevant information on their perception of and interests in smart city through the newspaper text analysis, and that interviews would not gather significant additional information because this type of actor usually behaves in a highly strategic way. For a complete list of all interviewees see the Appendix. All interviews were done face to face and recorded. Interview information is anonymized.

Media texts

Theoretical background

Our analysis of media texts centers on narratives, which we understand as little stories framing the issue of smart city. We conceive media texts as being composed of two layers: on the one hand, a media narrative is articulated by the author(s) of an article using references to actors and by other means, while, on the other hand, any media text that contains the utterances of actors also represents a specific discourse or different discourses involving these utterances. This second layer of a media

text allows to discern discourse coalitions that are pressing for certain policies connected to smart city. For our analysis of the meaning of smart city in relation with a specific city, we analyze both dimensions of media discourse separately, although they produce effects in combination and can be distinguished only for analytic reasons. We assume that urban development discourses take on place-specific meanings and constellations. For this reason, smart city discourses in each of our case study cities are first analyzed separately and then brought into comparison. This is however done against the backdrop of the broader international smart city discourse, which has been analyzed in the literature already. Furthermore, the analysis of the city-specific smart city documents informs our interpretation of local urban development discourse centered on smart city insofar as we assess the extent of overlap, the influence of those policy documents on public debate, and contradictions. Finally, this part of the research was enhanced by collecting and analyzing further newspaper articles that related to topics of interest in connection with smart city, but that were not captured by the keyword selection procedure and the pre-defined sample of media types. In that way, blog entries, special interest outlets and further material were taken into account for the analyses.

Methodology

The purpose of the analysis was, first, to determine how much smart city constructions of respective policy papers correspond to smart city in *newspaper* discourse with regard to themes and narratives; second, which actors are associated with these in newspaper discourse; and third, which discourse alliances are active. Specifically, we wanted to know whether the city administration or the government is more important in constructing smart city in newspaper discourse, and what role industry, city executives (administration and government) and civil society play in relation to each other. This approach entails to limit attention to one specific urban development label and concept, i.e., smart city. However, further material such as interviews was used to assess the relevance of smart city in overall development debates. The extent of smart city as a term and concept in the newspaper texts also served to estimate how influential smart city is in specific contexts. The media analysis is described in a specific chapter. Later on, the interview analysis is presented.

Material

Media texts were selected by keyword search using the combination of “smart”, “city”, and the respective city name. All genres were collected. Thus, the local meanings associated with smart city concerning specific cities were captured. This included smart city meanings that were articulated through international conferences on the topic. Such conferences convey a certain meaning attached to smart city as well, since cities position themselves as internationally relevant through these. Often, media reports take smart city conferences as an occasion to focus on the specific relation of a given city to smart city. Further articles relevant to the topic were read to enrich our background

knowledge. Sometimes, similar articles appear in newspapers. These were usually not reduced to one of the versions in order to capture the frequency of certain smart city framings.

For Austria and Germany, the *wiso* database of the *Austrian National Library* was available, which includes regional as well as national media. For Spain, newspapers were screened individually through the respective online search engines, which cover major left- and right-wing national and regional newspapers (*El País*, *La Razón*; *El Periódico*, *La Vanguardia*). Only newspaper texts in Spanish were collected. Relevant articles issued in *El País* in Catalan language had also been published in Spanish. For all three cities, articles between the beginning of 2010 and mid-2017 were taken into consideration, including two from 2009 for Vienna. Multiple reports on one event were taken into account, since the frequency of reporting indicates relevance.

Themes and narratives

The analysis followed three steps involving inductive coding. Codes were arranged in more abstract categories to elucidate the web of meanings through which the imaginary that smart city denotes is woven. First, the *whole article* was assigned to a code describing the overall topic and context, and the key terms associated with smart city were identified. The general attitude of an article towards smart city was assessed with a five point scale ranging from very negative to very positive[1]. Second, actors' utterances or indirectly quoted positions referring to smart city as a term, notion or explicit context were coded according to the *overall theme of their utterances*, if they could be assigned to a certain narrative or fragment of a narrative. Utterances relating to single technologies were included as long as they referred to some general concern of smart city and could be assigned to a narrative or a fragment of it. Relevant opinion articles on smart city (which were rare in Berlin and Vienna, but more frequent in the Spanish media) were regarded as utterance, too. In addition, actors were classified into types of institutions. Third, codes of actors' positions on smart city were grouped into *narratives*, which give meaning to the themes smart city is related to. All actors' utterances on smart city were coded, including those that do not directly refer to the case study cities, since they are at least indirectly related to city-specific planning discourses through the overall geographical reference of the article and the mentioning of the term smart city. The share of utterances not directly relating to the case study cities was very small. Those rather rare utterances within relevant articles that did not refer to smart city as term, notion, or context were not included. This step of the

1 The overall message and tone of an article in relation to smart city as a label were assessed, with "very positive" being assigned to articles that are near to or identical with lobbying, characterized by the total lack of critical, sceptical or questioning sections or voices, and by an enthusiastic tone –while "very negative" was attributed to articles that fully reject the concept of smart city or are overall mostly critical (regardless of how smart city is understood). The values "positive" and "negative" were assigned to articles that in general imply a positive or negative image of smart city, while the value "neutral" characterizes articles that either do not evaluate the subject in any visible way or have a balanced way of reporting by confronting pro and con voices. Articles that are neutral in their style of reporting, but only contain positive to very positive voices were classified as "positive" as well, unless they include a visible identification of the author(s) with these voices, which justified a classification as being "very positive".

analysis was oriented by a sociology of knowledge approach following Keller (2010, 2011)[2]. By analyzing how an actor (as represented in a newspaper article) constructs the problem to which smart city responds, the meaning of this label was located within specific narratives. These were carved out by generalizing from the discourse fragments of utterances or indirectly quoted actors' positions referred in the single texts. It shall be noted that actors (as being represented in newspaper articles) may draw on different narratives, and that they may voice positions with regard to varying topics. However, actors usually can be assigned to one dominant narrative. The structure of smart city as a phenomenon (Keller 2010, 2011) was conceived of as being composed of a cause and nature of a problem, responsibility, solution, obstacles, and the identification of self and others.

Thematic co-occurrence networks

After these three steps of the media analysis, thematic co-occurrence networks were constructed on the basis of the results in order to elucidate the institutional power of certain positions on smart city. This was done with some inspiration drawn from Suitner (2015) by using *Gephi 0.9.0*. Actors were defined as nodes, while edges symbolized utterances of actors that belong to the same theme. Eigenvector centrality was calculated to quantify the importance of a node in the network. The size of a node in the thematic network diagrams (see below) shows the degree of its centrality and indicates the extent to which a node connects different themes. Therefore, the largest nodes can be regarded as opinion leaders in city-specific smart city newspaper discourses, which interweave different themes. It can be assumed that actors figure as opinion leaders even more so if they are also frequently quoted. This variable was checked independently of the *Gephi* visualizations to avoid an information overload of the graphs. The modularity class calculated by *Gephi 0.9.0* was used to identify sub-networks of actors. These sub-networks gather actors who are more densely linked to each other than to actors outside of their group defined by a predominant theme or set of themes. The thematic co-occurrence networks and sub-networks were further analyzed with regard to the type of institution to which actors belong, and how actors frame the theme or themes that they address. Likewise, the overall structure of the thematic co-occurrence network of a city was investigated in order to detect discursive structures.

Word frequencies

Moreover, the most frequent words appearing in those paragraphs that contain the term smart city or are most closely linked to how a text conceives of it were counted and depicted in word clouds[3]. Image captions were excluded from word counts. This method allows to give an additional type of

2 The number of articles analyzed as such is lower than those with utterances.

3 For the material from Berlin and Vienna, https://www.wortwolken.com/ was used, for Barcelona, https://www.nubedepalabras.es/

information on dominant meanings associated with smart city, although its results must be interpreted with a grain of salt due to language differences and loss of context.

Only substantives including names (excluding prenames of persons) as well as adjectives were accepted. All verbs, particles (including adverbs and prepositions) and numerals were excluded, as were “smart”, “city” (in English, German and Spanish), and the respective names of the cities under investigation. Although necessary for the sake of readability and a systematic sample definition, this selection rule entails a loss of interesting information such as the very high frequency of the Spanish particle “más”, which indicates superlatives, and was counted 506 times, and thus nearly as much as “Barcelona” (725 times). The Spanish “urbano” (meaning “urban”) and the German “städtisch” were excluded, while the German “urban” was retained due to a more narrow and specific meaning in comparison with “städtisch”, which would also translate into the English “urban”, though. Likewise, the Spanish “municipal” was excluded, while “Urbano” with a capital letter was retained –it almost always appears as part of the denomination of a specific city council in Barcelona. Plurals were merged with singulars into the most common form. Different cases, comparative forms, and ways of writing were unified, although this again reduces interesting information such as the higher frequency of the comparative and superlative of “good” in the Spanish articles in comparison with the simple form of the adjective. Genders were standardized to the male form, since this was the gender expressed in the overwhelming number of cases –testifying to the patriarchal language the media use in general. Sometimes, words that can either be verbs or adjectives were included (as adjectives), when their predominant use is as an adjective (e.g. the German “vernetzt”). Equally rarely, words that can be particles or adjectives, or particles or nouns, were either included or excluded depending on their meaning. Thus, the German word for “simple” was excluded, for example, as was the German word “rund”, which can either be understood as “approximately” or “round”. The Spanish “forma” was not counted since it almost always refers to the verb or adverb. The Spanish “Nueva” was not merged with other forms of “nuevo”, because it almost always was part of the city name “Nueva York”. “Medio” is in rare cases part of “medio ambiente”, which usually is written as a single word. The Spanish “embargo” was not included, since it is almost always part of the expression “sin embargo”. In these and similar cases, the original texts were checked if necessary to identify the predominant meaning. In rare cases, a word can be both an adjective and a substantive, like the Spanish “móvil”, which might mean “mobile phone” or “to be mobile”, or denote an adjective or a noun, like the Spanish “Gran”, which –with a capital letter– almost always refers to the street name “Gran Vìa”, and thus was counted as a word separate from “gran”. The Spanish comparative “mayor” was merged with “grande”, which means “big”, although in a very few cases, it has a different meaning such as “prime”. Word count was cut off at a share of about 10% of the numer of articles of the respective city, i.e. five for Berlin and 19 for Vienna as well as for Barcelona. After this initial definition of the word list, deviating forms (genders, cases, plurals or singulars etc.) were summed. Sums of word forms that only appeared below the above mentioned thresholds were not calculated and the initial word list therefore remained fixed. It can

be expected that hardly any word would have passed the threshold otherwise. Composite words including one of the words above the threshold were disregarded. Words with similar meanings were kept separate except “Arbeiten” and “Arbeit”, which both mean “work”.

3. Media analysis results

3.1. General remarks

Newspaper coverage of smart city is much more extensive in the case of Barcelona (N=194) and Vienna (N=198) than in Berlin (N=49), which is reflected in the sample sizes. In Spain and Austria, national newspapers report regularly about smart city either in general, with regard to other national cities, or concerning the case study city. In Berlin, however, newspaper interest is very limited and concentrated on one of the regional media outlets. Very few articles in the samples did not contain utterances. These were subtracted from the sample with regard to the respective steps in the analysis of narratives, but included for gaining further insights. In the following, the structure and development of discourse are analyzed for each city separately, including the overall attitude of articles and their distribution across newspapers, the basic structure of words associated with smart city in the respective cities, the thematic development of discourse over time, basic narratives, the distribution of utterances acros actors and types of organizations, and the thematic co-occurrences with regard to actors, as well as the narratives they refer to in their utterances.

3.2. Berlin

News outlets and attitudes

Most of the articles on smart city appeared in *Der Tagesspiegel* founded in 1945, which has a rather liberal orientation, being read mainly in the Western parts of the city[4]. Overall, the texts of the sample are mainly very positive including some lobbying articles (20)[5], or positive (14). The latter category sometimes contains texts expressing a slight criticism, for instance when these are briefly mentioning concerns or sceptical remarks, but only if done in a peripheral manner. Sometimes, irony is present in positively oriented articles, then marking a distance to the topic. A smaller group of articles is neutral, balanced or treats the topic in a purely marginal way (10). However, texts that treat smart city focused and more extensively in a rather balanced way are actually non-existent. Only two articles come close to this standard. A clear minority expresses a negative attitude (4) and one text is very critical –it is possibly no coincidence that this text is a letter to the editor, and very short. No tendency of attitudes related to newspaper or year of publication is evident.

4 https://de.wikipedia.org/wiki/Der_Tagesspiegel [9.10.2017]

5 figures in brackets indicated numbers

Word associations

The following Diagram 1 shows the word associations in the newspaper texts on smart city connected to Berlin. The highest share of all types of words is linked to the language of political legitimization (red color). These are words partly typical for the language of advertisement such as "new", "intelligent", "good" or "big" and "large", while "future" is characteristic for political rhethorics, as is the expression that "examples" are set or indicated. Equally important are expressions often to be found in more abstract political speech, but also in project management and news reporting such as "development" or "year". A very frequent word is the name of the former economy senator Cornelia Yzer (CDU), followed by former urban planning senator Michael Müller (SPD), who later in our sampling period became mayor. Economic actors and terms are also very visible, together with the place names "Europe" and "Barcelona", as well as the words "energy" and "people". Mobility and housing are only weakly represented or absent. Besides party labels, political concerns are hardly visible, and social issues are practically missing.

Diagram 1: Word associations for the German newspaper texts on Berlin and smart city (see explanations in the methodology section). Black: abstract language in technical, political and project terms, including names of planners, experts, politicians; red: political legitimation language; deep blue: geographical names and adjectives; pink: social and political concerns; bright green: environmental and sustainability concerns sensu stricto; light blue: economic terms and actors; dark green: mobility; orange: energy issues.

Development of discourse

The discourse on smart city starts between 2011 and 2013 with rather scattered topics, however, the perspective of technology research dominates the texts. In 2014, technological strategy is becoming most important, followed by place development in relation with smart city. Texts from 2015, which counts most articles of the sample period, are dominated by economic growth, closely followed by two newly appearing topics: governance by technology and energy provision. The years 2016 and 2017 are again characterized by a lower number of articles with scattered topics.

Themes and narratives

"E-mobility" has a specific relevance in the Berlin discourse on smart city in comparison with Vienna. "Energy provision" is about grids and the energy system in the sense of production and distribution –while the use of energy is assigned to the themes of housing, mobility etc. Within the "housing" theme, buildings are put at center stage, although specific aspects are sometimes foregrounded. Further quite frequent themes are "technology research" and "technology strategy", where the former addresses reports on research or issues of how research is best supported, while technology strategy is mainly about how to develop technology. "Infrastructure" is about energy, mobility and housing structures in general. "Community" denotes a rather varied range of topics revolving around democracy, participation, inclusion, local economy and regionalization, or justice. Housing issues are included here if social concerns are highlighted in this context. The theme of "governance by technology" lays emphasis on technological means to steer a city and its planning. A further prominent theme is "economic growth" either related to macro-economic dynamics or focused on business issues or even more specific concerns such as start up support or locational policies of international corporations. "Industrial policy", in contrast, is about smart city as a component of the promotion of industry. "Place development" labels relevant utterances if these are about how to brand a certain site before it is developed by starting construction on a site. "Citizens' autonomy" highlights the power of citizens to make decisions and shape their lives, while "everyday life" is about the mundane implications of smart city. "Labor market", "e-government" and "international trade" are further minor themes in Berlins' smart city discourse.

These themes are associated with one of five narratives. In the "pro-growth" narrative, technology or smart city in general are understood as means for the goal of economic growth, while the "pro-technology" narrative frames technology as an end in itself or a natural process or an unquestioned requirement (sometimes with reference to business promotion). In the narrative of "opportunity and challenge", smart city is seen as providing consumer conveniences, but also threats that have to be countered, or problems that have to be amended. In the "social" narrative, smart city shall support business to the end of creating employment –a topic more important in Berlin than in Vienna. In one case, smart city is understood merely as a "set phrase", close to the position rejecting smart city

in toto that has been identified in several cases in the Viennese discourse (see below). In another case, the focus is on "ecological standards" in building.

Distribution of utterances

Cornelia Yzer (CDU), the economy senator, is most frequently associated with smart city (12 times), and almost always supports a pro-technology perspective, relating most often to the topics of technology strategy, technology research and economic growth. Yzer is closely followed by Michael Müller (SPD), who was senator for urban development and became mayor in December 2014. His utterances on smart city are much more heterogeneous in their associations with both topics and perspectives. Most interestingly, Müller has a stronger focus on a pro-growth perspective related to a considerable concern with employment. This issue is rather marginal in Yzer's utterances, and mostly appears in her case when she answers a corresponding question. From the 46 persons that are mentioned as authors of smart city utterances in the texts, only three appear more than once. Authors mainly consist of researchers from universities and non-university research institutions (11) and economic actors, including corporation managers, small business representatives, or members of economic interest groups (17). Five are from agencies of the Berlin city executive, and five are senators, including the current mayor, who formerly was a senator, too. NGO officials or members of citizens' initiatives are not present.

Thematic co-occurrences

This basic structure of the thematic co-occurrence network shows a strong concentration of the smart city newspaper discourse on two party officials responsible for economic and urban development issues. The economy senator Cornelia Yzer is focused on a narrow technological perspective within which a legitimation of technological change is not necessary, while the urban development senator and current mayor Michael Müller repeatedly justifies smart city with reference to the creation of employment. The difference between these two perspectives is rather one of degree than of substance. The overwhelming connection of these two crucial actors with a range of economic and scientific actors testifies to the decisive constellation of interests that is articulated by reference to smart city in Berlin. Thus, further high centrality values characterize a set of actors consisting of Stefan Franzke (director of *Berlin Partner*), followed by finance senator Ulrich Nußbaum, Roland Sillmann from *Wista*, a firm managing the technology park in Adlershof, Peter-André Alt (president of *FU Berlin*), Jochen Brückmann representing an economic interest group as *Head of Department Infrastructure and Urban Development* in the *Commerce Chamber Berlin*, Harald Wolf, who was economy senator before Cornelia Yzer, and Florian Nöll, director of the *Bundesverband Deutscher Start Ups*.

To the contrary, social perspectives on smart city are rare in relation with Berlin. They open up the possibility of deviance, if they are connected with community as a topic. In these cases, digital technologies are envisaged to support inclusion and the local economy –contrary to the dominant ideas of global competitiveness and international trade. Likewise, smart city is conceived of as literally intelligent and innovative approaches to urban problems beyond the application of high technology in relation with the topic of community. Very rarely, a rather neutral perspective of opportunity and challenge can be found in our sample. Although deviant perspectives are not completely absent from the newspaper texts connected to Berlin, they are associated with actors that occupy isolated positions in the overall actor landscape of urban development in Berlin.

When looking at the thematic co-occurrence network shown in Diagram 2, two further observations can be made. First, the network is highly structured by several thematic sub-networks, amounting to a fragmented character (modularity value 0.460). A cluster that combines the themes of economic growth and technology strategy (purple) is related to both Cornelia Yzer and Michael Müller. E-mobility is important in this cluster, too, as is place development, with Tegel being the most prominent place in this regard. Housing forms a small sub-network (dark grey) with a single connection to Michael Müller. Infrastructure characterizes the thematic feature linking a totally disconnected group of three actors (ocean green), as is the case with community issues (red). Four actors show no connection to overarching themes at all, expressing utterances related to e-government, citizens' autonomy, international trade and everyday life. Second, it shall be noted that the sub-networks on economic growth and technology strategy as well as on governance by technology are quite closely integrated –in contrast to the other sub-networks.

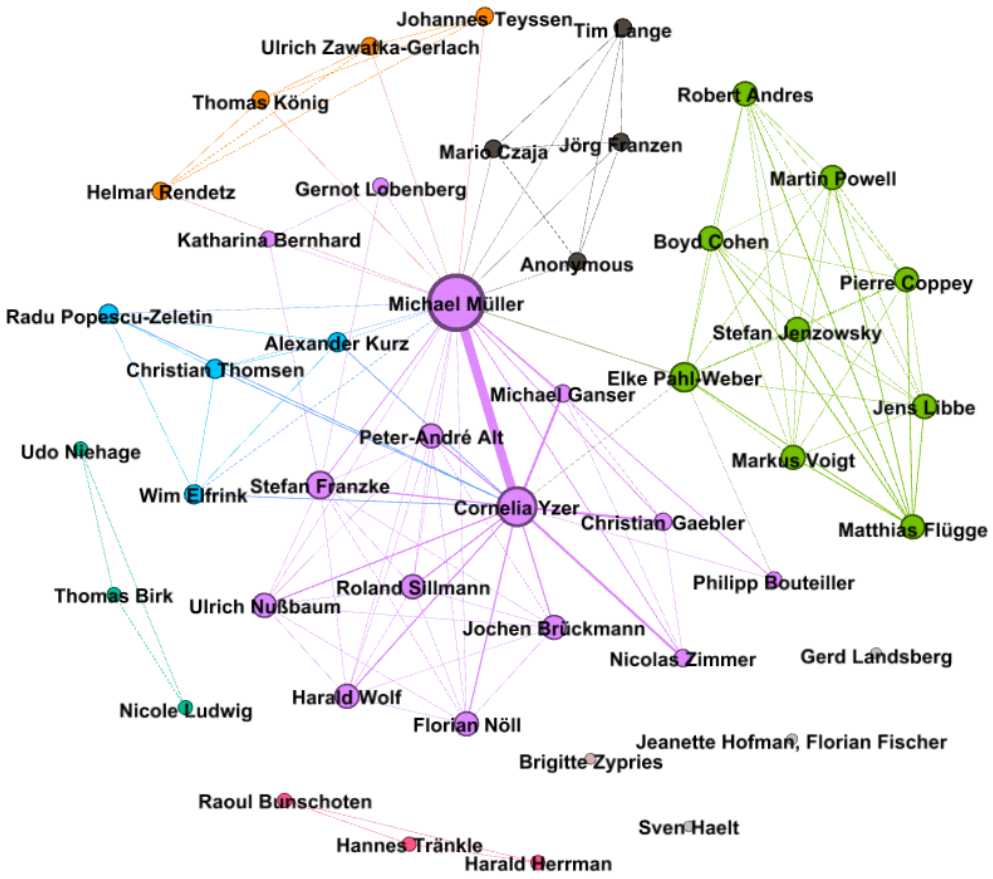

Diagram 2: Weighted thematic co-occurrence network with modularity classes in different colours. Eigenvector centrality shown by node size. Edges denote utterances within the same theme by actors, with edge thickness indicating closeness of actors. Graph calculated by *Gephi 0.9.0* using the Yifan Hu and Fruchterman Reingold algorithms.

3.3. Vienna

News outlets and attitudes

A broad range of newspapers is covered by the sample –with a much higher diversity than in Berlin. No clear positions towards smart city per news outlet can be seen except regarding *Falter*, which is disproportionally critical, and *News* and *Wirtschaftsblatt*, which are more positive than on average. Reporting starts at different years in the media compared. Some such as *Wirtschaftsblatt* initiated coverage of smart city in relation to Vienna in 2010, triggered by the first research projects funded by the *Austrian Climate and Energy Fund*, while others entered this topic only later on. The topic appears to be more attractive to more intellectually demanding media, such as *Falter*, *Der Standard*, *Die Presse* or *Wiener Zeitung*, while it is very rarely tackled in the tabloid *Kronen Zeitung*. National magazines such as *News* also rarely feature smart city in Vienna. Reporting becomes more critical over time, which reflects the lack of knowledge on different perspectives on smart city at the

beginning and the strategic advantage of those actors promoting smart city in the early period of its development. A significant share of articles is close to lobbying or lacks any mentioning of counter-arguments or criticism, but the sample in general is more balanced than in the case of Berlin. Therefore, public debate on smart city appears to be more informed, nuanced, and diverse than in Berlin as far as it is reflected in newspapers. Overall, a small minority of articles is very critical or outright rejects the concept (7), while a somewhat higher number is critical or sceptical (14). Many more articles (37) are balanced in the positions on smart city in Vienna that they express, or neutral, or treat the topic as a marginal issue in the overall context of an article. Nearly twice as many articles have a positive overall attitude to the topic (66), and the majority (74) has a very positive attitude, sometimes bordering on lobbying or advertisement.

Word associations

The following Diagram 2 shows the word associations in the media texts on smart city connected to Vienna. Similar to Berlin, the highest share of all types of words is linked to the language of political legitimization (red color). These words are “new”, “intelligent”, “good” or “big” and “large”, as well as “future” and “example” as in Berlin. Equally important are expressions often to be found in more abstract political speech and in project management. Except “year”, the concrete words within this group differ from Berlin, with “percent” and “project” being most important. Unlike Berlin, names of persons are less visible overall. Economic actors and terms are in general less prominent, but *Siemens* is more frequent than in the Berlin newspaper sample. The term “energy” has a very dominant role in the discourse on Vienna as a smart city, and there is a broader variety and higher share of words for political subjects such as “people”, “citizens” or “inhabitants”, together with the notion of “quality of life”, which is not as important in the Berlin discourse. Mobility, social and political concerns, and housing show a stronger representation than in Berlin. Party labels are not visible in newspaper discourse (despite the government being a coalition of SPÖ and the Greens since 2010). Interestingly, “public” is one of the most frequent terms in the Vienna media discourse –but is missing in Berlin. A further and striking difference to Berlin is marked by the high visibility of a flagship project of smart city in Vienna, the “Seestadt Aspern”.

Diagram 2: Word associations for the German media texts on Vienna and smart city (see explanations in the methodology section). Black: abstract language in technical, political and project terms, including names of planners, experts, politicians; red: political legitimation language; deep blue: geographical names and adjectives; pink: social and political concerns; bright green: environmental and sustainability concerns sensu stricto; light blue: economic terms and actors; dark green: mobility; orange: energy issues; rusty red: housing issues; political subjects and quality of life: light green.

Development of discourse

The discourse on smart city in relation with Vienna starts between 2010 and 2012, and is becoming more extensive in 2013. The range of topics is more diverse than in Berlin right from the beginning on. Infrastructure and general urban development, mobility and technology research are the most prominent themes on the level of actors' utterances. The amount of articles on the topic of smart city appears to be rather constant over the last years since 2013, and no significant changes in topic distribution are visible except that community concerns related to democracy, participation and data security become more important in the last years.

Themes and narratives

The smart city discourse connected to Vienna is structured by 16 themes. The most important of these in quantitative terms is “infrastructure and urban development”, which groups all general utterances on city development in Vienna with regard to overall visions, perspectives, rationalities, principles, dimensions, and the interrelations between the different aspects. From this theme, more specific ones can be distinguished, which mostly are similar to those identified regarding Berlin (see above). However, some have specific leanings or tendencies. Thus, “mobility”, which deals with all issues related to mobility, is often focused on walking, bike use and public transport in Vienna, while e-mobility has a rather marginal position within this theme. “Energy provision” is about grids and the energy system in the sense of production and distribution –while the use of energy is assigned to the theme of housing, mobility etc. Within the “housing” theme, buildings are put at center stage. Unlike Berlin, energy use, aesthetics or construction materials are often referred to in relation to housing in the Viennese smart city discourse. Further quite frequent themes –but less prominent than in Berlin– are “technology research” and “technology strategy”. Like in Berlin, “community” denotes a range of various topics revolving around democracy, participation, inclusion, local economy and regionalization or justice. Housing issues are included here if social concerns are highlighted in this context. The theme of “governance by technology” lays emphasis on technological means to steer a city and its planning, as has been explained already for the case of Berlin. But in Vienna, it also includes utterances related to modeling or simulation tools. “Economic growth” is less prominent than in Berlin, as is “industrial policy”. “Public relations” contains all utterances connected to the international recognition of Vienna as a smart city and was not identified in a similar way in Berlin. “Citizen data use” deals with utterances focusing on the use of data by citizens, for instance by smart phone applications, which is also unique for Vienna. “Place development”, however, can be identified as a category in Berlin as well, but is more important in the Viennese discourse. Minor themes are “funding”, “administrative cooperation”, and “education”, which have not been found relevant enough in Berlin to justify separate categories.

These themes are associated to varying degrees with one of seven narratives. The central narrative of smart city in Vienna can be called the “sustainability” narrative. Technology here (only) appears as one among several elements of solutions for a diverse range of problems that are understood as being interconnected. The normative focus of this narrative is on quality of life and ecological soundness. Sometimes, participation is addressed. Smart city is then conceived as a planning tool or framework and as a guiding vision for an integrated form of urban development, which sometimes is called systemic or holistic. Technology is addressed quite selectively. Some technologies are seen more critically and a significant role is played by low technology or non-technological means. Although ecological concerns have a dominant role in this narrative, it includes social, economic, and political issues as well. Therefore, themes that are not directly related to ecological issues are also assigned to this narrative if the other criteria apply. The “sustainability” narrative can be

distinguished from the narrative of "ecological modernization", which is primarily or solely about environmental or climate policy and emphasizes technology. A third narrative has consumer conveniences as its main concern, which is sometimes accompanied by the threat of data insecurity or similar problems. It is thus called the narrative of "opportunity and challenges". This narrative is relevant in different contexts, for instance when opportunities for political cooperation created by smart city are put in contrast with the threat of non-cooperation; or when transport business assesses smart city policies in neutral terms but is demanding that foreseeable problems must be amended.

A "social" narrative regards smart city primarily as a means to generate employment through business opportunities. Thus, technology is a means to support business which is a means to support employment. Equally rare cases are the "pro-growth" and the "pro-technology" narrative. In the "pro-growth" narrative, the focus of an utterance related to smart city is on technology for the purpose of economic growth and competitiveness. Growth and competitiveness are the primary goal. Technologies supported by smart city policies are the means to this end. Seldom, technology does not appear at all in this framing of smart city. It is pro-business in general, while other aspects are not addressed. The "pro-technology" narrative conceives of technology as an end in itself or a natural process or an unquestioned requirement –sometimes with reference to business promotion or consumer convenience, seldom with regard to climate change mitigation. This narrative partly includes utterances that are focused on merely technological issues. The primary characteristics of the "pro-technology" narrative is the lack of justification of the technology focus. It may thus be regarded as a variant of one of the former narratives.

The narrative of "rejection" is not a separate narrative in the proper sense, but appears sometimes as a total or nearly total refutation of smart city, the label, the concept –or both.

Distribution of utterances

With regard to frequency of utterances, planning director Thomas Madreiter (MA18) stands out with the highest number (17). He is followed by Wolfgang Hesoun (8), director of *Siemens AG Österreich*. Both cover a rather broad range of topics connected to different narratives, but the utterances of Madreiter are much more homogeneous than those of Hesoun. While the former mainly speaks on infrastructure and urban planning issues connected to a "sustainability" narrative, the latter has a tendency towards issues of growth and governance by technology linked to narratives of "ecological modernization" and "economic growth", though sustainability dimensions are not absent. Politicians are frequently mentioned actors, especially mayor Michael Häupl (7) and vice mayor and economy councilor Renate Brauner (7), followed by housing councilor Michael Ludwig (6) –all three from the SPÖ. Interestingly, the vice mayor of the Green party, Maria Vassilakou (4), is mentioned less often. While Häupl and Brauner connect to many different topics alluding to different narratives, Ludwig quite consistently focuses on social concerns connected to a

"sustainability" narrative, corresponding to his responsibility for housing. The institutional distribution is skewed towards city administration (44) and business (40), if the number of utterances per type of actor is counted. This pattern becomes even more pronounced if utterances from members of *Wien Holding* are included (17). Politicians with offices in city government follow with a much lower frequency of utterances (26). In comparison, scholars are well represented (26), as are non-academic research actors (18), while utterances by architects (6) and independent experts are rare (5). Interest groups (9) and media (9) are weakly represented, as are NGOs (3). National funding agencies (4) and ministries (4) are likewise rare. The rest consists of other politicians (4) and a museum director (1). One may resume that the actor constellation as it appears in newspaper discourse is an alliance between administration and business, with some influence of scientific experts and politicans. While administration and politicians have a clear focus on a "sustainability" narrative, business narrates smart city in Vienna in different ways, but a "pro-growth" and "ecological modernization" perspective are prevalent in this regard, although "sustainability" is not absent. Among interest groups (*Labor Chamber*), media and scholars, some reject smart city, and also one of the architects is doing so. An "ecological modernization" view on smart city in Vienna is more prevalent among *Wien Holding* members and research institutions, while sustainability perspectives are better represented among scholars.

Thematic co-occurrences

In comparison with Berlin, the thematic co-occurrence network is remarkable because of the high number of nodes, density of clusters, and the rather large group of central nodes in the network. Although several actors reach high centrality values, the overall network is however clearly dominated by planning director Thomas Madreiter. Further central nodes are occupied by three further members of the administration, Ina Homeier (MA18), Gabriele Payr (Director, *Wiener Stadtwerke*), and Martin Krajcsir (Director, *Wiener Stadtwerke*), as well as by vice mayor Maria Vassilakou and university professor Boyd Cohen, who reached prominence in Viennese media discourse because he ranked the city high in several of his evaluations of smart cities. Mayor Michael Häupl, the economy councilor and vice mayor Renate Brauner, as well as Wolfgang Hesoun (Director, *Siemens AG Österreich*) also have high degrees of network centrality. The overall thematic co-occurrence network thus is dominated by the planning director, who is closely embedded in a sub-network of administrative officials, top city politicians, an important industrial company and an actor with a considerable relevance for the international city branding of Vienna (Boyd Cohen). These actors connect smart city to a broad variety of themes, which are in themselves very dominant within the overall network.

When looking at the thematic co-occurence network shown in Diagram 4, three further observations can be made. First, the network is highly structured (modularity value 0.422) by several thematic sub-networks. The most important two in terms of numbers of actors (and density) are a cluster

centered around infrastructure (purple), where community issues also play a certain role, and a mobility cluster (light blue). A third cluster with a mixed set of themes, that are frequently linked with each other (green) is important, too, combining economic growth, technology strategy, governance by technology, and energy. Further clusters are grouped around the themes of housing and place development (orange) and citizen data use (olive green). Of these sub-networks, the infrastructure cluster contains the most important nodes except Wolfgang Hesoun and Renate Brauner, who together are part of the cluster centered around economic growth. While Thomas Madreiter is often quoted with long sections on general urban planning and development visions, principles, rationalities, and perspectives, Häupl and Brauner rather act in support of a diverse range of themes and related actors in the context of smart city. Typically, they are quoted only briefly with regard to smart city. In a similar way, Wolfgang Hesoun (*Siemens AG Österreich*), Brigitte Bach (AIT), Theresia Vogel (*Austrian Climate and Energy Fund*) and Andreas Trisko (Head of MA18) have a rather high number of utterances, but lack a narrow thematic focus, which testifies to their connecting function in media disourse on smart city. Second, besides the infrastructure cluster, the mobility sub-network has the highest degree of integration as node size is showing. Third, the theme of citizen data use is totally disconnected from the main network, while the cluster revolving around housing and place development issues –which is shaped by architects and related experts as well as officials of Seestadt Aspern development– is weakly integrated with the other sub-networks.

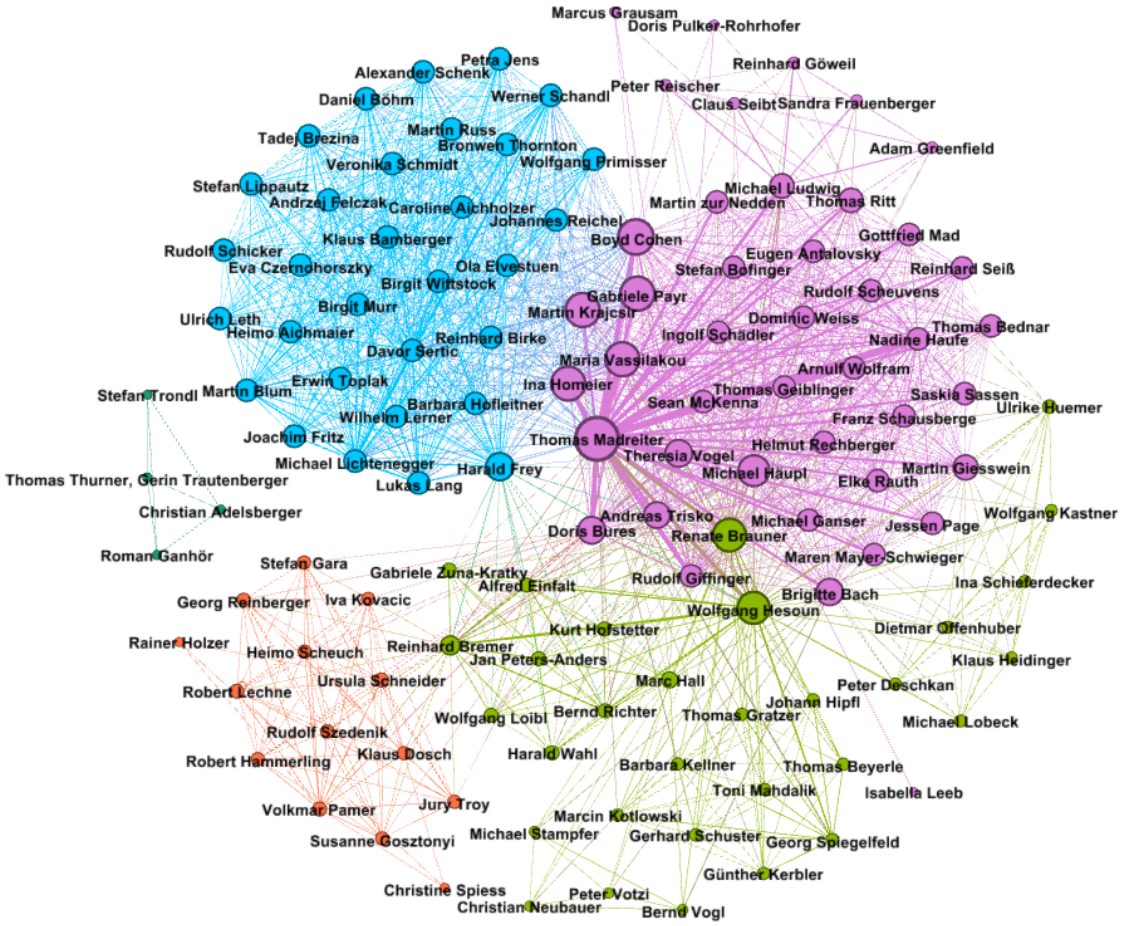

Diagram 4: Weighted thematic co-occurrence network with modularity classes in different colours. Eigenvector centrality shown by node size. Edges denote utterances within the same theme by actors, with edge thickness indicating closeness of actors. Graph calculated by *Gephi 0.9.0* using the Yifan Hu and Fruchterman Reingold algorithms.

3.4. Barcelona

News outlets and attitudes

The newspaper discourse concerning smart city as related to Barcelona is more critical than in Berlin or Vienna. Only a rather small number of articles (21) is very positive, although many articles are moderately positive on the subject (67). However, even more are neutral, either because they are balanced in the perspectives they express on smart city or distanced, or treat the topic as a marginal issue in the overall context of an article (73). A considerable minority, though, has a negative attitude (25) and some (7) are outright negative towards smart city in relation with Barcelona. Concerning the distribution of attitudes across newspapers, no clear associations are visible except that the most critical articles, and the largest share of negative texts, are to be found

in *El País* and *El Periódico*, while *La Razon* is missing in these groups. *La Razon* is, however, also missing in the group of very positive articles, while most of its reports have a rather neutral attitude.

Word associations

The following Diagram 5 gives an impression of the predominant associations of meanings with smart city in Barcelona as they appear in newspaper texts. Interestingly, the same pattern as in Berlin and Vienna is visible with regard to those words that are most frequent: “intelligent” and “new”, together with some rarer words of this group. But besides, a few striking differences to Vienna are visible, which indicates a certain similarity of the Barcelona discourse on smart city to Berlin. In contrast to Vienna, words related to the economy (light blue) are much more frequent, including the words “Expo”, “World” and “Congress” that mostly appear together to denote the respective prominent event of the *Smart City Expo & World Congress*, while those associated with place development are not important. Some expressions in abstract speech are very visible, above all “technology” and “technological” as well as “service” and “project”. Within this group, the words “municipality” and “mayor” are also very frequent. Unlike Vienna, housing, mobility, and ecological issues hardly play a role in the Barcelona discourse. And the relative lack of the terms relating to energy issues is an evident difference to both Berlin and Vienna. Political subjects are clearly marked by the Spanish terms for “citizens” and “persons”, and “public” is quite relevant. While “Barcelona” is a quite frequent word in the Berlin discourse, in Barcelona itself, hardly any place names are important, but the adjective “international” is visible.

Diagram 5: Word associations for the Spanish media texts on Barcelona and smart city (see explanations in the methodology section). Black: abstract language in technical, political and project terms, including names of planners, experts, politicians; red: political legitimation language; deep blue: geographical names and adjectives; pink: social and political concerns; bright green: environmental and sustainability concerns sensu stricto; light blue: economic terms and actors; dark green: mobility; orange: energy issues; rusty red: housing issues; political subjects and quality of life: light green.

Development of discourse

The discourse around smart city in relation with Barcelona perhaps begins before 2011, although the analysis starts in this year, when ex-mayor Xavier Trias came into office and declared smart city as his prime political perspective for the city. While the number of relevant articles is rather low in 2011, it increases considerably in the following year and remains rather constant afterwards until 2016, when the new (and current) government led by Ada Colau changed its relation towards smart city policies. The range of topics is rather broad. Except the topic of "community", which gains strength in 2015 related to increasing criticism of smart city, no clear trend in topics is visible on the level of actors' utterances.

Themes and narratives

Overall, the discourse on smart city and Barcelona addresses 12 themes, which is a lower number than in Vienna, but the same as in Berlin. Cearly, the theme of economic growth has a dominant function, followed by "governance by technology" and "community", that each reach about half the frequency of "economic growth". These themes are mostly defined as in the Berlin and Vienna cases. "Economic growth" groups different approaches to the topic of economic growth (e.g., as creator of jobs), including issues of (city) competition, while "governance by technology" is about the more or less automated and integrated control of flows and processes in a city (often through sensors). This latter theme often relates smart city to "digitized" public services, either in the form of e-government or as information platforms integrating different data often collected through sensors for city governance (e.g., automated traffic regulation). In contrast, "community" groups all issues primarily associated with social relations, which in Barcelona cover a broad range including social cohesion, solidarity, democracy, the vividness of public life, ethical issues, citizens' control and participation as well as –in very rare cases– a certain notion of "urbanism" and the idea and demand of "technological sovereignty". The themes of mobility, infrastructure and technology strategy are less relevant than in Vienna. As in the other two cities, "infrastructure" contains all topics combining different sectors such as, e.g., housing, energy, transport, public services in general (without specification), except "governance by technology". "Infrastructure" also includes walking, thermal insulation, and further common topics of sustainability policies. In very rare cases, only utterances related to the internet are subsumed under this theme. Utterances assigned to "technology strategy" refer to, e.g., the creation of the *Smart City Campus*, or concern the relation of public bodies and private business in developing technology, which is of special relevance in Barcelona with regard to smart city. Further themes, which are of quite marginal importance, are recycling, production (only referring to FabLabs), formation and food. A somewhat higher, but also quite peripheral importance has the theme of urban renewal, which is denoting all action against urban deterioration and territorial marginalization or social inequality insofar as it is linked to the built environment or city structure. Likewise, all actions remodeling existing areas and places in architectural terms (e.g., the *Gloriés*) are including, as well as buildings renewal (e.g., at *Eix Verd*).

These themes are part of certain narratives or related to fragments of these. They are in part similar as in Berlin and Vienna, but not completely identical, and the shares of similar narratives are strikingly different. Due to the comparatively little relevance of ecological issues in Barcelona, the narrative of smart city in terms of ecological modernization or sustainability are not as frequent as in Vienna. "Ecological modernization" here denotes a strong focus on economic growth and technology with regard to the solution of environmental problems –neglecting low- or non-technological means and social aspects, while "sustainability" is defined as the equal consideration of social and environmental aspects, where governance criteria may also play a role. The narrative of sustainability is concerned with societal development in more general terms than in the

"ecological modernization" narrative, or the "pro-technology" one, for that matter. It does not relate exclusively to technology, but may also refer to non-technological means such as walking.

In contrast to the environmental narratives, those that put economic and consumer interests at their center are dominant in Barcelona: "pro-growth" and the rather unspecified "opportunity and challenge" narrative. The "pro-growth" narrative is basically pro-business. Here, technology is not the prime focus or ultimate goal, but rather economic growth (with technology as its means). Moreover or alternatively, international recognition as a strong urban economy or business location and competitiveness may be in the center of utterances within this narrative. Further side effects or benefits of growth in relation to smart city may be mentioned, such as citizens' benefit –according to the idea of so called win-win, with business being however the prime concern. The narrative of "opportunity and challenge" is somewhat similar, but deviates from pro-growth insofar as it is a very general narrative constructing smart city on the one hand in terms of possible conveniences (including cost reductions) and –at the same time– in terms of challenges, problems, tedious requirements, necessary efforts, or trade offs, that have to be dealt with, including concerns of data security or large investments. It characteristically includes all utterances with a (sole) focus on consumer convenience (such as energy bill reduction). Its main feature is its very narrow focus.

The "pro-technology" narrative is similarly defined as in Berlin and Vienna: it includes all positions which do not legimitize technological solutions with needs, but focus on technology exclusively. Sometimes, superficial justifications are provided, which usually are efficiency and convenience. This narrative is business friendly, but its themes rather revolve around technology, not growth in itself. Consumer convenience may also be important here, including a technocratic steering of city infrastructures such as for tourism. The "good governance" narrative constructs technology as progress insofar as it benefits citizens –even if to the detriment of corporations; if data privacy vis-á-vis corporations is secured; and commercial goals are not in the center of city policies. The "good governance" narrative is similar to the one on sustainability, but differs by its focus on politics.

A distinctive feature of the discourse on smart city with regard to Barcelona is the "social equality and democracy" narrative, which centers on equality of opportunities, and with regard to access to the basic necessities of life. Social inclusion, empowerment, and democracy are its prime concerns, which are understood to create equal opportunities to determine urban development against top-down policies and commercialization or privatization. This narrative also may include an idea of cosmopolitanism, e.g., when democracy is understood as being related to the reality of social diversity in Barcelona. The narrative partly includes utterances focused on technology as long as these are framed by the concerns mentioned above as in the case of a decision-making tool sold by *ChangeTomorrow*, which shall facilitate participatory budgets. The main characteristic of this narrative, however, is that technology is not at its center. This feature also distinguishes it from the narrative of good governance. The "social equality and democracy" narrative may include a concern

for jobs, but goes beyond this issue, which is –to the contrary– the sole issue of the "social" narrative. In the latter case, smart city is constructed exclusively following the reasoning that without technology, there is no growth, and without growth there are no jobs, implying that without jobs, well-being is impossible. While these narratives provide more or less room to position oneself quite differently with regard to smart city, all positions rejecting smart city or those that are very critical of the concept and the policy are subsumed under a separate narrative of rejection. Finally, a marginal and very fragmentary type of reasoning is called "no subsidies". The overall narrative of which it is part could not be detected in the respective utterances. The position argues that business shall pay for infrastructures related to smart city or that existing measures and areas are sufficient.

Distribution of utterances

The central actors in terms of number of utterances are Xavier Trias and Antoni Vives of the former CiU government that terminated in 2015 and was followed by mayor Ada Colau from *Barcelona en Comú*. Trias (16 utterances) was mayor, and Vives (9) held the position of vice mayor and head of the new department of *Hábitat Urbano*. All the other actors do not come even close to these numbers, including members of the new government. Vice mayor Geraldo Pisarello, e.g., is counted with three utterances on the topic of smart city in Barcelona. While Trias is almost exclusively speaking about smart city in Barcelona in terms of economic growth, Vives covers a broader range of themes. In terms of types of actors, officials of municipal and provincial bodies as well as politicians are by far leading the number of utterances (57), with politicians from the municipality of Barcelona accounting for the largest share of these. Private business (39) comes second, while experts or scholars of various sorts (17), state affiliated enterprises (16), and media actors (12) are important, too. Interest groups (6) are only of minor relevance in terms of numbers of utterances. Officials of public bodies and politicians are relating smart city predominently to economic growth, technology strategy, and governance by technology. But other themes are present as well. Thus, members of the new government speak about smart city mainly in terms of community. Within the group of business actors, governance by technology is the leading theme, because most products developed or sold with regard to smart city in Barcelona are relating to respective applications and systems. While economic growth is also a strong theme in this group, community, mobility and energy are relevant in this regard as well. Narratives are varied, too. The other actor groups do not show any specific focus with regard to themes or narratives.

Thematic co-occurrences

The Barcelona network of themes is less fragmented than in Vienna (modularity value 0.379), and the number of central nodes is much smaller. Clearly, Antoni Vives, the former vice mayor and head of the Hábitat Urbano department is the central node in the overall network. This is due to the fact that he covers the broadest range of the most important themes connected to smart city, and

rather evenly so, whereas former mayor Xavier Trias, who is clearly leading in total number of utterances, has a very narrow focus on economic growth, impeding to interweave other aspects of smart city, which are or were important in Barcelona, too. Between Vives and Trias, a set of actors with very high centrality values consists of Josep-Ramon Ferrer Escoda (director, área de *Estrategia* TIC del *Instituto Municipal de Informática* IMI, and Director of Smart City), Ramón Roca (president, FIRA), Jordi Marín (director, *Administraciones Públicas y Sanidad* of *Indra* in Catalonia). This core group that combines top politicians and business actors, together with an administration official in charge of a technologically conceived smart city perspective, is followed by a set of actors including the current mayor Ada Caloau and vice mayor Gerardo Pisarello, together with the critical scholar Joan Subirats (professor for political science, UAB), Mercè Conesa (mayor, Sant Cugat del Vallès) and Ugo Valenti (director, FIRA). Although this second group is relating smart city to economic growth as well, they include a focus on community issues, which makes them somewhat oppositional to the first one. Unlike Vienna, business actors themselves do not play a role as opinion leaders, but business interests are much more articulated through smart city by top politicians. However, this constellation has changed with the new government of Ada Colau (see below).

The cluster centered on economic growth (purple) occupies the dominant position and is rather well connected to two further clusters: the first is centered on governance by technology (light blue); the second (green) is basically split in two sub-groups (that are not distinguished as modularity classes, but separated in the Diagram 6 below) revolving around technology strategy on the one hand, and community on the other. Gemma Galdon Clavell (professor of politics and technologies of security at the University of Barcelona) is connecting both. A third cluster (grey) is distinguished by the theme of mobility and almost completely delinked from this broader smart city discourse. Only Eduard Freixedes, councilor of mobility of the former government, provides a connection. Fourth, infrastructure issues relating to general urban development concerns are the basis of a separate cluster (red) linked to the main discourse through Xavier Trias. Completely separated are the thematic networks on energy (orange), formation (ocean blue), recycling (light grey) as well as food and production with only one node each. Although the energy theme is not fully marginal regarding the number of actors and their utterances, it is much less part of the overall smart city discourse than in Vienna.

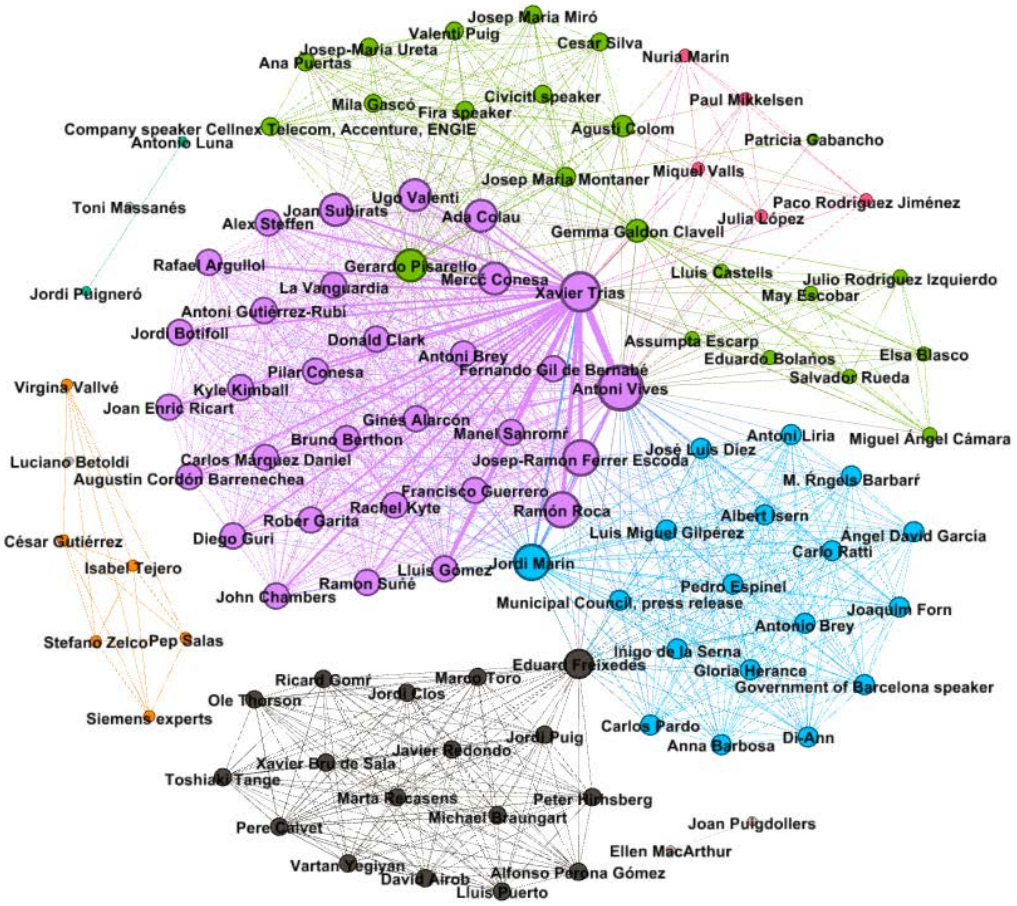

Diagram 6: Weighted thematic co-occurrence network with modularity classes in different colours. Eigenvector centrality shown by node size. Edges denote utterances within the same theme by actors, with edge thickness indicating closeness of actors. Graph calculated by *Gephi 0.9.0* using the Yifan Hu and Fruchterman Reingold algorithms.

4. Development of smart city: discursive and material change

4.1. General remarks

The following chapters describe and analyze the development of smart city policies in the three cases that we investigated: Berlin, Vienna, and Barcelona. Rather than structuring the chapters in a formalized way, we prefer to give a synthetic overview following a chronological order. This overview is based on expert interviews, media reports and policy documents, supplemented by a limited amount of participant observation in public smart city-related events in Vienna, Berlin and in Barcelona, and of activities of one urban agriculture project in Barcelona (*CanMasDeu*[6]). Smart city developments and urban agriculture were studied in Vienna extensively by expert interviews,

6 http://www.canmasdeu.net/ [28.12.2017]

policy document analysis and participant observation during the WWTF-funded research project "Green Urban Commons"[7], in which one of the members of the research team, Andreas Exner, participated as co-leader. Smart city debates in Barcelona were observed by attending an extended public conference on democracy and citizen participation entitled "Jornades de Democràcia Directa: Tecnologia i Democràcia", where Francesca Bria, Chief Technology and Digital Innovation Officer of the Barcelona City Council gave a talk[8].

The Appendix provides a full list of all formal interviewees. Information that specifically originates from expert interviews is indicated in the following text by a number referring to the interviewee. This number is not identical with the order of interviewees in the Appendix, and no additional information on the interview sources is given for privacy reasons. The consistent numbering of interview sources in the main text however allows to assess the overall number of sources and their distribution with regard to topics in the text. Media reports are not cited in the bibliography, but are either linked as online sources or quoted by media outlet and date in cases where the source is not accessible online. In terminological regards, it shall be noted that we understand the term "city executive" to include both government and administration.

4.2. Berlin

An urban development plan called *Berlin Strategy 2030* was published in March 2015 (SUE 2015) before a finalized smart city framework strategy, although there appear links in perspective to this strategy. Slightly after the urban development plan, a *Smart City Strategy Berlin* was published in 2015, 21st of April (SSU 2015). In 2016, the urban development plan was updated due to extraordinary population growth, according to the document (SSU 2016), as *Berlin Strategy 2.0*. Smart city is much less visible as label and discourse in Berlin than in Vienna and Barcelona, and possibly also had less material impact so far. A specific smart city website is missing to date[9]. Information on smart city projects cannot easily be accessed and is thus not evenly and coherently distributed among different actors. A corresponding website infrastructure and further applications are planned for the immediate future (interviewee no. 10).

Network governance

Scattered media reports that appeared in 2011, 2012 and 2013 highlighted economic topics associated with smart city (see media analysis above). In 2013, Economy Senator Cornelia Yzer (CDU) was featured in a media report describing a so called *Smart City Tour* that she had organized

7 https://greenurbancommons.wordpress.com/ [28.12.2017]

8 http://ajuntament.barcelona.cat/participaciociutadana/ca/jornades-sobre-democracia-directa, https://www.youtube.com/watch?v=A07KRLNXhBU [28.12.2017]

9 28.12.2017

through the city, presenting research of the *Fraunhofer Institute* at different locations[10]. This illustrates that the idea of smart city had already gained a foothold in certain parts of the city executive at the time. In the same year, media also reported that *Cisco* was looking for a new research center connected with smart city technologies called *Cisco Center of Innovation*, that should be installed either in Hamburg or in Berlin. According to the report, Hamburg offered a substantially more complex and powerful economy than Berlin, which, however, was attractive because of its role as the seat of government and influential lobbyists. Pilot projects, it was suggested, benefit not only *Cisco*, but also the respective city[11].

An economic focus of smart city in Berlin was visible also in an important prelude to the Berlin smart city policy: the networking efforts among several non-executive actors that in 2013 formed the *Netzwerk Smart Cities* (*Smart City Berlin Network*)[12], including companies, research institutions, interest groups and associations, for instance the *Chamber of Commerce and Industry Berlin* (IHK) and the *Chamber of Architects in Berlin* (AB 2016a). The *Smart City Berlin Network* is coordinated by *Berlin Partner* (which has also founded it, according to AB 2017, together with the *Technologie Stiftung Berlin*), and may be seen as the business part of smart city development (interviewee no. 11). It has been suggested that the main reason for the foundation of this network was the acquisition of EU funding (AB 2017a). And it may be regarded as an expression of the rather cooperative business environment of Berlin, where many companies act as consortia rather than in competition. In this sense, the smart city stategy is a further step in organizing companies into clusters and bridging clusters (interviewee no. 10). In any case, the *Smart City Berlin Network* appears to have been driving the smart city policy development process to a certain extent, which for instance is expressed by its statement in a brochure issued on 4th of April 2014, where the network demands a "clear political commitment of the city government to the Smart City Berlin and the development of the notion of Smart City Berlin to the lifestyle of this city" and a "uniform governance structure for the project Smart City Berlin, that develops into a real PPP (central contact person)" (NSC 2014, 8, translation by the author). These two demands illustrate the independent driving role of the network and tensions in its relation with the city executive. They were linked with mostly business specific demands in the document. At this time, the *Smart City Berlin Network* consisted of business actors, business related research and urban development institutions and a public utility company: *Berliner Wasserbetriebe* (a municipally owned enterprise that was re-municipalized in 2013[13]), *Berlin TXL The Urban Tech Republic*, *Berlin Partner*, *Berlin Tempelhof Projekt*, *Bosch*, BTO *Management Consulting*, EMO, EUREF, *Fokus*, GESI *Systeminnovation*, IHK Berlin, *innoZ*, KPMG, *mc-quadrat*, *McKinsey & Company*, SAP, *Siemens*, *Vattenfall*, *Technical*

10 http://www.tagesspiegel.de/wirtschaft/smart-city-berlin-senatorin-yzer-reist-in-die-zukunft/8776540.html [28.12.2017]
11 https://www.welt.de/print/die_welt/hamburg/article122833929/Auf-dem-Weg-zur-vernetzten-Stadt.html [28.12.2017]
12 https://www.berlin-partner.de/en/the-berlin-location/smart-city-berlin/smart-city-berlin-network/ [28.12.2017]
13 http://www.bwb.de/content/language1/html/8368.php [29.12.2017]

University Berlin, *Technologiestiftung Berlin*. Likewise, *Berlin Partner* published a smart city leaflet in April 2014 (BPBT 2014), with similar content, but more in the style of an advertisement.

The political part of the development of the strategy was a separate body in the form of an inter-ministerial working group on smart city that drafted a first strategy paper for the later smart city strategy of Berlin, consisting of five administrations led by the *Senate Administration for Urban Development and the Environment* over the course of nearly 2,5 years. In fall 2014, expert workshops were organized in the wake of a first strategy paper on smart city drafted by the inter-ministerial working group and in view of the further development of the strategy, and interviews with different stakeholders were conducted. A private company, the *VDI/VDE Innovation + Technik GmbH* was commissioned to support the development of the strategy[14] (AB 2016b). This inter-ministerial working group disbanded after the strategy had been finalized. The *Senate Administration for Urban Development and the Environment* was at the time responsible for three important policy documents, namely the smart city framework strategy, the urban development plan and the urban landscape plan (including urban agriculture), which are linked to each other. Because of austerity policies, this Senate Administration was very large at the time, which on the one hand made management more burdensome, but on the other facilitated some coordination tasks related to smart city since many relevant agendas such as environment, traffic, urban development and housing were located within the same Senate Administration (interviewee no. 11). In fact, all strategies such as the one on smart city are subsumed under the urban development plan *Berlin 2030*, and were developed by almost the same network of actors or in close cooperation with the actors behind the urban development plan. The strategies allow for different focal points, while *Berlin 2030* ensures coherence (interviewee no. 10). The former Senator for Urban Development and the Environment, Michael Müller (SPD), became mayor in the middle of the legislation period, after former mayor Klaus Wowereit had resigned, and was re-elected in 2016.

In 2015, Berlin applied for a large project on smart city together with Bologna and Paris at the EU funding program *Horizon2020* [15], which was possibly one important contribution to the development of the smart city strategy (AB 2015, cf. interviewee no. 9)[16]. Indeed, in an interview with Economy Senator Cornelia Yzer (CDU), smart city appeared as one urban development label among many others and is framed as a tool to acquire EU funding[17]. This motivation was put in relation with city competition and again Berlin appeared to be lagging behind Hamburg in this

14 with a contract of more than 100.000 EUR

15 This first *Horizon2020* application was not granted, and followed by an application together with Kopenhagen and Amsterdam, again involving *Siemens*, in 2017.

16 cf. http://www.tagesspiegel.de/wirtschaft/gemeinsam-mit-paris-und-bologna-berlin-will-eu-wettbewerb-fuer-smart-cities-gewinnen/11419344.html [28.12.2017]

17 http://www.tagesspiegel.de/wirtschaft/senatorin-cornelia-yzer-berlin-hat-sich-20-jahre-lang-ausgeruht/11718514.html [28.12.2017]

view[18]. The application was realized by a consortium of companies (including *Siemens*), the *Senate Department of the Economy* and research institutions. At this time, smart city agendas had no clear place in a specific department of the city administration. For this reason, the *Berlin Partner for Business and Technology[19]*, which had been founded in 2013[20], was commissioned with smart city agendas, and smart city was also more closely associated with the *Senate Department of the Economy* (interviewee no. 9), the reason of which is not fully clear. In 2015, a debate on the re-municipalization of the Berlin gas and electricity provision was connected to smart city. After the re-municipalization of the *Berliner Wasserbetriebe* (see above) in 2013, the GASAG[21] (gas utility company) and the electricity provision, which was managed by *Vattenfall[22]*, were demanded to be re-municipalized by the SPD, which argued that this is necessary for the development of Berlin towards a smart city[23]. However, re-municipalization failed[24].

In 2016, elections for the municipality took place, which impeded the development of smart city due to the reorganization of the administration. Smart city turned into a transversal policy issue, directly located at the Chief Executive Office (Senatskanzlei), working closely together with *Berlin Partner*, which increased effectiveness –first, because inter-departmental struggles were reduced due to the location of smart city agendas on a higher level, second, because legitimacy of this agenda was strengthened in this way. As mentioned above, this also meant that the coordination of smart city issues (and beyond: interviewee no. 13) has become more complex, however, and even more so as only the Economy Senate and the Urban Development Senate dispose of officials with a clear responsibility for smart city. Actually, only the Economy Senate's smart city contact person is clearly visible and easily accessible online. There is no official exclusively responsible for the overall smart city agenda on the level of the city. To this adds that the organizational culture within the administration often includes a strong focus on formally defined responsibilities, which impedes creative synergies at times. Coordination between the Chief Executive Office, and the Economy and Urban Development Senate Administrations is facilitated by meetings every two weeks, and a similar process as the *Smart City Berlin Network* meetings twice a year is envisaged to include more administration departments in smart city development (interviewees no. 9, 10, 11). Overall, the city executive of Berlin appears to be less centrally organized than in Vienna (cf. interviewee no. 10), to

18 Handelsblatt (2015): Trommeln für die deutsche Hauptstadt. 26.2.2015

19 https://www.berlin-partner.de/en/ [28.12.2017]

20 http://www.tagesspiegel.de/wirtschaft/neue-berlin-partner-wirtschaftsfoerderung-fusioniert-mit-technologiestiftung/8294116.html [28.12.2017]

21 https://de.wikipedia.org/wiki/GASAG#Entwicklung_seit_2007 [29.12.2017]

22 https://de.wikipedia.org/wiki/Vattenfall_(Deutschland)#Standorte [29.12.2017]

23 http://www.tagesspiegel.de/wirtschaft/gasversorger-gasag-berlins-politik-und-petrus-sorgen-fuer-unruhe/11748794.html; vgl. http://www.tagesspiegel.de/berlin/berlin-streit-um-energienetze-vorerst-beigelegt-senat-will-sich-an-gas-und-stromunternehmen-beteiligen/11733656.html [29.12.2017]

24 http://www.tagesspiegel.de/berlin/das-energiekonzept-von-berlin-viel-spd-steckt-da-nicht-drin/11739614.html; http://www.tagesspiegel.de/berlin/berlin-streit-um-energienetze-vorerst-beigelegt-senat-will-sich-an-gas-und-stromunternehmen-beteiligen/11733656.html [29.12.2017]

which probably adds a more dynamic political environment including changing coalitions contributing to a more fragmented city executive.

According to official information provided in 2016 by the *Senate Administration for Urban Development and the Environment*, the *Smart City Berlin Network* is currently meeting twice a year and has established six working groups according to the action fields of the smart city strategy. These working groups are meeting regularly and partly representatives of the Senate Administrations are participating. According to other informations, the results of the working groups are usually discussed in plenary and then are transmitted to the Chief Executive Office and *Berlin Partner*, which forward them to the various Senate Administrations. *Siemens* is part of three of the working groups (mobility, security, infrastructure) (AB 2016a; interviewees no. 9, 10, 11). Overall, business agents are acting independently from the city executive with regard to smart city issues in a social environment that is characterized by a large number of diverse actors (interviewee no. 9). Despite this network governance pattern of smart city development, significant conflicts between economic and administrative or political actors were not reported, though business rather wishes politics to act faster (interviewee no. 11). *Cisco*, which has finally opened its innovation center in Berlin[25], is actively lobbying the city executive with regard to lighthouse projects concerning digitization, and had signed a memorandum of understanding with the Economy Senate in 2016, which later had to be withdrawn for procurement law reasons. *Cisco* is now active within the *Smart City Berlin Network* (AB 2017b).

Approaching citizens

Currently, a *CityLab Berlin* is planned, which will collaborate with business and science actors (interviewee no. 11). According to AB (2017), the *CityLab* shall allow the urban society to work on concrete solutions for challenges –especially those created by the growth of Berlin– together with the administration, economy and science. Thus, the aim is a greater degree of citizen participation. Moreover, it was announced that the *Smart City Berlin Network* and the Senate of Berlin, led by the Chief Executive Office (Senatskanzlei), will conduct a strategy dialogue on smart city with corresponding project proposals, which will be formulated by the *Smart City Berlin Network* with regard to energy, mobility, housing, data, and infrastructure. The *Senate Administration of the Economy* underscores the follow up-use of the former airport Tegel as *Urban Tech Republic* conceived as a smart and innovative location for urban technologies to be the most important single project in this regard (AB 2017a, interviewee no. 11). In fact, the *CityLab Berlin* may be regarded as an important step towards the implementation of the strategy, which has not been tackled much so far (interviewee no. 11). Currently, the *Senate Administration for Urban Planning* is working on an implementation strategy for smart city (interviewee no. 13).

25 https://www.euref.de/de/veranstaltungen/veranstaltungsnews/cisco-eroeffnet-openberlin-auf-dem-euref-campus/ [30.12.2017]

While the smart city core target group consists of administration and different political actors, and is driven to a significant extent by business, which also is an important or even the central addressee of the strategy document (interviewee no. 10, 14), Berlin is characterized by a strong culture of civic engagement. To this adds, that direct democracy can be exerted via specific instruments (*Bürgerentscheide* and *Volksentscheide*) (interviewee no. 13, 15, 17). The substantial role and opportunities for civic engagement in other policy areas may put the current smart city development process in a doubtful light, since it is not open for civil society participation to the degree certain actors demand (interviewee no. 15). However, smart city may be regarded as being too complex and too much focused on administrative issues to be widely discussed among the citizenry. For this reason, participation in smart city matters is currently envisaged by some actors more with a focus on lifeworlds and by taking up ideas of citizens for concrete solutions of problems related to everyday life that citizens identify. The *CityLab Berlin* may be seen as one step into this direction. Moreover, the digitization of government services reacts to pressures from citizens to speed up bureaucratic routines (which also becomes visible in the smart city strategy of Berlin, SSU 2015) (interviewee no. 11; cf. no. 9), and the influence of civil society organizations on government policies has been noted also in other areas such as housing or food policy (interviewee no. 17, 18). Data security issues are taken very seriously in the Berlin conception of smart city (which is also apparent in the smart city strategy document, SSU 2015, see further below), possibly because of the historically contentious character of data gathering by state agencies (interviewee no. 13). For instance, in 1987, there was a mass boycott of a public census due to fears for democracy, which had been preceded by related struggles connected to data security concerns[26].

Some officials voice concern that citizen participation is potentially risky in case that NIMBY-ism prevails, and that citizens are not always well informed (interviewee no. 11). On the other hand, the Urban Planning Senate has currently started an extensive process to develop guidelines for citizen participation together with citizens groups, which is already applied by the Chief Executive Office and wishes are voiced that such guidelines may be developed for policy areas other than urban planning as well (interviewee no. 13). However, this process is evaluated very differently by officials and at least certain citizens groups that are substantially more critical about their real role in relation with politicians and official experts (interviewee no. 17). In fact, a higher degree of citizen participation in developing the smart city strategy may well shift its current outlook, which is technology oriented (and not focused upon democratic participation). For instance, the smart city strategy currently fosters e-mobility, which is contested by civil society groups promoting bikes and criticizing car traffic in general. Thus, the notion of participation as articulated in the smart city

26
https://de.wikipedia.org/wiki/Volksz%C3%A4hlung_in_der_Bundesrepublik_Deutschland_1987#Volksz%C3%A4hlungsboykott [29.12.2017]

discourse in Berlin may be questioned. To this corresponds, that quantitative indicators for participation are missing, in contrast to technical goals (interviewee no. 15).

Taken together, smart city appears to be hardly of interest for actors outside of business and administration, and concerns are voiced that smart city as understood in Berlin is beyond the lifeworlds of a substantial part of its citizens that have a hard time to afford tablets or e-cars. Although NGOs and certain interest groups such as trade unions were not excluded from the smart city strategy development process (in contrast to Vienna, see below), their participation appears to have been secondary or marginal. Public housing seems not to be associated with smart city, not least because in Berlin, the strategy is mainly targeting new housing projects, though energy issues in housing are partly linked to it (cf. interviewees no. 12, 14, 16). The rather secondary role of smart city in overall urban development issues is further illustrated by the low media impact of the topic (see media analysis above). These aspects also mark differences to Vienna (see further below).

The smart city strategy of Berlin is elaborate and the thematic scope is fairly extensive, although much focused upon technology. It is politically significant insofar as it has been developed with a rather broad set of actors with political clout. In fact, its reasoning corresponds to the results of the media discourse analysis, which also puts emphasis on technology and represents smart city as a rather secondary issue among several others that are connected to city development. In the following section, which concludes the case study on Berlin, an analysis of the rhetorical content of the smart city strategy of Berlin (SSU 2015) is given.

Analyzing the discourse of the smart city strategy: the rhetorical content

The *Smart City Strategy Berlin* (SSU 2015) belongs to the policy report genre, with some elements of a scientific report. It is formulated in a rather deliberative manner and in a neutral tone, indicating some distance to the smart city discourse and voicing several concerns. It is logically coherent, clearly structured and hardly redundant. Concrete projects are described with considerable detail explaining benefits, problems and remedies. The imagined audience appears to consist of politicians (especially from Berlin, but also from similar municipalities in Germany) and investors interested in political guidelines.

Reconstruction of the phenomenon structure

The narrative revolves around problems and on-going trends on the international level and in Berlin. The identity of Berlin is marked in rather modest terms and does not capture much place in the document. Two main problems are identified: (1) urban growth, which increases resource and infrastructural demands, and (2) ICT, which offers opportunities and implies risks for security, which requires new concepts. Berlin is growing, it is stated, and faces challenges common to many

metropolises. Not least, mobility changes increase environmental problems and immigration increases rents. Concerning ICT, cities must position themselves in this regard. All these urban challenges require cross-cutting solutions, which are currently –by implication– lacking.

To face this challenge, Berlin is in a good position, since it is one of the leaders in e-mobility in Europe and already builds up open data systems as it follows an e-government strategy. Furthermore, it has set standards in neighborhood development. Thus, Berlin is one of the central, growing metropolises of Europe and on the way towards a socially balanced, ecological, innovative energy system. Not least, Berlin is a melting pot caring for diversity, where immigrants quickly find contacts in neighborhoods. In passing it is noted that Berlin is linked with other cities with regard to innovation, since cities in general are centers of innovation because of the challenges they face.

Several dimensions of smart city are present in the document. (1) Smart city focuses on areas key to livelihoods, with a prime concern for social integration and improving quality of life. Thus, smart city is oriented towards the common good. It consists of integrated approaches creating synergies and should be understood as a continuous and dynamic dialogue. (2) ICT is the technological backbone of smart city, as are intelligent provision structures. ICT enables performance increases despite population growth, better services, and resource reduction. Furthermore, digitization increases efficiency and productive exchange for citizens and with the administration. Indeed, modern administration needs ICT and the concomitant digital administration requires smart personnel. In this context, public WLAN and open data are important. The citizen phone project is cited as a promising initiative improving contacts between citizens and administration. (3) Smart grids are necessary, inter alia because they are important for renewables. But (4) smart grids are vulnerable to attacks and volatility, so smart city solutions must be resilient and flexible, and an encompassing and resilient internet is crucial. Because of the amount of data that are to be collected and used by the smart city, informational self-determination is crucial. (5) Mobility is a key dimension, which is crucial for Berlin as it is required by both companies as well as for the participation of citizens and their livelihoods. Modern urban logistics are intelligent. E-mobility requires renewables and appropriate infrastructure and it improves the quality of life and value creation in the economy. Furthermore, it supports environmental and energy policy goals. In addition, car sharing increases mobility efficiency and strengthens the economy. (6) The energy transition is a future market for industry in Berlin, and international networking in this regard is in itself innovative and (resource) efficient. (7) ICT improves waste recycling and sustainable water provision contributes to smart livelihoods. (8) Ambient assisted living must combine ICT and personal services, and (9) smart home diffusion is in the public interest.

To these dimensions correspond specific goals: (1) E-government shall be further strengthened, (2) housing must be affordable and combined with good infrastructure, while household energy use shall be adaptable, (3) ICT based participation must not undermine formalized democratic

procedures, (4) the good reputation of e-mobility in Berlin shall be further increased, and (5) the growing energy consumption by digitization must be curtailed. (6) Green and open space must be used and improved. (7) Berlin must further profile its energy efficiency benchmark role, aims at being a leading smart city, and shall become CO^2-neutral in 2050. In this regard, innovative products must be developed and used in Berlin. (8) Traffic policy must increase the quality of the environment and life and urban logistics must consider existing infrastructure and hold industry in the city. An intelligent traffic policy is necessary to increase resource efficiency. (9) Urban planning must consider demographic change and barrier-free aspects. (10) ICT must be controlled and restricted, and the internet must be secure.

The smart city strategy is shaped by a broad variety of conditions on international, national, and municipal levels driven by various actors. (1) The federal government supports research and innovation for future oriented cities and Berlin acquires EU and federal funding. Municipalities debate potential benefits of ICT and the European Commission supports smart city. Indeed, many networks and cities engage with smart city. (2) ICT is useful for all social groups and digitization is an on-going process, which creates business models and civil society initiatives. The diffusion of ICT triggers the smart city trend. Big data is an emerging market. Smart phones are an important relais for smart infrastructures. All networked realms of public services are able to integrate ICT. For instance, intelligent light systems are efficient. However, ICT also has negative effects that must be regulated. Likewise, teleworking is promising but may have downsides. In any case, broadband internet is crucial. (3) Berlin has a good start up scene that supports its competitiveness. New financing models emerge worldwide that may strengthen innovative businesses. (4) Housing in Berlin is diverse and accessible. The challenges of energetic improvements of housing correspond to housing structure. (5) Berlin shows a trend towards non-motorized traffic, but traffic policy must react on changing population and employment structures. (6) The Berlin energy and climate protection program is formulated participatively with great interest by citizens.

The document mentions a considerable number of strategies and measures to be taken in order to reach the goals of the strategy against the backdrop of relevant conditions. Most importantly, smart city is based on cooperation of administration, companies and science, requiring cross-departmental and cross-regional cooperation, in particular the exchange with other cities. This will serve to connect isolated flagship projects in cooperative webs. An integrative cross-departmental approach is in any case inevitable. Cooperation is also necessary for smart infrastructures that require the combination of its elements and have to balance different interests. Not least, safeguarding mixed neighborhoods requires the cooperation of many actors. Comprehensive consensus-finding shall be facilitated without blocking progress. Berlin cooperates also to ensure EU funding. In particular, networks of science and the economy support innovation and competitiveness. In general, international exchange is necessary and Berlin must cooperate with the most innovative regions worldwide. In this regard, ICT pilot projects create visibility, which is further enhanced by hosting

smart city congresses to increase international reputation. Further networking shall be supported. To organize a dialogue between the society, politics, and the administration is necessary to enable the correction of errors. Although Berlin observes the smart city discourse as an international trend, it thus also attempts to shape it. In this regard, an active role of politics is foreseen, as the Berlin Senate will intervene more in energy nets, and the administration must purchase innovative technologies. Furthermore, innovative technologies shall be supported by public policies although public spending focuses on safeguarding infrastructure due to financial problems. The smart city Berlin must strengthen a transparent administration. The necessary smart human resource politics must be diversity friendly, gender sensitive and discrimination-free. Concerning mobility, e-mobility is a key concern, which must be further supported. However, traffic policy must go beyond ICT, although the urban development plan (STEP) on traffic will be adapted to the smart city strategy. Densely built space is crucial for traffic reduction and an integrated mobility concept includes systemwide traffic steering. Taken together, infrastructural improvements and alternative propulsion technologies improve the ecological performance of traffic. With regard to housing, the focus shall be on the energetic improvement of housing in mixed neighborhoods. In general, making existing buildings smart is more important than new buildings. Ambient assisted living is promising. Smart infrastructure requires a circular economy. The role of industry shall be strengthened in several ways. Thus, craft is supported by smart city and supports smart city in turn. Start-ups shall be linked with traditional industries, and industry 4.0 shall enable urban industrial development. New financing models shall support competitiveness and innovative start-ups. It is paramount that citizens support smart city. Thus, marketing must ensure the acceptance of ICT by citizens. Finally, satellite based navigation systems shall increase public security.

Several types of outcomes are formulated in rather cautious terms as potentialities. Thus, ICT allows for a new smart culture of security and can increase the security of homes. E-government may support participation, which is relevant since the smart city Berlin increases participation possibilities in general. In a related way, ICT can support neighborhood self-help, security and various actors engaged with neighborhoods. Active integrated mobility policy could stop the increase in motorization. Likewise, intelligent cars are promising. Berlin can pioneer the build up of ICT competence for the labor market. Smart systems enable new ways of heat provision and ICT may support barrier-free housing.

The expected outcomes of implementing the smart city Berlin strategy are manifold. (1) Economically, the strategy will create markets through international networking and increase the urban competitiveness of Berlin. It will thus become a leader in smart provision infrastructures. This increases also the employment in the urban region of Berlin. (2) With regard to quality of life, the benefits will be numerous. In general, the ratio between quality of life and resource use will be more favorable. Negative effects of urban density will be reduced, resilience increased and social services safeguarded. In fact, quality of living will be supported in the same way as sustainability

and markets. For instance, ICT contributes to affordable as well as ecologic new housing developments, ecologizing housing energy use, which safeguards attractive and diverse neighborhoods. Likewise, intelligent urban logistics contribute to climate policy and reduce ecological burdens for locals. (3) Concerning ecological aspects, the smart city Berlin decreases non-renewables, expands renewables and increases resource efficiency. Smart infrastructures optimize sustainability, climate neutrality and economic concerns, and smart meters optimize energy consumption. (4) In general, the smart city Berlin solves problems with intelligent technology. ICT enables transparent, efficient and new public services and to collect data allowing real-time management. Thus, ICT supports cooperative traffic systems for accident avoidance. Consequently, the smart city Berlin strategy supports the STEP traffic 2025. (5) Further beneficial outcomes concern culture, where digitization improves the integrative effect of culture and health. E-health deals with demographic challenges and improves health services. Finally, Berlin contributes to federal and city specific climate protection goals by its smart city strategy and contributes to efforts to position Germany as a site of innovation.

The document describes the management structure of the development of the strategy and mentions a special agency that supports e-mobility. Security is a core task of the Senate, it is stated, but requires active support from citizens.

Discussion

The document sets out from the international digitization trend and argues against this backdrop for a more conscious development of the existing strengths of Berlin in this regard. The main problems concern data security and grid stability, besides some other potential risks and downsides of ICT issues as well as urban growth. The benefits for citizens and companies are put into the foreground while environmental concerns are framed as positive additional effects, but not as the prime motive for the smart city strategy. Quality of living is frequently mentioned as a concern. Social integration –as the wording goes– is mentioned too. Although it is called a key concern, it is not further elaborated upon in the strategy and thus has a rather rhetorical role. In many instances, a broad variety of concrete actors are mentioned reaching from industry to civil society initiatives and trade unions. Although it is not clear how civil society initiatives concretely may contribute to the further development of the strategy, the concerns of citizens are addressed in the document. However, the approach to the citizenry is rather one of marketing smart city. In this way, a fundamental decision to massively expand ICT, which is already taken, shall be merely made acceptable. The wording of the document is rather variable concerning smart city. Thus, the term “sustainability” is sometimes used along “smart”, and “intelligent” is used recurringly. The aspect of barrier-free infrastructures is highlighted in different sections. The main goal of positioning Berlin as a center of technological competitiveness is clearly expressed and its international activities and contacts are highlighted. While this aspect obviously reacts upon a structural constraint in the context of urban competition

on national and international levels, which is addressed by the document, the need to expand ICT in terms of benefits to citizens is less clear. One justification mobilized in this regard is public security, another one the wish for less complicated bureaucracy. ICT thus rather seems to be the wish of the city administration and politics responding to perceived economic trends. Smart city, as it is constructed in this document, is not conceived of as an encompassing strategy. Criticisms are clearly voiced, and the discussion of data privacy takes considerable space in different sections. Likewise, increased energy consumption by ICT is mentioned as a problem that has to be solved. Furthermore, limits of ICT are identified and the importance of measures beyond technological improvements are stated. In addition, the strategy has the character of the outcome of deliberation and leaves some room for further discussions, for instance of the potential role of ICT in citizens' participation. Taken together, the smart city strategy Berlin thus appears to have a quite clear focus on e-government on the one hand, and mobility on the other, with further potential applications in housing, especially with regard to increased resource efficiency and barrier-free designs. It does not stretch out to further policy areas or to urban development in general. To the contrary, the document suggests smart city to be one component, albeit a crucial one, of wider urban developments. To this interpretation adds that smart city is seen with some critical distance as a concept. The need to position the municipality towards new technologies is framed in part as a necessity due to developments such as digitization, which are understood as external to urban policy-making.

Actor constellation

The definition of political guidelines and international networking is undertaken by the political board, according to the document. The agency *Berlin Partner* has established a special service unit called "Smart City", which is especially responsible for managing funding in this regard. *Berlin Partner* also coordinates the *Smart City Berlin Network*, an interdisciplinary committee that serves to consult the city of Berlin with regard to smart city development. The document states that the smart city strategy was formulated across departments and with a broad participation of citizens. However, the first draft of the paper was issued by an inter-ministerial working group on smart city. Expert workshops and interviews were held. The document states that citizen participation in the development of the smart city strategy only will start at the end of this process.

The actors listed as interview partners and workshop participants mainly are from the administration, businesses and universities. Very few civil society actors are included, one from an environmental organization, and one from a trade union.

Synthesis

The strategy is technology oriented and business related and the process of its development was managed top-down. This is reflected by the actor constellation indicated by the document as being

responsible for its drafting. Technological innovation is its key category, mainly linked to expected increases in efficiency of public services on the one hand, and the increase in international competitiveness on the other hand. Ecological concerns and social issues are important, but secondary. The document is not encompassing the whole of urban development but deliberately frames technology as one component, albeit important. The document voices several critical concerns about ICT and leaves some space for future deliberation.

4.3. Vienna

Smart city as strategic re-enactment

In Vienna, a *Smart City Wien Framework Strategy* was adopted by the City Council in 2014, 25th of June (VCA[27] 2014a). The urban development plan (STEP 2025) that was adopted in the same session of the Council (MA18 2014) was developed in interchange (interviewee no. 1) and thus is closely related to the guidelines and goals of the framework strategy. The city government hosts a website dedicated to smart city with a considerable list of projects associated with the strategy[28]. Vienna shows a rather high level of engagement with regard to EU smart city projects (cf. interviewee no. 1), and the label of smart city is very visible in institutional discourses and partly also in the media, which amplify the considerable promotion efforts of the city executive.

Although the development of smart city started most visibly in 2011 with a project funded by the *Austrian Climate and Energy Fund* (KLIEN) (see below; cf. interviewee no. 1), Vienna's liaison with the idea of smart city dates back to at least 2010 (Rhode/Loew 2011), when former Mobility Councilor Rudolf Schicker was featured in a newspaper article on mobility challenges. Smart city was framed as a "project" in the article, but central features of the current understanding of the label by the city executive of Vienna were present already with regard to mobility issues: the high share in public transport was underscored as being essential for Vienna as a smart city, and e-mobility was seen rather critically depending on the sources of the electricity used and the demands on space that are coupled with continued car use, which may be even aggravated if e-cars increase the total number of vehicles, Schicker warned. Moreover, a new app for route planning was featured[29]. At this time, the *Wiener Stadtwerke* (Vienna Utility Company)[30] appeared in newspaper reports as the main driver of smart city[31]. Before, *Wien Energie* had used the adjective "smart" in its annual report, but only in combination with smart grids and smart meters (Wiener Stadtwerke 2009), as was the

27 VCA is the acronym of the owner and publisher of the document in English language, which is the Vienna City Administration

28 https://smartcity.wien.gv.at/site/ [23.5.2017]

29 Möcher, A. (2010): Smart Citys: Wien ist Modellstadt für Mobilität. Wirtschaftsblatt, 1.10.2010

30 https://www.wienerstadtwerke.at [16.12.2017]

31 Möcher (2010) op. cit., Die Presse (2010): Smart City Vienna. 31.12.2010

case in the second period of KLIP, the Viennese climate protection program, in the context of which smart grids were mentioned (Magistrat der Stadt Wien 2009).

The *Austrian Climate and Energy Fund* (KLIEN) played an important role to establish the smart city agenda, taking the *European Strategic Energy Technology Plan* (SET plan)[32] as its background (cf. EC 2007). The SET does not specifically focus on cities and contains the notion of smart only in relation with smart grids, but it is linked to the concept of smart city since 2010 (MA 18 2015)[33]. In 2011, the KLIEN, together with the *Ministry for Infrastructure* organized an event called *Smart Energy Demo – Fit for Set*, claiming that Austria was the first EU country with a national funding scheme for smart cities[34] (cf. VCA 2014a, 97). This event served to inform potential applicants for smart city funding in the context of the EU SET policy. In the course of the KLIEN initiative, Thomas Madreiter, who had been head of the *Urban Development and Planning Department* MA 18 since 2005, and became planning director in 2013[35], developed an interest in smart city and early on engaged mayor Michael Häupl with it (interviewee no. 1). Indeed, the mayor officially introduced the smart city perspective for Vienna in 2011 (Rohde/Loew 2011)[36].

The specifically multi-level character of the smart city development in Vienna (see, e.g., Madreiter 2016) became very palpable, when the *Urban Development and Planning Department* MA 18 started the project "smart city Wien – towards a sustainable development of the city"[37] financed by the *Austrian Climate and Energy Fund* (KLIEN), in April 2011, which ran until February 2012. This project was of crucial importance for the development of the Vienna smart city strategy (MA 18 2015, 48f.; cf. interviewee no. 1). The consortium of this project already expressed the actor constellation that shaped the overall smart city strategy of Vienna (VCA 2014a), for the project was led by Thomas Madreiter (head of the Planning Department MA 18 at the time), with partners from the city administration (Energy Planning Department plus *Wiener Stadtwerke*, MA 20), the public-private partnership organization managing the urban development process in Seestadt Aspern (*3420 Aspern Development* AG[38]*)*, and technical research institutions with a close affinity to business interests (*Energieinstitut der Wirtschaft* GmbH[39]; *Austrian Institute for Technology* GmbH/AIT[40];

32 https://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan [16.12.2017]

33 cf. https://setis.ec.europa.eu/set-plan-implementation/technology-roadmaps/european-initiative-smart-cities [18.12.2017]

34 http://derstandard.at/1297819295495/Gut-sichtbare-Leuchttuerme-mit-gruenen-Signalen [16.12.2017]

35 http://www.heute.at/oesterreich/wien/story/Neuer-Planungsdirektor-fuer-Wien-20509656 [1812.2017], http://wien.orf.at/news/stories/2570787/ [18.12.2017]

36 see also https://smartcity.wien.gv.at/site/wp-content/blogs.dir/3/files/2014/06/Mitteilung-des-B%C3%BCrgermeisters-zur-Smart-City-Wien-Rahmenstrategie1.pdf [18.12.2017]

37 http://docplayer.org/18740459-Smart-city-wien-towards-a-sustainable-development-of-the-city.html [18.12.2017]

38 73,4% are owned by GELUP GmbH, which is a subsidiary of the *Vienna Business Agency*, the *Vienna Insurance Group* and the *Bausparkasse der österreichischen Sparkassen Aktiengesellschaft*, while 26,6% are owned by the *Austrian Real Estate Development* GmbH, a subsidiary of the *Bundesimmobiliengesellschaft*, see https://www.aspern-seestadt.at/ueber_uns/partner [20.12.2017]

39 an institution owned to 6/9 by the Business Chamber of Vienna, plus further business agents see http://www.energieinstitut.net/de/ueber-uns/gesellschafter-aufsichtsrat [18.12.2017]

Österreichisches Forschungs- und Prüfzentrum Arsenal GmbH[41]), except the *Vienna University of Technology*, plus a corporation (*Siemens* AG *Österreich*), and a small planning firm (*raum & kommunikation* GmbH) (MA 18 et al. 2012a, b). Most of these organizations reappeared in the smart city strategy development process (according to the actor list in VCA 2014a), and their dispositions are indicative of the interests that are primarily articulated by the smart city strategy of Vienna. For the smart city development process that finally led to the framework strategy (VCA 2014a) many other organizations added input – but mostly again primarily from the administration and business-related technical research institutions (see below). Moreover, several core ideas of the Viennese smart city development were already formulated in this first smart city project.

In the year 2011, when the KLIEN-funded project started, the *Wiener Stadtwerke* also published a working paper on the notion of smart city. As in media reports at this time, smart city was still framed as a "project" in this document. Although published by the *Wiener Stadtwerke* and reflecting internal debates and addressing core strategic concerns of the city executive, it was written by Friederike Rohde and Thomas Loew from the *Institute 4 Sustainability* in Berlin (Rohde/Loew 2011). In 2011, a loose network of real estate investors was also founded under the title of *Smart City Vienna*[42]. This network put forward very market- and investment-oriented demands on the city government and acted as an economic pressure group with some media visibility, but only for a rather short period. In 2012, the notion of smart housing was established by Housing Councilor Michael Ludwig, which attempts to lower renting costs by reducing flat size, while intelligent planning shall safeguard comfort[43]. Smart city was thus already an established institutional discourse at the time, with an increasing recognition in the media. The outcome of the KLIEN-funded "smart city Wien" project was published as a *Road Map for 2020 and beyond*, including an *Action Plan 2012-2015*[44] (MA 18 et al. 2012a). The document puts strong emphasis on the reduction of greenhouse gases through the decrease of individualized motor traffic and the recapture of public space, as it is formulated, the reduction of energy use by housing, a strong increase in renewables, and a generalized behavioral change towards resource conservation. Moreover, Vienna is conceived as a future leader in smart city technologies in particular, and cutting edge technology research and product development in general. Interestingly, MA 18 et al. (2012a, b) put some emphasis on citizens' participation. The project report stated that the aim was to focus on connecting the goals of the SET plan initiative with the contents of the Vienna development plan. For this reason, it was intended to link the smart city initiative closely with the development of the new urban development plan (that finally was published in 2014, cf. VCA

40 50,46% of which are owned by the Republic of Austria through the Ministry for Infrastructure, together with a research association of the Federation of Industrialists, which holds 49,54%, https://www.ait.ac.at/#/ [18.12.2017]

41 linked with the AIT (see https://www.oegnb.net/AIT.html, 18.12.2017)

42 http://immobilien.diepresse.com/home/international/738996/Schlau-gruen-mit-Perspektive [17.12.2017]; Kurier (2012): In Schönheit sterben, 22.3.2012

43 http://derstandard.at/1331779748186/Smart-Schlauer-wohnen-mit-den-Wiener-Roten [17.12.2017]

44 cf. http://immobilien.diepresse.com/home/international/738996/Schlau-gruen-mit-Perspektive [17.12.2017]

2014a). The strategic character of the smart city initiative was underlined by Thomas Madreiter in a talk given in 2012, where the smart city report published by the *Wiener Stadtwerke* mentioned above (Rhode/Loew 2011) is quoted with regard to the specific understanding of smart city, which promotes (1) the systematic application of ICT and resource conserving technologies to (2) enable a development towards a post-fossil society, to reduce resource use, and to (3) increase the quality of life as well as competitiveness, emphasizing (4) the particular effort to link energy, mobility, spatial planning and governance while including social aspects and ensuring participation (Madreiter 2012).

One of the main drivers to initiate the smart city strategy in Vienna was the EU policy level that binds considerable funding opportunities to the SET plan (Madreiter 2012, 2016; interviewee no. 1; MA 18 2015). More precisely, the EU fosters smart city development since 2011 in the *European Innovation Partnership for Smart Cities and Communities*[45], to which the smart city website of the KLIEN also refers[46]. Indeed, the "smart city Wien" project was followed by an EU project together with other cities called "Transformation Agenda for Low Carbon Cities/TRANSFORM" (2013-2015)[47], where the *Austrian Institute for Regional Studies and Spatial Planning* GmbH (ÖIR), the *Siemens* AG *Österreich*, the AIT and the *Wiener Stadtwerke* participated, besides the Planning Department MA 18. This EU project further contributed to the development of the smart city strategy of 2014[48]. The strategy was developed in the course of discussions among cities on smart city, testifying to the agency[49] of city executives in articulating their demands towards industry and research in smart city terms and shifting the emphasis from technology and business actors –which had been the focus during the initial development phase of smart city support by the EU Commission– to city executives and their understanding of smart city (interviewee no. 1). Certainly, the Viennese strategy puts special emphasis on the human dimension of smart city (VCA 2014a, see below) –although the current digital city policies of Barcelona after the smart city period under the Trias government do so even more (see section on Barcelona below)– and ICT has not the role visible in other smart city strategies (such as in Berlin and Barcelona), possibly further conditioned by the anticipation of civil society criticism of big data and a focus on technology (interviewee no. 1), which has indeed been voiced later on notwithstanding (see, e.g., Hammer 2016).

One of the aims of the smart city strategy of Vienna was to influence EU policy to better recognize the needs of cities and the human dimension (Madreiter 2012, cf. interviewee no. 1), following a somewhat different track than the corporations that were present in corresponding applied research projects, too, and which at times pursued a different rationality than city executives, without sufficient recognition of their constraints and criteria, for instance with regard to decision-making

45 http://ec.europa.eu/eip/smartcities/about-partnership/what-is-it/index_en.htm [18.12.2017]
46 http://www.smartcities.at/europa/eu-initiativen/eip-smart-cities/ [18.12.2017]
47 http://www.transformyourcity.eu/ [18.12.2017]
48 https://www.wien.gv.at/stadtentwicklung/projekte/international/transform/index.html [18.12.2017]
49 a social science term that denotes the power to act and to relate strategically to opportunities despite constraints

and data security (interviewee no. 1). Notably, the multi-level character of the smart city initiative in Vienna –which also becomes visible in the smart city strategy (VCA 2014a)– is not merely a top-down effect of national policies oriented towards the EU. For Vienna has an independent strong presence in Brussels as a city as well, which enables the city executive to directly respond to EU policies (interviewees no. 1, 2). The TRANSFORM project also supported the combination of a general urban strategy with more circumscribed place development projects that was already visible in the smart city KLIEN project. Besides the Seestadt Aspern, the development of the Liesing district was closely connected to smart city in both projects.

The decision of Boyd Cohen to rank Vienna as smartest city worldwide in 2012 had some impact in institutional and public discourse –giving rise to speculations about a further boost for Viennese policy-makers to engage with the growing smart city discourse (interviewee no. 5)– though certain media met this recognition with quite some irony[50]. In spring 2013, the Chief Executive Director Erich Hechtner, who had entered office in 2010[51], started officially a smart city strategy development process led by Ina Homeier of MA 18 and including an extended set of participating actors. This was soon followed by a memorandum of understanding enacted by the mayor between the Vienna city executive and the *Republic of Austria* in support of smart city[52], with the goal to obtain further EU funding, and by implementing a joint steering group for initiating projects (VCA 2014a, 97). Moreover, the city executive envisaged to take part in further KLIEN and EU projects (Madreiter 2012; cf. MA 18 2015).

One of the aims defined by the *Road Map 2020* was the establishment of a smart city agency (MA 18 et al. 2012a, b), which was realized in 2014 by declaring TINA to be responsible for the support of smart city through stakeholder networking and communication servies. It had already been active in smart city issues since 2011, with service contracts with the city executive since 2012[53] (cf. interviewees no. 3, 4). In 2014, a digital city initiative driven by actors from the administration and private business was founded[54], aiming to alleviate the lack of IT specialists and to increase Vienna's standing as a leading digital hotspot, explicitly supporting the smart city strategy[55].

Although very much focused on rather ambitious energy policy goals for Vienna, the struggle for competitive advantage of Austrian organizations related to industrial interests and benefits for locational policies is visible in smart city efforts, too. For instance, the international orientation of

50 Wittstock, B. (2012): Mann, sind wir smart. Der Falter 04/2012, 25.1.2012; the international recognition of Vienna's smart city efforts is ongoing, see, e.g., https://www.wienholding.at/Mediaroom/News/Wien-auf-Platz-Eins-im-Smart-City-Index [20.12.2017]

51 https://derstandard.at/1277337321090/Der-Macher-im-Verborgenen [18.12.2017]

52 https://smartcity.wien.gv.at/site/wp-content/blogs.dir/3/files/2014/06/Mitteilung-des-B%C3%BCrgermeisters-zur-Smart-City-Wien-Rahmenstrategie1.pdf [18.12.2017]

53 http://alt.tinavienna.at/; cf. http://www.urbaninnovation.at/de [18.12.2017]

54 http://alt.tinavienna.at/de/smartcitywienagentur [18.12.2017]

55 https://digitalcity.wien/category/mission/ [18.12.2017]

the AIT was featured in the media recurringly[56] (see also, e.g., Bach 2016). And the *Road Map 2020* defined the "international positioning and marketing of smart Viennese city technologies" as one of the goals to be pursued (MA 18 et al. 2012a, 35). The strong presence of *Siemens* is evident in the policy documents associated with smart city. These condense the different interests linked to the smart city label in a particular way, and especially so in the smart city strategy itself (VCA 2014a).

This document and the organizational structure of its development were elaborated in a deliberative process involving multiple agents with a rather equal balance of the Executive Groups corresponding to politically responsible Municipal Councilors, with a high degree of voluntary engagement. Certain agencies such as TINA or the WWTF took over facilitating roles, while the process was essentially characterized by non-hierarchical bargaining and a broad participative approach to include as many actors as possible within the administration (interviewees no. 1, 2, 3, 4; cf. VCA 2014a, MA 18 2015). The strategy development built crucially on previous and ongoing research projects that had been used to expand the necessary expert knowledge. The KLIEN-funded "smart city Wien" (see above) and the EU-funded TRANSFORM (see above) were complemented by CLUE (*Climate Neutral Urban Districts in Europe* funded within INTERREG IV C, 2012-2014), EU-GUGLE (*European cities serving as Green Urban Gate towards Leadership in sustainable Energy*, 2013-2019), and the KLIEN-funded Transform+ project (2013-2016). Besides providing access to the required additional human resources for the development of know-how and networking, these projects also contributed to a certain change in working cultures –partly contested, partly supported– since they both allowed for, but also necessitated a new, more project-oriented approach that is flexibly cutting across departments and internal decision-making hierarchies. This change is part of a broader, self-organized tendency in certain parts of the city administration to move towards more project-oriented and flexible forms of governance, as in the case of the recent reorganization of the *Stadtbaudirektion* (which is a part of the Chief Executive Office and responsible for construction issues) in June 2017[57], which now includes a new competence center for urban planning, smart city strategy, participation, and gender planning headed by planning director Thomas Madreiter, and involving more horizontal decision-making opportunities than was usual before. Moreover, the expert knowledge gained or strengthened within the series of applied research projects mentioned above affected political decision-making over core issues of the content of the smart city strategy, since one type of conflict among actors shaping the strategy concerned the degree of the quantification of targets (MA 18 2015, interviewees no. 1, 4; cf. interviewee no. 3). In this context, the political support and clout of the mayor became important to take decisions in situations of conflict, and the official support of the Chief Executive Office was crucial to ensure

56 http://derstandard.at/1319182304588/Smart-City-Schlaue-Stadt-vom-Reissbrett [18.12.2017]

57 https://www.wien.gv.at/presse/2017/06/26/wiener-stadtbaudirektion-wird-neu-organisiert [20.12.2017]

the cross-cutting character of smart city that goes beyond its formal location within the Planning Department MA 18 (interviewee no. 1).

The resulting smart city framework text (that was adopted by the city government in 2014) is outstanding by its coherence, comprehensiveness and complexity with regard to the other two case study cities Berlin and Barcelona. Although targeting primarily the city executive itself, it is written for an external audience as well, and with some success, not least supported by PR efforts (interviewee 1, 4; cf. the results of the discourse analysis of the smart city strategy further below). The strategy development process –building crucially on the *Road Map 2020* and the TRANSFORM and Transform+ projects– is structured formally, including a steering group led by the Chief Executive Office, which is supported by an expert advisory board from a so called thematic process monitoring conducted by working groups. Ina Homeier, head of the *Smart City Unit* of the MA 18 was acting as the project leader. Additionally, 98 different agents are mentioned in VCA (2014a) as interviewees or process contributors. Obviously, these interviewees were integrated to very different degrees, and at least one of them was only called once, irrespective of the unsuitable knowledge background, but is cited nevertheless as having participated as an interviewee in the document (interviewee no. 5). In a similar vein, the administrative bodies contributed to varying degrees (interviewees no. 1, 2). The steering group was dominated by the city administration. As with civil society actors, politicians are absent in the steering group as well as economic interest groups other than the *Vienna Business Agency*, which is part of the city administration and managed by top politicians, business leaders, and the business chamber (as of 2017: Renate Brauner, Michael Ludwig; Helmut Horvath; Walter Ruck, Hans Arsenovic)[58], but has a strong economic mandate. In contrast, the expert advisory board was much smaller and exclusively consisted of academics or private consultants focused on technology and economy. Of its five members, three were academics from the *Austrian Institute for Technology* (AIT, owned by the *Republic of Austria* and the *Federation of Austrian Industries*), the *Vienna University of Economics and Business*, and the *University of Technology*. The thematic process monitoring working group was rather large with 18 members, again dominated clearly by 11 city administration officials (with the largest share coming from MA 18), including the *Wiener Stadtwerke*. However, there was a stronger participation of private companies (ETA, a consulting firm) and agencies of the city administration (TINA, ASCR). Overall, the largest part were affiliates to the city administration including *Wiener Stadtwerke* and the housing agency *wiener wohnen* (46 members), followed by members of research institutions (24), rather evenly distributed between universities and semi-private institutes, while representatives of interest groups were fewer in number (7) than special agencies of the Vienna city administration (11), with TINA having the most affiliates (6). There is thus a clear focus on the administration, followed by technical experts, and a selective inclusion of interest groups characterized by a strong representation of industrial and business interests –while

58 https://wirtschaftsagentur.at/ueber-uns/das-unternehmen/organisation/ [23.5.2017]

the Labor Chamber is almost missing (only mentioned with one interviewee who did not substantially participate), and trade unions as well as NGOs were completely absent. Members of the administration were invited to participate through an email circular, though actual engagement with the strategy development was not reported (interviewee no. 4). The influence of the *Siemens AG Österreich* is indirectly visible in the stakeholder list, against the backdrop of the strong role of the company in Vienna, and because of the fact that its chief executive is also head of the *Federation of Austrian Industries* that counts 6 interviewees (interviewees no. 5, 6). In any case, *Siemens* was strongly present in the crucial policy processes before the smart city strategy: the smart city Wien KLIEN project, and the TRANSFORM project funded by the EU (see above).

The smart city strategy (VCA 2014a) informs the urban development plan STEP –as the *Road Map 2020* had suggested (MA 18 et al. 2012a, b)–, that had started to be elaborated in 2011 (VCA/MA 18 2014, cf. interviewee no. 1). Although the STEP builds on the smart city strategy, this strategy has a more narrow meaning in the STEP, being mostly tied to the idea of the so called ecological city there (VCA/MA 18 2014, 24), or the "city of innovations" (VCA/MA 18 2014, 81). While in VCA (2014a), smart city appears as an extraordinarily encompassing strategic framework, the role of the label in the STEP is more ambiguous. Sometimes it appears as the overarching self-designation of the perspective of the city executive for Vienna, for instance in the forewards of mayor, vice-mayor, and top administration officials and in the section "Governance as an opportunity for the joint development of cities" (VCA/MA 18 2014), where it is said that "the Urban Development Plan STEP 2025 systematically reflects the central ideas, principles and objectives of the Smart City Wien initiative and draws on their strategic orientation in formulating concrete initiatives, e. g. in the fields of multimodal mobility options, integrated energy and spatial planning, the systematic greening of condensed urban zones or new quality requirements for the energy consumption aspects of future urban development approaches. In its urban development strategies, STEP 2025 hence contributes essentially to the implementation of the Smart City Wien goals" (VCA/MA 18 2014, 27). However, in other sections, smart city is rather one identity the city shall assume among others, such as, e.g., a prosperous, cosmopolitan, or participatory city (VCA/MA 18 2014, 21ff.).

Due to its specific coherence, complexity and comprehensiveness, and because it was developed in a rather broad process involving multiple agents, the smart city strategy bears a particular relevance for understanding smart city in Vienna, and will be analyzed in the following section separately.

Analyzing the discourse of the smart city strategy: the rhetorical content

With regard to formal structure, the smart city strategy of Vienna (VCA 2014a) shows a high level of repetitiveness, and partly has a nested character: A set of core ideas is mentioned repeatedly in various thematic contexts. The central dimensions of the narrative are hence embedded in different

contexts. The document combines three genres: advertisement, policy report and scientific report. The genre of advertisement shapes the overall outlook of the document. In this regard, it neither resembles a tourist brochure nor an invitation to (foreign) investors. Rather, the administration, certain stakeholders and possibly the media in Vienna appear to be the most important audiences, while other city administrations and governments could have been imagined as relevant as well.

Reconstruction of the phenomenon structure

In this section, the way the smart city strategy constructs the specific problem to which smart city shall respond, is reconstructed, followed by further dimensions concerning the proposed solutions. In this section, the wording of the strategy paper is used.

The narrative sets out from an opposition between a constellation of problems on the one hand, and an emphasis on the positive qualities of Vienna, which takes on a self-congratulory character. The problems, which the smart city strategy confronts are constructed in an anonymous way. The general outline of the problem constellation, which the smart city strategy (VCA 2014a) is addressing can be summarized by the following sequence of arguments: (1) All big cities grow by immigration and consumption is thus rising, however, (2) change is difficult; (3) this holds true for Vienna as well, which is also growing, mainly because of the high quality of its infrastructure; (4) in Vienna, growth leads to more traffic and less quality of living, while (5), climate change, which is caused by fossil fuel-related greenhouse gas emissions threatens the quality of living, as do resource scarcities; (6) this situation requires innovative solutions.

This constellation of problems, which already points towards a specific type of solution, is contrasted by asserting a specific identity of Vienna, which is a fantastic, distinctive, and internationally renowned metropolis, and better than other cities. Concretely, Vienna is prosperous because of its economy, is a centre of knowledge, does not discriminate between migrants and natives, has a very good climate performance and features a strong administration of social affairs. Furthermore, it is developed by its citizens and builds on cooperation in diversity. Along this line, it is also recurringly stated that Vienna has always been smart and is already smart, which is testified by its waste management, the long-standing promotion of organic agriculture, the temporary cultural use of vacant space, the reduction of energy consumption in hospitals and of air pollution, the use of existing structures by new flagship buildings as well as by multi-functional and dense neighborhoods. Likewise, rendering the sustainability of Vienna visible is already smart.

Despite all of these achievements, Vienna wants to become even more ambitious and give smart city a distinctive direction by the emphasis on social inclusion, states the smart city framework document (VCA 2014a). This distinctiveness, however, is embedded in the recognition of a common fate and fortune of cities worldwide, since these have always been centers of innovation,

which turns the problem of growth into an opportunity. Given their innovation power as seen against the backdrop of their level and dynamic of energy consumption, cities are key for the energy turnaround and even hold the key to the future in general, not least because they are the world's biggest mines, which may prove vital in the face of metal scarcities. These shared properties of cities lead to an exchange with other smart cities. The identity of Vienna, though place-specific, is thus supported by embedding it into a wider city identity in general.

Although Vienna has always been smart and is smart already, according to VCA (2014a), there is ample room to further improve on its achievements, which is also necessary considering the problems of city growth in terms of fossil fuel consumption. This improvement shall take place in Vienna in a distinctive manner by combining resource reduction with an increase of the quality of living by innovation. The smart city framework strategy of Vienna allows to decrease resource consumption while satisfying rising demands and safeguarding inclusion. In this way, the social, the environment, and competitiveness are ensured at the same time. From this general understanding it follows that the core areas of smart city in Vienna are those that impact strongly on qualify of living and innovation. Thus, the strategy prioritizes energy, mobility, buildings and infrastructure, and integrates art and culture. To sum up, Vienna's smart city strategy is holistic. This demands a new governance approach, because smart city requires flexibility, open spaces and constant evolution.

The strategy focuses on information and communication technologies (ICT) with regard to infrastructure, because ICT systems ensure a high quality of living, as VCA (2014a) argues. ICT is understood as the nervous system of the smart city, but is at the same time conceived of broadly. It enables new services and forms of presentation. Since prosperity is more than material security, the smart city also safeguards green space, not least in order to protect biodiversity. Corresponding to the distinctive feature of social inclusion in the smart city approach of Vienna and given that smart city is based on equality, all social groups are targeted by the strategy, it is said (VCA 2014a), including equal digital opportunities for everyone, and gender mainstreaming as an important cross-cutting principle. Likewise, equal education for all is central to smart city in Vienna.

To make the smart city Vienna resilient, to safeguard a dynamic economy which attracts investment and exports more high technology, and to increase the quality of living –which is as important as decreasing resource use– several goals are defined by the strategy in the realms of (1) resource policies including energy, (2) social issues, and (3) green space (VCA 2014a).

On the one hand, ressources must be preserved and fossil fuel consumption must decrease *in share*. However, also total *energy use* must decrease, as well as relative energy use. Likewise, greenhouse gas emissions must be reduced. On the other hand, the document states that fossil fuel consumption must be *abandoned* or that fossil fuel consumption *must not rise*. In any case, energy efficiency

must grow and renewables must expand. Waste heat must be used, air pollutants and noise must be reduced, and educational buildings should increase energy efficiency (VCA 2014a).

The strategy touches upon a broad range of social issues. In general, infrastructure must be developed without raising resource use. Thus, it is argued, high-quality housing must be affordable for as many as possible, and the institutional care for children must be expanded. Remuneration must cover all basic needs. Furthermore, health must be increased for and by everyone and people must not stay as long in hospital as they currently do. This requires the *Vienna Hospital Association* to remain a public enterprise and become more efficient. Likewise, health care in general must be managed efficiently. Also the level of educational attainment must be maximized. Not least, Vienna must express social diversity to the fullest, as it is said. Taken together, the smart city must make everyone happy concerning leisure time. In fact, the smart city Vienna promotes flexibility and deceleration to increase leisure and optimize everyday life. Not least, Vienna wants to create publicity, because it shall remain the most liveable city. Besides social issues, but also interlinking with these, the share of green spaces must be kept. In addition, new local green spaces must be created and land consumption must be minimized, the smart city strategy is declaring (VCA 2014a).

In pursuing these goals and facing specific challenges, not least those implied in the smart city strategy itself, Vienna builds on existing strengths, but also depends on Austria and the EU. The realization of the goals of the smart city strategy is enabled by several conditions. First of all, innovation solves potential contradictions between resource reduction and quality of life for all, but also requires constant redefinition and constant supervision. Vienna and its citizens keep a close eye on potential harm from innovations. The source of innovation is primarily education, research and a strong economy, with Vienna's universities taking on a particular role for generating economic value. Second, smart city is based on the intelligence of a diverse and broad population enjoying equitable and inclusive labor relations. But to safeguard this diversity, a social safety net is necessary, because social justice generates security. Likewise, the respect for public space ensures quality of living. Climate protection is good for everyone and the future is full of possibilities.

Vienna supports ecological production and consumption and acknowledges that health equality requires solidarity-based public funding. In the view of VCA (2014a), green space planning should include the criteria of both accessibility and efficiency. Realizing the goals of the smart city strategy is facilitated by the urban settlement structure, which is good for the environment, and by renewable technology progress. Initiatives such as urban gardening further support the strategy as it has multiple benefits (VCA 2014a).

All these conditions help to implement certain strategies and measures to reach the smart city strategy goals. On a strategic level, the smart city framework must be further developed. Cooperation takes on a particular role since it allows environmental policies to be effective. Thus,

smart city requires cross-cutting and regional cooperation. A special place is taken by the cooperation of the Vienna city administration with universities. Taken together, strategic planning ensures a vibrant metropolis. This calls for thematic super-management and the focusing of energy policy by specialized strategies in core areas. In this regard, ICT pilot projects are important as well as the follow-up of international trends. Implementation of the strategy requires constant monitoring by indicators. In this way, extraordinary costs and risks are avoided. In general, the smart city Vienna balances interests and supports social innovation, it is said (VCA 2014a). Long-term goals guide short-term actions, and learning from past experiences is important.

On a concrete level, a range of areas of intervention are mentioned in the document (VCA 2014a): (1) education, (2) economy, (3) energy, (4) human resources development in the city administration, (5) urban planning, (6) health and (7) culture. Concerning education and the economy, a smart city requires broad support for good education and an innovative economy. Furthermore, research for technological and social innovation is fostered. For instance, new technologies drive water conservation. Planning education will secure adequate labor supply for the smart city. Energy is interlinked with social issues. Therefore, educational centers will combine equality and energy efficiency. Vienna will support new enterprises with ICT. In general, the smart city Vienna motivates enterprises and institutions to be innovative, and takes care of human resource development that is crucial for the smart city administration. Thus, lifelong learning is actively supported by the city and cultural events shall multiply to foster innovative ideas in citizens. Smart urban planning reduces car traffic since resource-conserving mobility combines quality of living with short distances. Conventional motorized individual traffic must be reduced in share by cycling, walking and public transport. Furthermore, the minds of citizens could be manipulated towards ecology. These strategies must be complemented by regulation and fiscal policy beyond subsidies.

The implementation of these strategies and measures will lead to several positive outcomes while safeguarding achievements (VCA 2014a). In general, the smart city strategy will transform challenges into opportunities for everyone. In particular, it will make growth an opportunity by innovation. ICT will tap economic possibilities, drive innovation and thus Vienna will become a global player in technology. Furthermore, Vienna will implement international environmental policies through the smart city strategy and will in general become a leader by example, not least as a private entrepreneur. Likewise, it will be an investment hub, a center of knowledge, a regional innovation driver and its economy will be dynamic. The smart city strategy will impact European policy and contribute to European climate and energy goals. However, smart city will not only benefit the international standing of Vienna and of its economy, but will likewise increase the leeway for citizens and experts. ICT applications in general will benefit citizens. Top-notch nursing quality will support the stay of the elderly at home. A comprehensive transport system will include e-mobility. Much renewable energy will be produced in rural areas. While the smart city strategy

was created by many stakeholders, it was initiated and is steered by the municipality, it is emphasized (VCA 2014a). To reach its goals, everyone must contribute to the smart city.

Table 1 depicts the dimensions of the phenomenon of smart city according to the document (VCA 2014a) and gives an overview of the content of each of these.

Categories	Content
Problem	Climate change and resource scarcities threaten quality of living
	City and consumption growth
	Lack of innovation
Identity	Vienna is fantastic, distinctive, renowned and better than other cities
	Thus, Vienna has always been and is already smart
	but it wants to become even more ambitious
Support of identity	Cities always have been centres of innovation
	thus they hold the key to the future
	Vienna is part of this role cities play
Dimensions	The smart city strategy is holistic and targets all social groups
	but prioritizes energy, mobility, buildings and infrastructure
	It combines resource reduction with quality of living
	ICT is the smart city's nervous system
	The smart city strategy includes a new governance approach
	Equality is central
Goals	Fossil fuels, energy consumption, and GHG emissions must decrease
	by increasing efficiency and renewables
	At the same time, quality of living must be increased by
	remuneration covering all basic needs
	different social measures
	The economy must be dynamic
	Thus, the level of educational attainment must be maximized
	Vienna wants to create publicity
Conditions	Vienna builds on existing strengths
	The Smart City strategy is a challenge
	Vienna depends on Austria and the EU
	Innovation results from education, research and a strong economy
	Smart City is based on intelligence of a diverse and broad population
	with equitable and inclusive labor relations and social security
Strategies and measures	Strategic planning and cooperation
	Constant monitoring by indicators
	Long-term goals guide short-term actions
	Research for technological and social innovation is fostered
	Regulation and fiscal policy beyond subsidies necessary
	Broad support for good education and innovative economy
Outcomes	Challenges become opportunities for everyone
	while safeguarding achievements
	Contribution to EU/international climate and energy goals
	ICT taps economic possibilities
	Vienna will become a leader and investment hub
	Increased leeway for citizens and experts
Policy process	Initiated and steered by municipality
	but created by many stakeholders
Call for action	Everyone must contribute

Table 1: Elements of the construction of smart city in the smart city framework strategy of Vienna (VCA 2014a)

Discussion

While the smart city strategy of Vienna highlights social inclusion as a distinctive feature of the strategy in international comparison –as the strategy paper assumes (VCA 2014a)– the problem definition that the document provides does not relate to social issues, but to energy and resource

consumption in the context of urban growth. Although social topics are recurringly mentioned in the strategy, their connection with the other elements of the smart city strategy is rather vague. In fact, the strategy explicitly prioritizes ICT. This is justified by the need for innovation, which appears as a core formula in the text that suggests that problems can be solved by inventions. This formula links the issue of resource reduction with strengthening the economy as well as safeguarding social achievements. Since the text positions Vienna as being smart already, it does not become fully clear, why it is in need of a smart city strategy as long as one does not interpret ICT as its distinctive new contribution to urban policy. Although the document highlights social issues –and technology is less underscored than in the smart city contexts of Berlin and Barcelona (during the Trias government; see below)– it is indeed evident that ICT is the innovative part of the Viennese strategy. To this role testifies the lack of problem analysis in social issues, which are rather described in a self-congratulory way, often referring to international rankings of quality of living in Vienna.

The technical goal set for the core issue of increasing efficiency and renewables is ambigous, since it ranges from relative reductions in fossil fuel consumption to a complete abandonment, shifting from fossil fuels to total energy consumption. A strategic change of consumption patterns is absent. The document shows a strong ambition to increase the international competitiveness and reputation of the city, while local concerns are only mentioned in passing. Civil society is nearly completely absent even on the discursive level and does not play a role as an actor. Both the definition of the problem as well as the call for action are anonymous. Problems are constructed as tendencies and the strategy calls upon literally everyone to contribute. This call appears as rhetorics, since the strategy is clearly technology and business oriented, steered by the municipality and by the administration in particular. Seen in this context, the emphasis on equality and affordable living conditions thus rather serves to strengthen the legitimacy of the technoloy and business focus than they these are ends in themselves, according to the strategy. The repeated issue of quality of living is to be understood in this regard as well, not least because this quality is recurringly constructed as a good position of Vienna in international rankings established with a doubtful methodology.

Innovation understood as investments in ICT is the core category of the documents' discourse. Through technological innovation environmental problems shall be solved and the international competitiveness of Vienna's economy increased. Targets concerning improvements are practically limited to technical issues of reducing greenhouse gas emissions and the like. In contrast, social issues are treated as not being in need of improvements, and innovation is not understood in any substantial sense as social innovation. While it is claimed that ICT will increase quality of living, neither are quantitative targets mentioned in this regard nor is qualitative monitoring discussed.

In comparison with the *Road Map 2020* (MA 18 et al. 2012a, b), the smart city strategy is both thematically more comprehensive overall, but more narrow with regard to participation issues. On

the one hand, the much broader representation of actors within and beyond the administration obviously has led to a broadening of the meaning of smart city, while on the other hand, the focus on citizens participation that appeared in the *Road Map 2020* got nearly lost. Specifically, innovative ideas concerning participation such as Public Citizens Partnership (PCP) (MA 18 et al. 2012, 35) referring to a new "form of collaboration between municipality and citizens to jointly fulfill municipal tasks", mentioning cooperatives jointly managed by citizens and public bodies in social issues are not resumed by the smart city strategy (VCA 2014a). Likewise, the envisaged platform "smart citizens in a smart city" has not been implemented (cf. interviewee no. 1, 4), and smart city participation processes had been conceived of more broadly than mere financial participation of citizens in solar power cooperatives. The weak representation of citizens in the smart city development process was also identified by the evaluation of the process conducted by the MA 18 in the KLIEN-funded Transform+ project (2013-2016) (Hartmann et al. 2016). Since the other action fields set out by the *Road Map 2020* (MA 18 et al. 2012) have been more consistently followed up in the smart city strategy (VCA 2014a) and in implementation, the sidelining of the more innovative organizational approaches of the *Road Map 2020* is significant. One reason for this dynamics may to be found in the institutional selectivities involved, since the Planning Department MA 18, where the smart city agendas are meta-steered, is not officially responsible for managing participation at the interface between administration and citizens (although planning director Thomas Madreiter has declared participation as one of his core topics), which is rather the task of the *Neighbourhood Management Offices* (Gebietsbetreuung) or the *District Planning and Land Use Department* MA 21 (cf. interviewee no. 1, 3).

Indeed, civil society interviewees consistently lack significant knowledge on smart city policies in Vienna, and associate it with a sole technology focus that they deem problematic, although they are much engaged with environmental and broader development policies in the city –a view that is sometimes shared also with other types of actors (interviewee no. 8). Others are regularly part of consultations with the city executive on issues that are key to the Vienna smart city strategy, but were not included in the development of the strategy (interviewee no. 24). From the point of view of civil society actors, smart city is furthermore seen as not being very important for urban development in Vienna (interviewees no. 19, 20, 21, 22). Concerning participation of citizens in broader urban development issues, frustration was expressed in interviews from both civil society actors and executive officials. Although the theoretical principles of current participation policies in Vienna were seen rather positively, concrete experiences with participation issues were regarded as being much more problematic either because of lack of substantial participation beyond marginal issues, or because of the problems involved and resources needed to adequately respond to conflicts in the context of pressing urban development challenges (interviewees no. 21, 22, 23, 24).

Smart city as innovative meta-governance

In terms of policy content, the smart city strategy revolves around the notion of efficiency, which is the underlying principle that implicitly –and partly explicitly– connects measures as different as car sharing, the concept of the compact city and sensors to reduce energy consumption[59]. Efficiency involves the coordination of different policy measures, which is captured by the emphasis on holistic or integrated governance, that appears repeatedly in the Viennese smart city discourse. In accordance with the results of the discourse analysis of the smart city framework strategy presented in the previous section, interviews have pointed towards the crucial relevance of the resource-related issues in comparison with the secondary role of social policies (interviewees no. 1, 4, 5), which are not in the center of the strategy, although they are important.

The fact that the smart city strategy is to a large extent a continuation of existing and sometimes long-standing policies of the city executive is highlighted both in smart city policy documents as well as in interviews, although these policies are not identical with the smart city strategy, which in part also defines new or increased targets (cf. interviewees no. 1, 2). Most importantly, these existing policies concern the Viennese climate protection program (KLIP, since 1999), and specific sub-programs, namely the urban energy efficiency programme (SEP, since 2006), and the guidelines for sustainable construction site management (RUMBA, since 2004[60]), together with the urban development plan (STEP, since 1985) (MA 18 et al. 2012b), the Viennese strategy for research, technology and innovation (since 2007), and the sustainability strategy of the *Wiener Stadtwerke* (since 2006) (MA 18 2015). A further example are the two initiatives that the framework strategy declares to be the best practice examples of Vienna as an environmental model city (VCA 2014a): the public procurement initiative *ÖkoKauf* (since 1998, see Magistrat der Stadt Wien 2009), which is itself closely related to the KLIP (Magistrat der Stadt Wien 2009, Smith et al. 2016, Roth/Kromp 2016, interviewee no. 8) and the city-wide support for community gardens (since 2010; see also below). But even with regard to digital technologies, which are part of the *differentia specifica* of the Vienna smart city framework strategy (see discourse analysis above), innovation is not necessarily their central contribution or feature, for instance with regard to the high level of e-government that is already implemented in Vienna, to take one example (interviewee no. 2). Given the quality of Viennese infrastructure in general, some of the assumed improvements associated with the international smart city discourse may appear to be already put into practice in Vienna (interviewee no. 5). On the other hand, the relatively weak representation of digital technology development goals may even appear to constitute a specific deficit of the Viennese smart city strategy that may be tackled by further revisions (interviewee no. 1).

59 cf. the topics highlighted by Thomas Madreiter in an interview in Wirtschaftsblatt (2012): “Wir führen Wien in die Ära der Smart City!”, 27. 12. 2012

60 http://www.rumba-info.at/index_en.htm [18.12.2017]

The KLIP[61] is of particular relevance with regard to the climate protection and energy policy goals of the smart city strategy. Beyond its specific policy goals, the KLIP also bears interesting similarities with the smart city strategy development concerning the structure of the process. Initiated in 1999, the KLIP already responded to the cross-cutting character of sustainability policies, to which the smart city strategy is related as well. Astleitner/Hamedinger (2003) situate the KLIP in the context of the transformation from government to governance and the partial implementation of New Public Governance principles in Vienna since about 2002, emphasizing the steering role of the small KLIP staff, and the concomitant development of a horizontal bargaining system and the unlocking of the existing system of administration including a broad variety of stakeholders reaching from representatives of universities, NGOs, businesses and pressure groups to the Labor Chamber. Spanning the policy fields of energy, mobility and waste/procurement, conflicts related to the KLIP in its early period erupted mainly between different departments and were dealt with in non-hierarchical bargaining fora (Astleitner/Hamedinger 2003). "In the course of the process", Astleitner/Hamedinger (2003) report, "departmental boundaries as well as administrative hierarchies were partially overcome by the continuous working process in this mixed setting, a commonly pursued goal (CO2 reduction), and interesting experience gained through the exchange of useful information and knowledge. Less successful from the beginning, however, was the originally expected integration of politicians into the development process of the programme" (Astleitner/Hamedinger 2003, 62), concluding that "the implementation process suffered from a lack of political backing and from behavioural structures within the system being resistant to change" (Astleitner/Hamedinger 2003, 62). At least in its early period, the KLIP process was mostly pushed by members of the administration and experts from research institutions, together with non-profit organizations close to the administration (Astleithner/Hamedinger 2003).

The policy continuity within the smart city strategy and the constitutive function of existing policies in this regard (new or increased targets notwithstanding) has to be seen in relation with the relatively innovative character of the smart city strategy development as such. Indeed, smart city in Vienna is a meta-innovation revolving around a new role for planning (Madreiter 2016) and an enhanced political role of the planning director, partly contested (interviewees no. 1, 5, 6; see also the results of the media discourse analysis reported above). It does not only respond to national and EU policies, but also involves a coordination of many crucial city policies (MA 18 2015, 49) and a stronger role of planning (MA 18 2015, 15), together with a further change in governance, not least within the administration, towards more project-like, flexible, and cross-cutting modes of working (MA 18 2015, interviewee no. 1; see also above). Seen against this backdrop, the smart city strategy of Vienna does not involve particular policy innovations, and it hardly is the unmediated result of EU policy-making or the lobbying of industrial corporations. While both aspects are important context conditions of European smart cities in general, the Viennese strategy expresses a new effort

61 https://www.wien.gv.at/umwelt/klimaschutz/programm/ [18.12.2017]

and innovative attempt to bundle and coordinate existing policies or policy guidlines in particular. In this vein, the agency of city officials is of prime importance, supporting informal cooperation cutting across departmental boundaries (interviewees no. 1, 4). Although the future impact and sustainability of the smart city strategy development appears to be uncertain (interviewees no. 5, 7), and the process may be narrowed down to those actors most directly engaged with related issues (interviewees no. 1, 2), certain impacts seem to be relevant for everyday policy implementation already, especially connected to the thematic concepts of the STEP (interviewee no. 2), which are coupled with the smart city strategy. Moreover, several applied research projects are dealing with the implementation and further development of the smart city strategy, for instance through the elaboration of a monitoring system (interviewees no. 1, 3).

Although some interviewees expressed scepticism concerning the real and longer run impact of the strategy or tended towards cautious expectations, a certain change due to the smart city strategy process was repeatedly indicated, too, to varying degrees (interviewees no. 1, 3, 4, 5, 7). It seems that previous experiences with cross-cutting initiatives such as the KLIP, or, specifically, the *ÖkoKauf* initiative (cf. interviewee no. 8) have been expanded and organizational solutions such as implementing special commissioners (as for the multiple use of land[62], or the special commissioner for the KLIP, which is located in the Chief Executive Office) for a circumscribed task that does not neatly fit into the established organizational hierarchies and departmental boundaries have been replicated. In any case, the smart city strategy development process reaches beyond the formulation of the strategy itself and involves ongoing policy learning pointing to further updates of the strategy. For instance, a certain shift towards social innovation complementing technological innovation appears to take place[63], an enhanced integration of policy fields in smart city terms according to the central goal of resource conservation is envisaged, together with improved target definitions that sometimes have been reached already or are either too vague or possibly too extensive (involving many further issues such as economic targets beyond resource conservation), or even somewhat biased against highlighting ICT, in contrast to many other smart city strategies (interviewee no. 1).

4.4. Barcelona

Smart city as government ideology: 2011-2015

The immediate roots of the idea of smart city in Barcelona are to be found within the electoral campaign of the former mayor Xavier Trias in 2011, and in his connection with architect Vincente Guallart, director of the *Institute for Advanced Architecture for Catalonia* (IAAC)[64] and later chief

62 https://www.wien.gv.at/stadtentwicklung/projekte/mehrfachnutzung/ [20.12.2017]

63 also see, e.g., http://www.smartcities.at/stadt-projekte/smart-cities/sinn-cities-soziale-innovationen-in-smart-cities [20.12.2017]

64 http://legacy.iaacblog.com/blog/2011/regenerar-barcelona-the-xavier-trias-project-for-the-city/ [4.11.2017]

architect of the Trias government, as well as with Antoni Vives, later deputy mayor. To make Barcelona a leading capital of technological innovation was one of the central tenets of his campaign[65], connected with liberalization measures and an overall focus on the economy and its internationalization[66]. This focus rested on a broader consensus of various stakeholders that ICT is an important backbone of the future urban development in Barcelona (Mora/Bolici 2016). In fact, ICT already prominently featured in urban development strategies some years before, namely in the ICT master plan of 2008 (Gascó et al. 2016). Bakici et al. (2013) even go so far as to project contemporary smart city conceptions into the 1990s, regarding Barcelona (Bakici et al. 2013, 139). In a somewhat similar vein, Charnock et al. (2014) outline the turn towards a knowledge-based economy steered by the Barcelona City Council, which can be identified since this time.

The impact of Trias' political message on his electoral success may be doubted, given the role of effectively marketing his public personality (Díaz 2014). Be that as it may, right after Trias had won the elections, the first steps to guide city policies onto the new avenue of the development of a smart city were taken. According to Ferrer (2017), EU policies within *Horizon2020* funding programmes were important for the IT strategy enacted by the City Council in 2011, with the goal of a sustainable city growth at their center. Ferrer (2017, 74), former director of Barcelona's *Smart City Program*, moreover underscores the strategic relevance of linking to EU and other regional or supranational funding opportunities through terms such as smart city (see also Gascó et al. 2016).

Already in 2011, the first *Smart City Expo & World Congress* (SCEWC) was organized by *Fira de Barcelona*, the economically highly important and internationally renowned conference enterprise of Barcelona[67]. At this event, Trias announced the creation of a *Smart City Campus* in the 22@ district, with the participation of *Cisco, Schneider Electric-Telvent, Agbar, Telefónica* and *Abertis*[68], and the establishment of a global forum intended to develop smart city standards[69]. This new congress complemented the thematically related *Mobile World Congress* held in Barcelona since 2006[70], which is of crucial economic importance for *Fira de Barcelona*, and has grown substantially during the Trias government, which also achieved to locate the *Mobile World Capital* in Barcelona[71], in a "joint effort by the Barcelona City Hall, the Catalan Generalitat, the Ministry

65 http://www.elperiodico.com/es/barcelona/20140722/el-sueno-que-no-cuaja-3401013 [4.11.2017]

66 http://www.expansion.com/2011/05/23/catalunya/1306179517.html [6.11.2017]

67 http://www.lavanguardia.com/barcelona-metropolis/20111129/54239495847/feria-smart-cityexhibe-ciudades-ecoeficientes.htm [4.11.2017]

68 http://www.lavanguardia.com/barcelona-metropolis/20111202/54239751035/empresarios-smartcity-barcelona.html?facet=amp [4.11.2017]

69 http://www.lavanguardia.com/tecnologia/20120222/54258192296/barcelona-pone-prueba-proyectosmart-city.html [4.11.2017]

70 https://es.wikipedia.org/wiki/Mobile_World_Congress [4.11.2017]

71 https://cronicaglobal.elespanol.com/business/antoni-vives-maria-sisternas-consultoria_84170_102.html [4.11.2017], http://w42.bcn.cat/web/es/noticies-i-premsa/noticies/actives/Barcelona-se-convierte-en-la-Capital-Mundial-del-Movil.jsp [4.11.2017]

for Industry, Tourism and Commerce as well as *Fira de Barcelona*, with the involvement of relevant entities and companies", according to a press release[72].

The Trias government quickly pushed for institutional changes to further its smart city policy, creating the super-department *Hábitat Urbano* integrating urbanism, infrastructure, housing, environment as well as urban services and ICT, which was headed by deputy mayor Antoni Vives (March/Ribera-Fumaz 2014a, Mora/Bolici 2016)[73]. This brought a broad range of administrative issues together under one roof, including the *Municipal Institute of Information Technology* (IMI) in charge of all ICT-related activities, which facilitated an integral approach to a diversity of topics under the smart city perspective (Mora/Bolici 2016). Vives –a friend of the architects Vicente Guallart and Willy Müller[74]– had variously been characterized as the "strong man of Xavier Trias"[75], "creator of the Barcelona model of CiU municipal government"[76], "urban ideologist" and "most clever of the political class"[77], a businessman "who knows how to sell refrigorators to eskimos", "sword of the mayor in technology issues"[78], and "one of the heavyweights of CiU in Barcelona"[79], in brief: "the right hand man of Trias"[80]. Press reports saw Vives as the one who was crucial for the smart city Barcelona framing –effectively overruling Trias in urban development issues[81]– that had recurringly been described as his "obsession"[82], or, in the words of a report in *El Mundo*, as "the concept, around which the imagination of the councilor of Barcelona revolves"[83]. An impression that corresponds to the enthusiastic, offensive, power-oriented, and self-congratulatory tone of his statements on the subject as reported by the press. Further privileged by advanced English skills (and the relative lack of these among his collegues), as had been emphasized in newspaper articles[84], Vives tended to replace the mayor in diplomatic relations, superseding Trias by far in the number of international travels[85]. Based on his ample experience in

72 http://mobileworldcapital.com/prensa-detall/41/ [4.11.2017]

73 http://www.elperiodico.com/es/barcelona/20121019/vives-destituye-al-gerente-de-habitat-urbano-2229835 [4.11.2017], http://www.lavanguardia.com/tecnologia/20120222/54258192296/barcelona-pone-prueba-proyectosmart-city.html [4.11.2017], https://www.smartscities.com/es/entrevistas/entrevista-antoni-vives-smart-city-expo [4.11.2017]

74 https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.htm [4.11.2017]

75 https://cronicaglobal.elespanol.com/business/colau-reivindica-influencia-agenda-mwc_68156_102.html [4.11.2017], http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017], https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.html [4.11.2017]

76 https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.html [4.11.2017]

77 http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017]

78 http://www.elperiodico.com/es/barcelona/20140722/el-sueno-que-no-cuaja-3401013 [5.11.2017]

79 https://elpais.com/ccaa/2015/09/07/catalunya/1441631211_300979.html [5.11.2017]

80 http://www.eltriangle.eu/es/notices/2014/12/vives-mano-derecha-de-trias-senalado-por-el-caso-marina-port-vell-3039.php [5.11.2017]

81 http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017]

82 https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.html [5.11.2017], https://cronicaglobal.elespanol.com/business/antoni-vives-maria-sisternas-consultoria_84170_102.html [5.11.2017]

83 http://www.elmundo.es/cataluna/2014/06/10/539613d7ca47416a398b4574.html [5.11.2017]

84 http://www.elperiodico.com/es/barcelona/20140722/el-sueno-que-no-cuaja-3401013 [5.11.2017] http://www.elmundo.es/cataluna/2014/06/10/539613d7ca47416a398b4574.html [5.11.2017]

85 http://www.elmundo.es/cataluna/2014/06/10/539613d7ca47416a398b4574.html [5.11.2017]

business –he had been commercial director of *Nissan Ibérica*[86]– and his former work for the Catalan government[87], Vives had built the foundations for his central role in smart city Barcelona before the Trias government. Linked professionally since long, Vives had founded the *Instituto de Arquitectura Avanzada de Catalunya* (IAAC) together with Guallart and Müller, with close connections to the agency *Barcelona Regional*[88]. Willy Müller was director of *Barcelona Regional* from 2011 to 2015[89], and Guallart served as its vice president, together with Vives himself, who was the president of *Barcelona Regional*[90]. Guallart also was head of *Habitát Urbano* under Vives until 2012[91]. Josep Maria Montaner, professor of architecture at the ETSAB-UPC in Barcelona, criticized this constellation of actors as a "false avantgarde that dominates in Barcelona, consisting of the Institut [sic] for Advanced Architecture of Catalonia (IAAC) and the leading architects of Hábitat Urbano and Barcelona Regional: the strawfire of smart city, hundreds of unrealized renderings and projects outside of Catalonia"[92] on the eve of the elections that would lead to the change in government from Trias' CiU to *Barcelona en Comú*. One of the first actions of Vives in office was to centralize city contracts in his hands[93]. Moreover, he merged the six public enterprises of the city under a new umbrella organization named BIMSA *(Barcelona de Infraestructures Municipales*)[94]. Within the newly created *Hábitat Urbano*, the *Directorate of ICT Strategy and Smart City* was most probably decisive for the development of the smart city strategy of the government (see below). *Cisco* and *Doxa Consulting* were two firms that delivered substantial input (Mora/Bolici 2016; cf. Ferrer 2017, where *Doxa Consulting* is also mentioned prominently). A skilled and well connected politician determined to realize his urbanistic vision, and equipped with the institutional powers to do so, Vives decided to remodel the Diagonal street, the Gràcia and the Paral.lel, and initiated the works for a tunnel at the Glòries under the Gran Via. He also was responsible for the refurbishment of Port Vell into a luxury harbor[95].

These projects, however, also led to conflicts. Thus, the dismissal of Vicente Guallart from the position of head of *Hábitat Urbano* in 2012 was the result of the resistance of locally important architects, who defended the prevailing model of urban development and their vested interests, together with citizens affected by urban development and renewal plans, as well as political

86 http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017]

87 http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017], https://ca.wikipedia.org/wiki/Antoni_Vives_i_Tom%C3%A0s [5.11.2017]

88 https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.html [4.11.2017]

89 https://iaac.net/people/willy-muller/ [5.11.2017]

90 http://www.elperiodico.com/es/barcelona/20150705/un-alto-cargo-de-habitat-urbano-adjudico-contratos-a-un-exsocio-4331010 [5.11.2017]

91 http://www.elperiodico.com/es/barcelona/20121019/vives-destituye-al-gerente-de-habitat-urbano-2229835 [5.11.2017], see also: http://www.lavanguardia.com/local/barcelona/20140506/54407630064/trias-releva-albert-vilalta-habitat-urba.html [5.11.2017], http://www.lavanguardia.com/politica/20121020/54352728275/trias-quita-poderes-arquitecto-jefe.html [5.11.2017]

92 https://elpais.com/ccaa/2015/03/25/catalunya/1427316128_189648.html [5.11.2017]

93 http://www.elperiodico.com/es/barcelona/20170202/el-mas-listo-de-la-clase-5781806 [5.11.2017]

94 https://elpais.com/ccaa/2017/02/02/catalunya/1486036071_756624.html [5.11.2017]

95 http://www.elperiodico.com/es/barcelona/20140722/el-sueno-que-no-cuaja-3401013 [5.11.2017]

opposition parties[96]. The replacement of Guallart by the technical engineer Albert Vilalta, who was chief engineer of the municipal government from 2000 to 2006, had a transport focus in his expertise and was director of *Túneles y Accesos de Barcelona* (*Tabasa*) and *Túneles del Cadí*[97] thus indicated a certain change in the smart city approach in Barcelona[98]. The subsequent replacement of Vilalta, who was shifted to different tasks by the government, with the architect Albert Civit continued the more conventional Barcelonian approach to urban development under Trias after the dismissal of Guallart. Civit had been the architect of buildings for the Olympics between 1989 and 1993 and had collaborated much with locally renowned architects in his private firm, before he entered *Incasòl*, a public enterprise of the *Generalitat de Catalunya*. He had been planning director (2001 to 2006) and technical director (2006 to 2011) at the *Institut Català del Sòl*, and was head of the Urbanism department within Hábitat Urbanoh before[99]. Guallart's vision of a materially self-sufficient city connected through the internet had raised some interest beyond Catalonia[100]. His specific variant of a smart city promoted a somewhat richer picture of ecological and technological concerns in comparison with the more strictly technological perspective embraced by Vives and, even more so, Trias. Guallart even made some references to the slow city perspective[101]. It has been argued that Trias rather bought into the ideas of Guallart for lack of an urban development concept for Barcelona that had been elaborated within CiU in order to distance its government from the socialist dominance[102], so that in part, smart city under Trias can be understood as renaming approaches that had been developed under socialist governments the three decades before (interviewee no. 27). The dismissal of Guallart in fact fits to the assessment by *La Vanguardia* in 2014 in view of the upcoming municipal elections, that in urban development matters, the Trias government hardly stepped out of the conventional pattern in the city (La Vanguardia 2014). Others have assessed that Trias in fact continued the model of a show-window Barcelona promoted by his predecessor Hereu as well[103], although Trias himself had accused Hereu with this very metaphor[104]. In general, environmental aspects were not visible in the smart city development under Trias,

96 http://www.lavanguardia.com/politica/20121020/54352728275/trias-quita-poderes-arquitecto-jefe.html [5.11.2017], http://www.elperiodico.com/es/barcelona/20121019/vives-destituye-al-gerente-de-habitat-urbano-2229835 [5.11.2017]

97 http://www.elperiodico.com/es/barcelona/20121019/vives-destituye-al-gerente-de-habitat-urbano-2229835 [5.11.2017]

98 see as one indication: http://www.lavanguardia.com/local/barcelona/20121019/54352710990/barcelona-ficha-a-albert-vilalta-como-gerente-de-habitat-urbano.html [5.11.2017]

99 http://www.lavanguardia.com/local/barcelona/20140506/54407630064/trias-releva-albert-vilalta-habitat-urba.html [5.11.2017]

100 e.g., https://www.theguardian.com/sustainable-business/time-for-cities-to-get-smart [5.11.2017], https://www.heise.de/newsticker/meldung/Smart-City-Barcelona-will-erste-sich-selbst-versorgende-Stadt-werden-1387668.html [5.11.2017], https://www.archdaily.com/471732/interview-with-vicente-guallart-chief-architect-of-barcelona [5.11.2017]

101 http://www.cittaslow.org/news/spanish-national-network-architect-vicente-guallart-barcellona-cittaslow-e-smart-city [5.11.2017]

102 https://elpais.com/ccaa/2012/10/20/catalunya/1350690677_360102.html [5.11.2017]; see for further aspects of this attempt: http://www.lavanguardia.com/politica/20120630/54318450379/xavier-trias-un-ano-despues.html [5.11.2017]

103 http://www.naiz.eus/eu/hemeroteca/gara/editions/2015-05-24/hemeroteca_articles/ciudad-escaparate-de-trias-o-la-nueva-izquierda-de-colau [6.11.2017], http://www.europapress.es/catalunya/noticia-trias-ve-tomadura-pelo-muestra-plaza-catalunya-dice-parte-politica-escaparate-hereu-20061122173734.html [6.11.2017]

104 https://elpais.com/diario/2003/05/09/catalunya/1052442444_850215.html [6.11.2017]

despite some rhetorical allusions to it (see also, Gavaldà/Ribera 2012, Gascó et al. 2016), which most prominently had been formulated by Guallart (cf. March/Ribera-Fumaz 2014a).

The personal and professional ties with Antoni Vives surely helped to introduce Guallart into the ideology of the Trias campaign and the initial phase of its government. The remarkable gap between the highly ambitious –or even utopian– urban vision of Guallart, which aimed at "productive barrios at human speed within an energetically autosufficient, hyperconnected city with zero emissions"[105], and the almost total lack of strategic planning, let alone practical steps into the said direction (besides the increase in internet connections), renders plausible that Guallart was not politically effective[106], and that his ideas did not match sufficiently the power relations relevant for the Trias government. However, Trias himself likewise encountered considerable resistance at least from political opposition parties. Thus, his high priority idea to create a whole new barrio near the coast called *Blau@ictinea*[107] was first considerably reduced due to scepticism, and then cancelled after enduring opposition from PP and PSC that demanded more caution in urban development of a place that they considered to be highly complex[108]. To the contrary, the lack of social policies to counter the effects of the economic crisis after 2008 was only faintly criticized in newspapers[109]. Outside of established media and organizational channels, however, social protest grew significantly. The predominant NIMBY-ism of urban protests against the rapid and profit-driven changes in the built environment that had expanded in Barcelona in the early 2000s morphed into a more complex and far reaching political agenda represented by the 15M movement (del Romero Renau/Lozano 2016, Asara 2016). Within this movement, the discontent with established forms of citizen participation against the backdrop of a deep social crisis and an increasing commercialization of urban space in the context of the austerity measures that were taken since 2010, articulated into a political process that finally gave birth to a political party that won the municipal elections in 2015 (Eizaguirre et al. 2017) –and whose repercussions on smart city policies we will analyze further on below. Already in 2013 and 2014, sharp criticisms of further privatizations and the commercialization of public space by the Trias government appeared in the media[110].

At the same time as it was institutionalizing the smart city perspective in the municipal administrative bodies, the Trias government was entrenching its smart city policy agenda by strengthening the relations with ICT corporations such as *Cisco* and the creation of further organizations, for instance the *Instituto de Tecnología para el Hábitat Urbano* (BIT for the Habitat)

105 https://elpais.com/ccaa/2012/10/20/catalunya/1350690677_360102.html [5.11.2017]; see also: http://www.dwellings.sg/innovation/envisioning-smart-city [5.11.2017]

106 https://elpais.com/ccaa/2012/10/20/catalunya/1350690677_360102.html [5.11.2017]

107 https://elpais.com/ccaa/2012/04/25/catalunya/1335377735_881001.html [5.11.2017]

108 https://elpais.com/ccaa/2012/04/25/catalunya/1335377735_881001.html [5.11.2017]

109 see, e.g., http://www.lavanguardia.com/politica/20120630/54318450379/xavier-trias-un-ano-despues.html [5.11.2017]

110 e.g., http://www.elperiodico.com/es/barcelona/20130524/el-precio-del-escaparate-2400061 [6.11.2017], http://www.eldiario.es/catalunya/Barcelona-ciudad-escaparate_0_178132516.html [6.11.2017], http://politica.e-noticies.es/trias-missing-87698.html [6.11.2017]

that was announced in 2012[111] and registered in 2014 as the *Barcelona Institute of Technology* (BIT). Regrouping a large number of different stakeholders reaching from public agencies to research institutions and business, the BIT was declared to be financed by the municipality of Barcelona together with *Cisco, Schneider* and GDF at the *Mobile World Congress* in 2015[112].

Business relations with other cities or countries were also deepened. There was regular press coverage of contacts between Barcelona and New York on the level of municipalities and business since 2012 in the context of smart city, and Trias signed a corresponding MoU with New York mayor Bill de Blasio[113]. In addition, Trias visited Shenzhen in China to support collaboration on smart city in 2012[114] and also made a trip to Hongkong in the context of the smart city agenda[115]. In 2013, a large delegation from Barcelona including Vives and Trias made a trip to the USA to increase the international standing of Barcelona as a technology capital, including business talks with *Cisco*[116]. The municipality also signed an agreement of collaboration in smart city matters with Seoul in 2012[117]. Several contracts or agreements with corporations were put into place to foster smart city developments, to name a few: in 2011, the municpality started an agreement with *Cisco* in view of a so called city protocol through implementation of the platform called *Cisco Smart+Connected Communities*, aiming at the joint development of further urban service applications[118], which was finally announced to be launched in 2012[119]; in 2012, an agreement with *Schneider* was signed to establish a smart city excellence center in the 22@ district in order to further develop a smart city Barcelona brand by exporting its integrated urban management model[120]; in 2013, *Microsoft* and the municipality entered an agreement on public innovation[121]; in 2014 the municipality signed an agreement with *Adobe*, saying that the company will support

111 http://www.lavanguardia.com/vida/20120301/54262371354/barcelona-sella-con-cisco-despegueproyectos-para-ser-referente-de-smart-city.html [4.11.2017]; see also http://cido.diba.cat/estatuts/405823/estatuts-de-la-fundacio-barcelona-institute-of-technology-for-the-habitat-bit-habitat [5.11.2017]

112 http://www.lavanguardia.com/local/barcelona/20150303/54428696105/barcelona-institute-oftechnology-bit-20-millones.html [5.11.2017], http://www.ccfundacions.cat/fundacions/fundacio-barcelona-institute-of-technology-for-the-habitat-bit-habitat [5.11.2017]

113 http://www.lavanguardia.com/local/barcelona/20120607/54308918983/la-smart-city-expo-worldcongress-promociona-las-smart-cities-en-nueva-york.htm [5.11.2017], http://www.lavanguardia.com/local/barcelona/20140918/54416084163/fundacion-bloombergpremia-barcelona-app-social.html [5.11.2017], https://elpais.com/ccaa/2014/09/23/catalunya/1411463433_769874.html [5.11.2017], https://elpais.com/elpais/2014/10/01/planeta_futuro/1412158923_770758.html [5.11.2017]

114 http://www.lavanguardia.com/politica/20120716/54325952700/trias-china-barcelona-smartcity.html [4.11.2017]

115 http://e-noticies.es/trias-busca-inversiones-en-china-66207.html [5.11.2017], https://www.elconfidencialautonomico.com/cataluna/Xavier-Trias-Barcelona-China-Europa_0_1868813107.html [5.11.2017]

116 http://www.lavanguardia.com/economia/20130512/54374017294/trias-eeuu-promocionar-barcelona.html [5.11.2017], http://www.elperiodico.com/es/barcelona/20140722/el-sueno-que-no-cuaja-3401013 [5.11.2017]

117 http://www.lavanguardia.com/mon-barcelona/20121113/54355154248/se-signa-un-acord-decooperacio-entre-les-ciutats-de-barcelona-i-seul.html [5.11.2017]

118 http://www.domonetio.com/en_US/blog/news-1/post/barcelona-y-cisco-se-alian-para-convertir-la-ciudad-en-un-modelo-de-referencia-urbana-sostenible-3002 [5.11.2017], http://www.lavanguardia.com/vida/20120301/54262371354/barcelona-sella-con-cisco-despegueproyectos-para-ser-referente-de-smart-city.html [5.11.2017]

119 https://newsroom.cisco.com/press-release-content?articleId=680179 [6.11.2017]

120 http://www.lavanguardia.com/vida/20120214/54254279736/schneider-barcelona-smartcity.htm [5.11.2017]

121 https://customers.microsoft.com/en-in/story/barcelona-realizes-vision-of-innovative-city-governan2 [6.11.2017]

Barcelona in marketing its smart city initiatives[122]; in this year, the *University of Barcelona* and *Telefónica* jointly created a professorship at the university for research into novel technologies and related teaching to facilitate the collaboration with excellent scholars from around the world to foster the development of smart city[123]; also in 2014, the municipality signed an agreement with *Endesa* to implement smart city policies in the realm of energy provision with a focus on efficiency[124]; in 2015, another agreement was met with *Deloitte* on replicating the strategic governance model of the smart city projects of Barcelona in other cities[125].

To this added the linking of Barcelona smart city ambitions with the goals of international institutions. Thus, the *World Bank* and the municipality of Barcelona agreed in 2013 to collaborate on smart city standards and the identification of technologies that might help other cities, especially in developing countries[126]. Moreover, the Trias government influenced the urban agenda of the UN-HABITAT III process[127], which only was shifted by the new mayor Ada Colau from smart city to right to the city shortly before the respective conference took place in Barcelona. The growing international recognition of Barcelona's attempts to infuse more technology into the city, which basically was the understanding of smart city within the Trias government, was also signaled by the 2014 invitations of Trias to the *World Economic Forum* in Davos and of the municipality of Barcelona to the *International Consumer Electrics Show* in Las Vegas as the only city, according to Vives[128], and the listing of Trias as number 46 among 50 of "The World's Greatest Leaders" identified by a media group of CNN, *Fortune*, and *Money* called CNN-*Money*, based on his promotion of smart city and close contacts with the New York mayor and major digital technology firms, including agreements of the municipality with *Cisco* and *Microsoft*[129]. In 2014, Barcelona was awared innovation capital of Europe[130] and won the *City Climate Leadership Award* for his City-OS system, handed over by *Siemens* and *C40 Cities*, as well as a price within the "Major Challenge" competition organized by *Bloomberg*[131]. In 2015, the city was ranked first as "Global Smart City" by *Juniper Research*[132]. In line with the offensive attempt to position Barcelona as a

122 http://www.lavanguardia.com/local/barcelona/20141121/54419570275/barcelona-y-adobeimpulsan-un-laboratorio-de-marketing-digital-para-ciudades-inteligentes.html [5.11.2017]

123 http://www.lavanguardia.com/vida/20141212/54421353232/universidad-de-barcelona-y-telefonicacrean-la-catedra-smart-cities.html [5.11.2017]

124 http://www.lavanguardia.com/local/barcelones-nord/20140903/54415636582/endesa-i-lajuntament-de-barcelona-signen-un-acord-de-col-laboracio-per-impulsar-un-nou-model.htm [6.11.2017]

125 http://www.lavanguardia.com/20150305/54428744874/alianza-estrategica-con-deloitte-para-lasmart-city.html [6.11.2017]

126 http://www.lavanguardia.com/tecnologia/20130516/54373556733/banco-mundial-barcelona-smartcity.html [5.11.2017]

127 https://elpais.com/ccaa/2016/04/04/catalunya/1459805531_194388.html [5.11.2017]

128 http://www.lavanguardia.com/politica/20140119/54400271040/barcelona-asciende-al-cuarto-lugaren-la-clasificacion-de-smart-city-europeas.html [5.11.2017]

129 http://www.elperiodico.com/es/barcelona/20140321/trias-se-situa-en-la-clasificacion-de-los-50-lideres-mas-influyentes-3208377 [5.11.2017]

130 https://elpais.com/ccaa/2014/03/11/catalunya/1394566393_942463.htm [6.11.2017]

131 https://elpais.com/ccaa/2014/09/23/catalunya/1411463433_769874.htm [6.11.2017]

132 https://elpais.com/elpais/2014/10/01/planeta_futuro/1412158923_770758.html [5.11.2017], https://www.juniperresearch.com/press/press-releases/barcelona-named-global-smart-city-2015 [5.11.2017]

leading smart city globally, the Trias government also initiated an international institution called the *City Protocol Society*, which had been announced already in 2011[133] and was officially launched at the SCWEC in Barcelona in 2012[134]. The multiple connections that were established under the Trias government with corporations, research and educational facilities, and international institutions are also highlighted by Ferrer (2017) as integral to the smart city conception at that time (cf. Gascó et al. 2016). This also corresponds with the broader vision of the *Barcelona Metropolitan Strategic Plan* to develop Barcelona as a global metropolis taking on international leadership (PEMB 2010).

Besides the urban renewal and development projects of Vives cited above, several further smart city projects were initiated soon after the Trias government had taken office. In 2012, the plan to renew the urban light system was pushed forward –in fact, the PP had made this a condition of its support of the 2012 budget[135]. Another example for the activity in smart city issues was the installation of a new system of e-bikes, which were provided with iphones. This was a project managed by the private agency *World Experience Barcelona* and the firm *Smart eBike*, a subsidiary of *Mercedes Benz*[136]. In 2012, a *Project Management Office* (PMO) in charge of supporting the activities of the various departments of *Hábitat Urbano* connected to smart city was created, the direction of which was entrusted to *Doxa Consulting*, with a staff from both the company and the municipality. A high number of meetings linked the new office to business actors and city executive officials. The office collected and reviewed a large number of projects in view of the smart city strategy, which had been developed before the strategy had been developed (Mora/Bolici 2016). According to Mora/Bolici (2016), the PMO acted as a central coordination hub for any smart city project proposal from 2012 onwards, with a special role for the *Municipal Institute of Information Technology* (IMI). Private investment was regarded as the backbone of the development of a smart city (Mora/Bolici 2016).

During the *Smart City Expo & World Congress* (SCEWC) in 2013[137], the municipality and its agency *Barcelona Activa* presented a *Smart City Tour* to illustrate the progress of Barcelona on the road towards a smart city. However, in the document no longer available on the municipality websites (AdB 2013b), several of the 15 initiatives that were presented had a longer or even much longer history, for example the *Solar Thermal Ordinance*, the *Forum Solar Photovoltaic Installation*, the district heating and colling system DISTRICLIMA, the automated waste collection system, or the e-bike system BICING. Likewise, the idea of energy autosufficient superblocks

133 http://www.lavanguardia.com/vida/20111129/54239526718/trias-barcelona-tendra-smart-citycampus-definir-ciudades-inteligentes-del-futuro.html [5.11.2017]

134 http://cityprotocol.org/ [5.11.2017]

135 http://www.lavanguardia.com/local/barcelona/20120719/54327135607/mejora-alumbradobarcelona.htm [4.11.2017]

136 http://www.lavanguardia.com/vida/20120726/54329330612/barcelona-tendra-un-servicio-turisticode-bicis-electricas-guiadas-con-iphone.html [4.11.2010]

137 http://www.lavanguardia.com/tecnologia/internet/smart-city-expo/20131127/54394562752/smartcity-tour-barcelona.html [5.11.2017]

promoted by Vives as part of smart city was rather a modernized version of a long-standing concept in Barcelonian housing policies under socialist dominance[138]. One of the most original and palpable smart city projects that the Trias government effected was the City-OS system to integrate different data streams into a management platform. It had been announced in principle already in 2011[139] and was finally contracted to a consortium of *Cellnex Telecom*, *Accenture* and ENGIE in 2015 under the new mayor Ada Colau. It was seen as a cornerstone of the *City Protocol Society*[140], which in fact has fallen into oblivion under the new government formed by Barcelona en Comú (interviewee no. 32).

Overall, the smart city strategy was firmly steered by the government in Barcelona, and citizens' participation as political subjects hardly played a role (see also Bakici et al. 2013, Gascó et al. 2016, Mora/Bolici 2016; cf. Eizaguirre et al. 2017) –some participatory aspects on the level of project development or implementation, or regarding the use of top-down created infrastructures notwithstanding (Capdevila/Zarlenga 2015), which, however, also generated citizens' opposition on some occasions (March/Ribera-Fumaz 2014a). The character of the smart city strategy of Barcelona under the government of Xavier Trias will be further analyzed in the next section with regard to one of the very few extended documents issued, which is a slide show describing the strategy (AdB 2013a), since AdB (2013b) is almost solely a list of single projects that also are mentioned in part in AdB (2013a). The development of the strategy is described by Mora/Bolici (2016), who mention the influence of *Cisco* and *Doxa Consulting* on it (cf. Ferrer 2017). It was primarily elaborated in the *Directorate of ICT Strategy and Smart City* within *Hábitat Urbano* (Mora/Bolici 2016).

Analyzing the discourse of the smart city strategy: the rhetorical content

Visual content analysis

Corresponding to the format of a slide show, the document includes a great number of pictures. In terms of space, these are dominated rather equally by company and conference logos, technological devices, organigrams, flow charts and maps. In addition, abstract representations of biophysical processes are shown, complemented with pictures of city sites and people. On the first slide, two images of mass gatherings are linked to "The city of people" by red arrows. Images of people are nearly missing on the following slides. The only gathering shown in addition to the front page is of a meeting of the *City Protocol Society* under the rubrique of "International Collaboration".

The concept of smart city is visualized by a so called anatomy of smart city. In this image that belongs to the genre of the scientific diagram, the landscape is placed on top, while different layers

138 http://www.elperiodico.com/es/barcelona/20140226/ciu-da-un-toque-smart-city-a-lassupermanzanas-3140142 [5.11.2017]
139 https://elpais.com/ccaa/2016/10/13/catalunya/1476380217_616930.htm [5.11.2017]
140 https://elpais.com/ccaa/2016/10/13/catalunya/1476380217_616930.html [5.11.2017]

of infrastructures, the built environment, public space, functions, citizens, information flows and performance are visualized as sub-layers as they were part of the soil of the landscape. While all layers are internally structured, the layer called “citizens, organizations, business, government” consists of a homogenous mass of points ordered as a grid, with lines surrounding some of the points, possibly indicating organizations. ICT is represented in line with socio-ecological cycles called “water, matter, energy, mobility, nature”, all of which resemble tree-like structures.

General properties of the document

The slide show was probably created to present the Barcelona smart city strategy to an international audience, since “Helsinki” is indicated as the location of the publication. It is a hybrid between the genre of advertisement, policy document and scientific report. The complexity and heterogeneity of the presentation weakens logical coherence and structure. It rather appears as an impressionist account of multifold, internationally renowned, business and technology related, promising, and scientifically founded activities of the city government and administration.

Reconstruction of the phenomenon structure

The narrative does not include an explicit reference to problems that shall be solved by smart city. It rather starts from framing technology as improving citizens’ welfare and quality of life and enabling economic progress. The goals to make urban mobility more efficient and sustainable and to increase environmental sustainability in general are mentioned twice among a list of eight goals on the first slide, and more prominently feature in the definition of the Barcelona smart city on the second slide, including the following properties: (1) productive neighbourhoods, (2) at human speed that are (3) interconnected, (4) eco-efficient, (5) re-naturalized, (6) energetically self-sufficient, (7) regenerated at zero emissions, and that are located (8) inside a high speed interconnected Metropolitan Area. In this context, sustainable development, the green economy, and nature are mentioned, too, followed by the objective of a sustainable transformation of cities in reference to the *City Protocol Society*. General slogans concerning smart city are “Many slow cities inside the same smart city” and “Manage citizens’ needs more efficiently”.

The institutional embedding of the smart city Barcelona in the EU stragegy 2020 is emphasized and the organization of different municipal departments as an organizational unit called *Urban Habitat Area* is explained. The institutional embedding encompasses participation in EU projects and a key role in the *Smart City Protocol*. A so called MESSI strategy is highlighted, which addresses (1) mobility, (2) e-government, (3) smart city, (4) systems of information and innovation. Smart city activities revolve around three axes: (1) international promotion, (2) international collaboration, (3) local projects. International awards and rankings of the smart city Barcelona are mentioned.

Particular emphasis is put on the international recognition of Barcelona as illustrated by international organizations' offices, awards and business links of Barcelona to other regions.

Strategically, cooperation and synergies are highlighted. Concretely, public private partnerships are indicated and a thematic super-management through a special smart city organization. Living Labs shall ensure the development of a community of citizens and developers. In terms of measures, a host of projects that are classified as either transversal or vertical is listed, each with one technical goal specified in precise quantitative terms. Most of these projects are represented on one slide each. These project slides constitute the major share of the slide show.

It is emphasized that urban resilience has to be increased. Fab Labs, citizens' sensors and open government are specifically highlighted. Smart government is understood as being part of smart city. Furthermore, smart city is framed as promoting industrial development of innovative products. In this regard, the cooperation with universities is stressed, with the flagship project of the smart city campus in the 22@ district. Local pilots shall be supported in view of global markets.

Synthesis

Given the fact that the slide show was the only encompassing smart city policy document of the (now historical) smart city Barcelona under Xavier Trias, it appears to be poorly conceived. The core of AdB (2013b), which was the only officially issued smart city policy document of Barcelona, is a list of technological projects. A logical argumentation unfolding from the diagnosis of a problem to the identification of conditions for its solution, possible critical considerations, and measures to implement goals in view of expected outcomes is missing. Rather, the document impressionistically combines different slogans enhanced by images associated with high symbolic capital, especially by company, international institutions' and conference logos. The key category is international recognition. Technological innovation is framed as a means to reach this end. Concrete economic benefits are mentioned, but do not take a prominent place. The economic emphasis is rather expressed by the large number of company logos and the business related project list. Against this backdrop, the vision that is stated to guide smart city Barcelona relating to self-sufficient and decelerated neighborhoods is isolated within the slide show. It remains unclear how the projects of companies relate to the stated vision. The actors apparant in the document do not represent civil society although "the people" are emphasized as the main beneficiaries in the first slide.

Continuity and change

Antoni Vives already presented his urban development plans –instead of Xavier Trias, interestingly– in view of the upcoming elections in front of a prestigious audience (La Vanguardia 2014), but the 2015 electoral campaign would bear the imprints of the development of urban struggles after the financial crisis of 2008 that had shaken the at least passive consensus on the direction of change the city of Barcelona should take. Thus, within the electoral campaign, the election was framed as a decision between two antagonistic urban development models, for instance in *El Periódico*: "On the one hand, the model of Barcelona en Comú, led by Ada Colau, who lays emphasis on social policies and barrio initiatives; on the other hand, the model of CiU, embodied by the current mayor Xavier Trias, who supports a postindustrial model centered on tourism and grand events"[141]. Already during the electoral campaign, Barcelona en Comú introduced the notion of technological sovereignty and the demand to better link the great technology fairs of the city with a local network of enterprises that focus on free software, while Trias indirectly coupled a part of his electoral promises to previous smart city policies, for instance suggesting the use of open government to increase transparency –in contrast to the combat of corruption, with which Colau associated the Trias government, by a special agency[142]. Overall, however, the issue of technological development in itself was not a major cleveage in the campaign and Colau was not opposed to the development of technology, clarifying her support for the *Mobile World Congress* and other such events, especially when they are relevant for strategic issues such as technology or medicine. However, Colau stressed that these events must be used to develop local industry, provide high quality jobs the whole year and generate technologies that are accessible for all, accusing Trias to substitute policy with anglicisms and of treating citizens as plight and threat – against which she placed the demand to open spaces for participation and to create a new model of government[143]. Trias was defending smart city as the main avenue of the city to create jobs and that only he could secure the technology orientation of the development the city had taken during the past years[144]. The main difference between the electoral programs of the two candidates with regard to technology and the importance of its development for Barcelona was the role of technology within an overall political perspective. For *Barcelona en Comú*, a participatory democracy much connected with social movements revolving around social issues was the priority (Zechner 2015; see for the indignados movement in Barcelona Asara 2016, Eizaguirre et al. 2017; in general:

141 http://www.eldiario.es/catalunya/politica/Barcelona-Trias-Colau-programas-puntos_0_389511740.html [6.11.2017], see also, e.g., http://www.elperiodico.com/es/politica/20150523/voto-elecciones-municipales-alcalde-barcelona-4212065 [6.11.2017], http://www.elperiodico.com/es/barcelona/20150507/trias-propone-buses-electricos-en-vez-del-tranvia-en-la-diagonal-4166612 [6.11.2017] or http://www.elperiodico.com/es/politica/20150524/las-ocho-promesas-de-colau-4214799 [6.11.2017]

142 http://www.eldiario.es/catalunya/politica/Barcelona-Trias-Colau-programas-puntos_0_389511740.html [6.11.2017], http://www.elperiodico.com/es/barcelona/20150507/trias-propone-buses-electricos-en-vez-del-tranvia-en-la-diagonal-4166612 [6.11.2017]

143 http://www.lavanguardia.com/local/barcelona/20150511/54431132978/entrevista-ada-colauelecciones-municipales-2015.html [6.11.2017]

144 http://www.lavanguardia.com/local/barcelona/20150518/54431696294/elecciones-municipalestrias-critica-insulto-facil-ada-colau-cup.html [6.11.2017]

Aragón et al. 2017; see also García-Carretero/Pérez-Altable 2017), in stark contrast to the CiU and Xavier Trias. For instance, the party program was developed in extensive neighborhood consultations (Zechner 2015, Kühberger 2017, cf. Eizaguirre et al. 2017).

This shift in context became visible on several occasions soon after the Colau government had taken office. Thus, at the inauguration of the SCEWC in November 2015, Colau emphasized the importance of public leadership and the democratically defined strategic priorities of cities for guiding technological development[145]. At the event, the newly elected government stated that smart city was no longer its priority. Agustí Colom, Councilor of Employment, Enterprise and Tourism, criticized a shop-window approach to urban development, which had been associated with Trias in the media and by social protests[146]: "Smart city is not only about putting sensors into the city. It is to ask why we need these sensors. Our political approach is not to convert Barcelona into a shop-window for the big corporations to display their products without being clear how technology may help to solve urban problems, as a tool and not as an imposition that invades the life of the people" [147]. Moreover, institutional changes were announced: the responsibility for the digital fabricators was moved from the *Hábitat Urbano* to the Economy department and it was claimed that they will be turned from luxury to productive uses in connection with local neighborhoods; the *Institut Municipal d'Informàtica* was deprived of its steering role for smart city, while Colom expressed his support for the public-private *Barcelona Institute of Technology*, though the leading role should be with the city, in the end, as it was argued. A representative of smart city projects at *Cisco* emphasized that all projects continue despite the change of government[148].

At the presentation of the income of *Fira de Barcelona* in December of the same year, which was the second best figure in the history of the organization with an operating profit of 12.5 mio. EUR, Colau emphasized the industrial history of Barcelona and stressed that competitiveness must be strengthened to recover industry. This, however, must not be achieved by lowering wages but by fostering innovation and technology, according to Colau, who also demanded to use economic growth to improve labor conditions and make an end to precarity. Moreover, she suggested an orientation of *Fira* towards the social and solidarity economy. The repositioning of *Fira* –and of its many technology related congress formats including SCEWC by extension– that Colau demanded on this occasion was accompanied by statements of the Regional Councilor of Enterprise and Employment, Felip Puig, who said that private business is leading and the public sector is providing impulses for the success of *Fira*, while Miquel Valls, president of the *Chamber of Commerce of Barcelona*, emphasized that despite political changes, a consensus was reached concerning *Fira*.

145 https://elpais.com/ccaa/2015/11/17/catalunya/1447798318_478847.html [6.11.2017]

146 e.g., http://ediciones.la22.org/municipales2015/2015/05/23/xavier-trias-el-politico-veterano/ [6.11.2017], and see above

147 http://www.elperiodico.com/es/barcelona/20151116/barcelona-inicia-el-smart-city-exporeorientando-su-estrategia-4677666 [6.11.2017]

148 http://www.elperiodico.com/es/barcelona/20151116/barcelona-inicia-el-smart-city-exporeorientando-su-estrategia-4677666 [6.11.2017]

Barcelona en Comú further on shifted the discourse of the SCEWC towards more citizen oriented and rights based approaches to technology and urban development. In April 2016, Colau vetoed a UN conference planned by Trias to focus on smart cities, which was one of the preparatory sessions for the big UN-HABITAT III conference in Quito later that year, and redirected its topic towards public space and right to the city. At the session, the concern of Colau was supported by Joan Clos, former mayor of Barcelona, and director of the HABITAT agency, according to press reports[149]. The 6th SCEWC speakers constellation illustrated the attempt to recontextualize technology development in urban environments that the Trias government had fostered by the new government. The new keywords were commons, circular economy, ethical Big Data and municipal collaboration[150], the overall intention of which was reflected in the name of the conference: "Cities for Citizens". According to the press, the conference format corresponded to this claim and resembled an assembly[151]. At the congress, the government also presented its new digital city plan[152] framing it as being "[b]eyond the smart city"[153], centered on the notion of technological sovereignty and the demand to use technology as a tool for democratization: "It's the start of a participatory process for the common construction of public policies on technological innovation in the city, based on real issues perceived by sectors of the public or groups affected by those policies"[154]. In a press statement drawing a balance of *Fira* results in 2016, which increased in comparison with the previous year to 20 mio. EUR operating profit, Colau restated that "by themselves, economic activities will not solve problems", highlighting again the goal to reverse deindustrialization and that *Fira* plays an essential role in this view[155]. Although *El País*, for example, reported the new orientation of the SCEWC and the *Fira* in the context of the new government, not all press reports put much emphasis on this shift. Since then, the municipality has presented its digital city perspective in different fora, for instance at the *Fira* congresses *Internet of Things* and the *In(3D)ustry* fair in 2017[156].

Together with the *Fira* and its strong technology orientation, the Colau government also continued with the lighthouse project of the previous executive, the City-OS[157]. Likewise, the district of 22@ is one of the centers of the urban development interest of *Barcelona en Comú* and is framed in the

149 https://elpais.com/ccaa/2016/04/04/catalunya/1459805531_194388.htm [6.11.2017]
150 https://elpais.com/economia/2016/11/04/actualidad/1478273834_049837.html [6.11.2017]
151 https://elpais.com/ccaa/2016/11/15/catalunya/1479219780_526859.html [6.11.2017]
152 http://www.elperiodico.com/es/mas-barcelona/20161008/barcelona-una-ciudad-mas-digital-mas-abierta-mas-democratica-5474710 [6.11.2017]
153 http://ajuntament.barcelona.cat/digital/en/blog/beyond-the-smart-city [6.11.2017]
154 http://ajuntament.barcelona.cat/digital/en/blog/beyond-the-smart-city [6.11.2017]
155 https://elpais.com/economia/2016/12/16/actualidad/1481912385_875767.html [6.11.2017]
156 http://ajuntament.barcelona.cat/digital/en/blog/barcelona-productive-open-and-democratic-city [6.11.2017]
157 https://elpais.com/ccaa/2016/10/13/catalunya/1476380217_616930.html [6.11.2017]

conventional language of Barcelona as the capital of innovation[158]. One may in fact understand the original idea of 22@ as embedding smart city in the sense of the Trias government (i.e., as a narrow technological agenda) in a wider concept of urban renewal that is integrating the knowledge economy with reclaiming public space and a concern for environmentally friendly mobility policies, more green space and a certain share of public housing. Accordingly, the Colau government has started to re-emphasize 22@ after a relative neglect unter the Trias government, with a broader inclusion of different stakeholders and the citizenry in the development process (interviewee no. 27). Continuity dominates over rupture in the overall handling of technology issues in the city except the shift of political focus to social issues including the regulation of tourism. Thus, the municipality has installed Francesca Bria as chief technology officer and digital commissioner, who reviewed the functionality of smart city implementations of the previous government and makes proposals to develop it further[159]. Bria has also reformed the *Instituto Municipal de Informática* (IMI) (interviewee no. 26). The scattered information of the technology strategy of the Trias government, which was in fact very much based on projects with an assumed international promotional value, was replaced by the current government with a *Roadmap Towards Technological Sovereignty*. Francesca Bria has worked out the digital city strategy[160] recently, elaborating the citizen centered approach to what formerly had been the technological core of smart city in Barcelona (Cañigueral 2017, cf. Kühberger 2017). The work of the government towards what it calls technological sovereignty includes a strong concern with data privacy and security and the retrenchment of corporate control of big data within a larger context of deprivatization. This approach is partly supported through funding by EU projects[161] (Cañigueral 2017). Smart city as a label is not always rejected and is partly strategically used by the current executive in order to influence wider EU city policies (interviewee no. 26) as it is the case especially in Vienna, too. But Bria claims that "[w]e reversed the paradigm completely" and that technology development is now based on citizen's needs and policy goals[162] (cf. interviewees no. 26, 31, 32). At another occasion, Francesca Bria demanded to replace smart city by the notion of a democratic city[163]. In line with this ambiguity, a commentator in *La Vanguardia* criticized an unclear stance of the government towards smart city as a concept and a terminology, emphasizing that corporations create jobs and that wrong priorities may endanger investments[164]. Indeed, the Colau government appears to have shifted the stance of the city executive towards high technology. While under the Trias government, the city had been rather offered as a test site for the projects of transnational corporations, the city executive now claims to first assess real needs and then to decide upon whether technologies are needed, and

158 http://www.lavanguardia.com/local/barcelona/20170601/423130205016/barcelona-crea-una-comision-para-reimpulsar-el-22-con-vecinos-empresas-y-universidades.html [7.11.2017]

159 https://www.ft.com/content/6d2fe2a8-722c-11e7-93ff-99f383b09ff9 [6.11.2017]

160 http://ajuntament.barcelona.cat/digital/en [29.12.2017]

161 e.g., https://www.decodeproject.eu/ [29.12.2017]

162 https://www.ft.com/content/6d2fe2a8-722c-11e7-93ff-99f383b09ff9 [6.11.2017]; see also Cañigueral (2017)

163 https://www.ara.cat/economia/Colau-Schneider-participa-Cisco-smart-cities-centre-alier_0_1654034753.html [6.11.2017]

164 http://www.lavanguardia.com/local/barcelona/20161105/411592694531/una-ciudad-dondeinvertir.html [6.11.2017]

which these are, putting the emphasis on real social inclusion (cf. interviewee no. 32). This is done in view of digital empowerment as well as open data and access, where open data do not stop at offering data, but include a useable form of data for diverse actors. This policy is connected to an increased concern for data privacy and ownership, so that the public administration manages public data instead of private companies. It also includes a concern for closing the digital gap. To enhance the digital competencies of disadvantaged groups is seen as a second alphabetization (interviewees no. 26, 31, 32). The municipality's economic incubator, labor market and economic promotion agency *Barcelona Activa*[165] (see for general information: Clark et al. 2010) is actively targeting neighborhoods with low access to digital information, including a concern for community development (interviewee no. 32). Environmental concerns seem to be taken more seriously by *Barcelona en Comú* than under the Trias government. One example is the superbloc development, which involves substantial challenges to change mobility behaviors, but is no longer associated with smart city (cf. interviewee no. 26, Cañigueral 2017).

With respect to the perspective of developing digital fabrication labs, the Colau government may be seen as being even more technology oriented than the previous one, given recent attention to the issue in 2017[166]. In correspondence with the *Roadmap*, Councilor Gerardo Pisarello expressed the perspective of "an economy that's based on re-industrialization 4.0, an economy rooted in the territory, giving opportunities to new manufacturing linked to new technologies, and that has the participation of the people and neighbourhoods, such as Poblenou"[167]. A statement that is very close or even identical with the core idea of former chief architect Vicente Guallart of slow and productive neighborhoods in a hyperconnected city. The difference however is that the current government has taken a more concrete approach to take steps into this direction. Likewise, a report on *Cisco*'s *Technology News Site* sees more continuity than change in the attitude of the Colau government towards smart city technologies, quoting Paco Rodríguez Jimenez, CEO of the *Instituto Municipal de Informática*: "We are building on our smart city successes to date in order to deal with some of the most pressing issues facing our citizenship"[168]. However, the Colau government has been harshly criticized by the opposition to have proven incompetent with regard to smart city policies[169]. Moreover, the statement of *Fira* councilor Enrique Lacalle warning to not politicize *Fira* can be interpreted as opposition to the attempt of a recontextualization of technological policies in Barcelona[170], which Colau however did not only voiced in view of the SCEWC, but also

165 http://www.barcelonactiva.cat [2.1.2017]

166 http://fablabbcn.org/news/2017/02/14/adacolau.html [6.11.2017]

167 https://blog.fab.city/made-again-documentary-the-silicon-valley-of-sustainability-in-barcelona-d23ac4ab422c 7 July 2017 [6.11.2017]

168 https://newsroom.cisco.com/feature-content?type=webcontent&articleId=1756837 [6.11.2017]

169 http://www.esquerrabcn.cat/noticia/8121/bosch-el-govern-colau-no-nomes-es-incompetent-en-la-gestio-sino-que-tambe-menteix [6.11.2017], http://www.lavanguardia.com/local/barcelona/20160913/41279880092/ciu-erc-colau-aclare-modelo-ciudad-inteligente-barcelona.html [6.11.2017]

170 http://www.lavanguardia.com/politica/20170412/421646885846/lacalle-pide-no-politizar-fira-debarcelona-y-preservar-su-independencia.html [6.11.2017]

targeting the MWC[171]. In fact, *Schneider* abandoned the plan to invest into the *Smart City Campus* initiated by the Trias government. While the Colau government claimed this was due to a shift in the company policy, *Schneider* stated the lack of clarity about the government position on smart city and lack of trust in financial matters as reasons for retreat. *Cisco*, however, kept to the plan, while Colau emphasized her support for technological development insofar as it fits to city policies[172]. The prime goal of the Colau government in this regard is to diversify economic relations to better include small and medium enterprises, and to exert public leadership, i.e., to collaborate in principle with any corporation that is willing to support government policies (interviewee no. 26). A further issue of conflict appeared with regard to the *iWater* congress held by *Fira*, which is closely connected to the privatization agenda *Barcelona en Comú* set out to oppose. While Colau avoided to be associated with the congress, CUP was openly demanding the recommunalization of water and criticized *Barcelona en Comú* for its lack of action within *Fira*[173].

Modernizing long term urban development patterns

The description of the policy process of smart city in Barcelona between 2011 and 2015 has so far identified a central power constellation of actors revolving around the issue of city branding and making it functional for income and profit generation in tourism, urban renewal projects, and the development of technology and services. In that period, the powerful private-public partnership organization of *Fira de Barcelona* was the focal point of a condensation of social forces that combined global business interests with the strategic issues of public bodies on the municipal, provincial and national level. Besides the *Smart City Expo & World Congress* and several technology oriented congress events with related topics, the *Fira* organizes the *Mobile World Congress*, which accounts usually for about 40% of its total income and is increasingly internationalizing its activities. The link to the high technology sector is especially close because Barcelona is also *Mobile World Capital*[174] –an organization consisting of the *Spanish Ministry of Energy, Tourism, and the Digital Agenda*, the provincial government, the municipality of Barcelona, the *Fira* and GSMA, which is the interest group of global mobile operators. The activities of *Fira* do not only promote Barcelona's image as a dynamic, modern and globally connected city, but is an economic heavyweight in its own right, attracting large numbers of conference visitors each year (Gelderloos 2015).

171 https://cronicaglobal.elespanol.com/business/colau-reivindica-influencia-agenda-mwc_68156_102.html [7.11.2017]

172 https://www.ara.cat/economia/Smart-Colau-insisteix-Schneider-lempresa_0_1655234530.html [6.11.2017]; see also: http://www.elnacional.cat/es/bcn-hub/barcelona-cisco-campus-tecnologico-ca-alier_116907_102.html [6.11.2017], https://www.ara.cat/economia/Colau-Schneider-participa-Cisco-smart-cities-centre-alier_0_1654034753.html [6.11.2017], https://www.ara.cat/economia/Colau-centre-Cisco-Schneider-Barcelona_0_1649835035.html [6.11.2017]

173 http://www.lavanguardia.com/local/barcelona/20161115/411888883290/colau-se-salta-congresoiwater-gestion-del-agua.html [6.11.2017]

174 http://mobileworldcapital.com/transparency-portal/institutional-organisational-information/ [6.11.2017]

These events also serve to strengthen the international position of Barcelona as a city shaping international debates and acting in collaboration with business partners and cities around the world. With regard to smart city, this specific function gains an added value, because the city of Barcelona serves as a co-producer, a test site, and a promotional venue for smart city technologies. Such technologies may be co-produced in public-private partnerships (such as the City-OS together with *Cisco*), and then marketed (such as the specific smart city project management approach developed in Barcelona, together with *Deloitte*). The reputation of Barcelona as a co-producer as well as an investment site for smart technologies is enhanced by implementing these in Barcelona. Organizing smart city tours for visitors as by the Trias government served this purpose. Businesses present at *Fira* sold their smart technologies in a city that embodied the imaginary of a smart city as an additional purchase incentive. The kernel of this model of urban development is sharply condensed in a press release by Trias on the occasion of the inauguration of the *Mobile World Capital* Barcelona in 2011: "Becoming the Mobile World Capital was a strategic bid for Barcelona, and consolidates our leadership as a benchmark city for new technologies. This will give a significant boost to the image of our city brand associated with a sector, that of mobile communications, which will experience strong growth in the next few years. Barcelona is reaping the rewards of the serious, professional work of different institutions with the involvement of many of the city's companies and entities. Now, Barcelona will be the center of a new model of international event linked to economic growth, industrial development and the creation of new jobs vital to the future of our economy" [175]. This urban development model did not require an elaborate, coherent, and far reaching smart city strategy, but could be implemented by pursuing the characteristic project-based type of urban development of the so called Barcelona model. Indeed, the urban plan of Barcelona is outdated. The *Metropolitan Plan of Barcelona* is from 1976 (Del Romero/Lanzano 2016), whereas a more loosely conceived strategic thinking in terms of guidelines elaborated by multiple stakeholders may have become more important over the last decades (see already Marshall 2000; Eizaguirre et al. 2017, cf. PEMB 2010), in a context of an enhanced orientation of the executive towards New Public Management (Gascó et al. 2016), and a typically strong top-down strategic planning by the government according to the so called Barcelona model of producing urban competitiveness (Charnock et al. 2014, cf. Eizaguirre et al. 2017). In any case, to suggest a certain imaginary was sufficient for the smart city policy under Trias. And the lack of any document coherently describing what smart city development has actually meant for the Trias government is significant (also see PwC 2014 for the connection of smart city under the lens of the Trias government with place-branding for tourism and internationalized business strategies; and for in-depth analytic views on the crucial importance of tourism, see Charnock et al. 2014, Gelderloos 2015). Given that place-branding (see specifically for Barcelona: Sutton 2014) was structurally decisive in Barcelona for speculative real estate development, which in Barcelona was framed as being grounded in a knowledge-based economy since the 1990s and tightly connected to the urban

175 http://mobileworldcapital.com/prensa-detall/41/ [7.11.2017]

renewal area 22@ established in 2000 (Charnock et al. 2014, Charnock/Ribera-Fumaz 2014, Gelderloos 2015) –which was again prominently featured in the smart city discourse– the overly enthusiastic and boom-like character of smart city can also be understood as being fuelled by a concern for property values of office space. Gelderloos (2015) has argued that Barcelona does not directly attempt to copy the San Francisco model of highly competitive IT production, but rather to carve out its internationalized niche of a work/play model of attracting creative workers by playing on its cultural capital together with its precarity advantage, "complementing rather than replacing the existing giants" of IT technologies (Gelderloos 2015, online; also see Casellas/Pallares-Barbera 2009).

However, this type of development is actually characteristic of a longer run reliance of Barcelona on the service industry (Charnock et al. 2014), with a relatively high degree of foreign capital investment (Sánchez 1992; see also, e.g., AdB 2014), and a specific type of urban development driven by mega-projects. The most prominent of these were the Olympic Games in 1992, which have laid the infrastructural groundwork of the smart city concept promoted by Trias, i.e., a 500 kilometer-long fiber-optic cable network[176], and which changed the identity of the city towards greater self-esteem (cf. interviewee no. 27), while the organization of the Olympic Games also went along with a more managerial style of urban development (Marshall 2000, Monclús 2003, Blakely 2010, Sutton 2014, Gelderloos 2015, Eizaguirre et al. 2017), including an emphasis on image development (Balibrea 2001, Smith 2005). Indeed, Josep-Ramon Ferrer, former director of Barcelona's *Smart City Program*, explicitly relates the smart city model under the Trias government to the role of the 1992 Olympic Games for urban development (Ferrer 2017).

Given the harsh confrontation between the CiU and *Barcelona en Comú* in the municipal elections of 2015, together with the ostentative distantiation of the Colau government from the smart city plans and terminology of the predecessor raises the question whether the political change marks a new period in urban development in Barcelona. Indeed, both the discourse as well as the rules of the game in terms of city development have changed. While the Trias government constructed citizens as passive consumers even in the socially most concerned projects such as the *Vincles* app[177] (see Gascó et al. 2016 for a similar view in this regard), or as entrepreneurs, in other cases (Capdevila/Zarlenga 2015), the Colau government now constructs citizens as political subjects , who shall have a say in how technology is developed and to which purpose –as co-producers and co-administrators of policies, in fact (interviewee no. 26; cf. 27), in order to combat rampant social inequality (interviewee no. 32). This is not mere rhetoric. The implementation of this political conception of the citizen is facilitated by the social movement roots of *Barcelona en Comú* (interviewee no. 31), and goes along with material changes such as the development of a web

176 https://newsroom.cisco.com/feature-content?type=webcontent&articleId=1756837 [6.11.2017]

177 http://www.lavanguardia.com/politica/20140917/54416077526/un-proyecto-de-barcelona-gana-el-premio-de-mayors-challenge-de-bloomberg.html [7.11.2017]

platform (DECIDIM[178]) dedicated to this issue, together with regular sessions with citizens groups on various matters (Eizaguirre et al. 2017). DECIDIM is an open access program and is offered to other administrations in order to facilitate democratic participation of citizens. Currently, DECIDIM is used by many other municipalities and the program is intended to be further improved collaboratively. Furthermore, the city executive has enhanced political transparency so that citizens can track and monitor each political proposal. At the same time, innovations of the former government are strengthened if they serve the purpose of enhancing participation, e.g., shared technological working centers for social projects (interviewee no. 26). In some respects, for instance the commitment to equal opportunities, gender equality, the support for the local economy, the orientation of technology towards needs, or participation, the new government does not necessarily follow completely new directions or goals. Rather, its actions may be characterized by a stronger focus and coherence in these regards, and a greater concern for concrete implementations of measures that put rhetorical claims into practice, e.g., concerning active support of marginalized and vulnerable social groups (interviewees no. 26, 31), disfavoring, e.g., arts and culture in comparison, as it has been criticized (interviewee no. 33). Smart city, some suggest, is in this respect reformulated mainly as a smart administration that is better reacting to people's needs (interviewee no. 32, cf. 33). This interpretation includes a reflection of failures to live up to the enhanced participatory ideals of the new government (Cañigueral 2017, cf. interviewee no. 33, and discussions at the "Jornades de Democràcia Directa: Tecnologia i Democràcia"[179]).

In fact, the change in the contextualization of smart city or, to put it differently, of digital technologies for urban uses, is most visible in the regard of how citizens are framed in comparison of the two governments. This difference corresponds to the long term alternation and synchronic existence of a development regime and an empowerment regime as described by Blanco (2015; before *Barcelona en Comú* came into office; see for a similar view Eizaguirre et al. 2017), who asked how far these types of political interaction collide or may be combined in a sustainable way. Citizen participation has a long history in Barcelona and has been institutionalized since long (Blanco 2015, Eizaguirre et al. 2017). The recent cycle of crisis and protest (cf., e.g., *Plataforma de los Afectodos por la Hipoteca* since 2009[180], or *Alianza en contra de la Pobreza Energética* since 2014[181]) has overflown the institutionalized forms of citizen activism, but is not a completely new phenomenon, reaching back to the Franco era, at the least (Blanco 2015, Del Romero/Lanzano 2016, Eizaguirre et al. 2017; see for a wider perspective on Spanish cities in this regard: Martí-Costa/Tomàs 2017).

178 https://www.decidim.barcelona/ [30.12.2017]

179 http://ajuntament.barcelona.cat/participaciociutadana/ca/jornades-sobre-democracia-directa, https://www.youtube.com/watch?v=A07KRLNXhBU [28.12.2017]

180 http://afectadosporlahipoteca.com/ [31.12.2017]

181 http://pobresaenergetica.es [31.12.2017]

The hypothesis that these antagonistic policy regimes in the sense of Blanco (2015) –or policy arrangements in the sense outlined in this report (see above)– are part of a larger dialectic of Barcelonian urban development may be supported by a look back onto the discourse and institutional analysis concerning the smart and digital city concepts presented in previous chapters. Indeed, according to Hajer (1993), political coordination does not solely take place in clearly bounded arrangements, but also through loosely coordinated discourse coalitions, defined as a group of actors sharing a social construct (Hajer 1993, 45). In this conceptualization, a discourse coalition dominates a political realm by the mechanisms of discourse structuration and institutionalization. Discourse structuration means that central actors are persuaded by or forced to accept the rhetorical power of a certain discourse, and discourse institutionalization refers to the fact that a political process is conducted according to the ideas of a given discourse (Hajer 1993, 48).

In fact, *Barcelona en Comú* is reproducing crucial features of the smart city period under Trias. The basic tenet of this continuity is an emphasis on high technology. Although the Colau government has visibly downsized the importance of this policy domain, it remains materially highly important, because the promised increase in social spending crucially depends on the same set of economic actors that Trias had strengthened ties with[182]. A fact that Colau acknowledged already during her electoral campaign. The privatization agenda pursued by Trias and previous governments now proves as an effective lock-in of certain power relations that can hardly be reversed over the short run in a general way, although *Barcelona en Comú* attempts to introduce alternative economies through the notion of solidarity economy into the city discourse and pursues a re-municipalization agenda, with some limited inroads through skilled procurement policies and political pressure (Cañigueral 2017, Kühberger 2017, Eizaguirre et al. 2017; cf. interviewee no. 32).[183] Thus, a new department, the *Commissioner's Office for Cooperative, Social and Solidarity Economy*[184] was created, with a focus on the social and solidarity economy, working towards a recognition of the centrality of caring work with a feminist approach cutting transversally across departments of the municipality, and including a plan for gender justice[185] (interviewees no. 31, 32). Thus, the "how" of social innovation is emphasized over the "what" (interviewees no. 27, 31). Hence, social innovation in this understanding denotes mutual aid, de-emphasizing the focus on economic growth. The *Commissioner's Office for Cooperative, Social and Solidarity Economy* focuses its attention on neighborhoods most affected by inequality, combining conceptual work and public relations (including workshops) with support of suitable initiatives through subsidies. The budget of the Commissioner's Office is substantial, with about 24.5 million EUR per year, which mostly comes

182 https://www.transform-network.net/en/publications/yearbook/overview/article/yearbook-2017/new-municipalism-in-barcelona-a-first-attempt-at-a-balance-sheet/ [7.11.2017], see also: http://www.elperiodico.com/es/barcelona/20170523/balance-dos-anos-colau-alcaldesa-6057412 [7.11.2017]

183 See also: https://www.transform-network.net/en/publications/yearbook/overview/article/yearbook-2017/new-municipalism-in-barcelona-a-first-attempt-at-a-balance-sheet/ [29.12.2017]

184 http://ajuntament.barcelona.cat/economia-social-solidaria/en/the-comissioners-office [31.12.2017]

185 http://ajuntament.barcelona.cat/dretssocials/sites/default/files/arxius-documents/plan-para-la-justicia-de-genero-2016-2020.pdf [31.12.2017]; cf. http://governobert.bcn.cat/en/noticia/guaranteeing-gender-transversality-at-city-council [31.12.2017]

from the municipality, with additional EU funding. Half of the budget is administered by *Barcelona Activa*, acting as the agency for the social and solidarity economy. The Commissioner's Office is reaching out to other cities in order to strengthen the social and solidarity economy (interviewee no. 31). Although *Barcelona en Comú* reconnects with the period of heightened citizens' participation in urban politics in the 1980s and early 1990s, and was enabled by a decade of networking among activists and movements in the city prior to its coming into office, it does not garner city-wide support, facing severe opposition from private interests and parts of the City Council. Moreover, it rests on local social forces, cannot dispose of resources independently of other levels, and of course cannot change national laws (interviewee no. 32). For these reasons, the rights-based policies of *Barcelona en Comú*, e.g., its anti-eviction policy or its policy against energy poverty[186] are not fully effective (interviewees no. 29, 30). Substantial material changes are thus more difficult to achieve than certain cultural impacts (Eizaguirre et al. 2017), although the Colau government follows a strategic approach, i.e., also envisaging structural changes that may not be easily undone by a subsequent government with a different political attitude, namely its social and solidarity economic promotion[187], or wider participatory democracy components (interviewee no. 31, Cañigueral 2017).

Thus, with regard to high technology, one might indeed identify a discourse coalition that reaches from the actor constellation of the Trias period to *Barcelona en Comú*, which is broad enough to accomodate for the swing of the pendulum between development and empowerment regimes in the sense of Blanco (2015). Given the contradictory policies of the current government –in the context of a precarious relative majority, a difficult coalitional landscape and entrenched right-wing forces in parts of the administration[188]– one may even think about the question raised by Blanco (2015), whether a combination of both types of policy regimes or regime-like patterns could be sustained. Seen from this angle, the government of *Barcelona en Comú* even strengthens the hegemony of international capital, because it charges its ambitions to sell high technology with enhanced social concerns and a democratization project responding to widespread urban protest. Although emphasizing the instrumental relation to high technology, the almost inevitable use of this technology as it has already been implemented in the city, and the ongoing dependence on the internationalized tourist and conference sector (which has been wired to smart city imaginaries by the Trias government) may rather support an imagination according to which a large scale implementation of high technology is necessary for social progress. On the other hand, the combination of a reoriented high technology policy with a revamped social housing policy, with additional successes in combating speculation and eviction, may also tend towards a shift from speculative finance capital to a more productive capitalist orientation, which would correspond to the usual process after a financial bust. In this sense, the Trias government may have laid the

186 http://www.eldiario.es/catalunya/Ada-Colau-primeros-alcaldia-Barcelona_0_391611848.html [31.12.2017]

187 cf., e.g., http://bcn.coop/ [31.12.2017]

188 https://www.transform-network.net/en/publications/yearbook/overview/article/yearbook-2017/new-municipalism-in-barcelona-a-first-attempt-at-a-balance-sheet/ [7.11.2017]

foundations of a certain shift of local power relations with the capitalist class that the Colau government may draw to an urbanist conclusion, so to say. But this remains to be seen.

5. Smart city, urban agriculture and urban gardening

Policies related to urban agriculture and gardening are part of several discourses within policy and scientific communities in the EU context. Major EU-funded projects of applied research have dealt with the topic in different contexts: the COST-action "Urban Agriculture in Europe" (Lohrberg et al. 2015); and three 7th FP-projects, i.e. "Suburbfood"; "Foodlinks"; and "Greensurge". Lohrberg et al. (2015) define urban agriculture by its multiple purposes for urban areas and citizens, but do not draw links to smart city. In this section, we explore the significance of urban agriculture and gardening –which are not always clearly distinguishable– in relation with smart city. Besides the contribution of such a perspective for the further development of urban agriculture and gardening, it also adds to the knowledge of how civil society actors strongly affected by urban development (and especially by urban growth) perceive smart city policies in our case study cities. This is of specific interest in the case of Vienna, since the Viennese smart city framework strategy mentions urban agriculture and gardening, together with the issue of public food procurement (in the frame of the *ÖkoKauf* program) in a prominent position. Notably, all three case study cities signed the *Milan Urban Food Policy Pact*, which calls for food policies[189]. Next, the situation of urban agriculture and gardening in each of our case study cities, and its relation with smart city are briefly outlined.

5.1. Vienna

One element of the smart city vision in Vienna is the support of certain initiatives of urban agriculture and gardening, such as community gardens, self-provisioning fields and citizens' gardens to strengthen the attachment to place, social cohesion, responsibility and ecological awareness (VCA 2014a; see also MA48 2014, MA25 2014, MA18 2015). Furthermore, the municipality is an important producer of food itself through its organic farm.

The *Smart City Wien Framework Strategy* highlights the importance of high-quality food for healthy lifestyles (VCA 2014a, 74) and outlines the vision of an environmental model city being composed of "a dense network of local green and open spaces and smaller vertical and horizontal gardens". This is including "the planting of trees in the city, facade and roof gardens, new buildings with greened flat roofs and neighbourhood gardens" (VCA 2014a, 77). According to the *Smart City Wien Framework Strategy*, community gardens present a best practice example of Vienna as an environmental model city, emphasizing "[t]he great benefits of this gardening culture", that "lie in fostering social encounters and a sense of community, thereby creating the substrate for more

189 http://www.milanurbanfoodpolicypact.org/signatory-cities/ [30.12.2017]

intense commitment on behalf of the neighbourhood [...]" (VCA 2014a, 78). In a similar vein, the benefits of urban community gardens as being supported by the Vienna city government and administration are emphasized in the urban development plan STEP. In this document, urban gardening is associated with the transformation of "street space" to "public space" (VCA/MA 18 2014, 110) which, according to the STEP, is calling for the "[i]mplementation and support of projects for the (non-commercial) use and maintenance of public spaces by citizens (e.g. sidewalks, former parking lots, tree grids or larger surfaces of urban gardens" (VCA/MA 18 2014, 122), locating community gardening in the wider frame of a "city-compatible agriculture" (VCA/MA 18 2014, 135). The thematic concept of the STEP on green and open spaces (VCA 2014b) stresses the importance of "new types of gardening" under the premise to "maintain the accessibility of as many areas as possible", offering the opportunity to provide "additional functions and qualities" in "existing public space" (VCA 2014b, 77). Thus, "people's desire to produce their own food" is being reflected by "the adoption of plots which have been handed over to the citizens for self-administration" (op. cit.). Further options of green and open spaces are outlined there in terms of "wild gardening" that can be permitted "[a]t suitable places" (VCA 2014b, 80). In general, "[c]itizen initiatives, such as guerilla gardening and similar urban phenomena, are to be promoted and permitted" (VCA 2014b, 80). In addition to the support for a city-compatible agriculture for the benefit of sense of place, neighborhood attachment, social inclusion, the reviving of public space and contact with nature, as the *Smart City Wien Framework Strategy* and the city development plan STEP outline, the Vienna city government has recently signed the *Milan Urban Food Policy Pact* of 2015 (MUFPP 2015) in view of smart food as exemplified by its public procurement strategy *ÖkoKauf* (VCA 2014a, 78; see also above). Concerning the vision of Vienna as an "environmental model city", which the *Smart City Wien Framework Strategy* promotes (VCA 2014a, 76), this public procurement strategy counts as the second example of the two best practices mentioned there, together with urban community gardening, but seems not to be particularly well anchored within the overall smart city policy (cf. interviewee no. 8). Such strategies are highlighted by the policy document *Food Smart Cities for Development* (FSC4D 2015) corresponding to the *Milan Urban Food Policy Pact* of 2015. There, it is also stressed that food governance shall be improved by strengthening ties with society, as is exemplified by the urban food policy of Utrecht. The *Milan Urban Food Policy Pact* of 2015 more specifically declares that urban food policy considerations shall be a cross-sectoral topic in social, economic, and environmental policies. This, the pact states, shall be achieved by "interdepartmental and cross-sector coordination at municipal and community levels" (MUFPP 2015, 2). Among other actions, the document recommends to "[p]romote and strengthen urban and peri-urban food production and processing based on sustainable approaches and integrate urban and peri-urban agriculture into city resilience plans" (MUFPP 2015, 5). Likewise, various forms of "short food chains" are recommended, including social innovations (MUFPP 2015, 5).

Indeed, urban gardening is very prominent in Viennese media discourse and supported by the government since 2010, which led to a boom in such initiatives. Social movements often associate notions of resistance and food sovereignty to such initiatives, but some caution is warranted towards generalized claims (Exner/Schützenberger 2014). Gardening projects broadly fall into two categories: those more closely influenced and shaped by municipal agencies, and those that are without such influence (Exner/Schützenberger 2015). Both types are primarily shaped by a cultural elite connected to left alternative milieus, and favored over the much more extensive allotment gardens in city policies and media debates (Exner/Schützenberger 2017, 2018), partly serving to brand new urban development areas as green, rural and participatory (Exner et al. 2016).

Given the prominent place of urban agriculture and gardening in the smart city strategy and related urban development documents, the institutional and financial support appears to be quite modest, or even insufficient (cf. interviewees no. 8, 20, 21, 22). In fact, urban gardening projects still struggle with lack of transparency and support in bureaucratic matters, which at times requires very significant investments in time and motivation in the context of already strained project resources that usually rely solely on unpaid labor over sustained periods of time (interviewees no. 20, 21, 22). However, the recently founded project "Garteln in Wien" [190] may alleviate this situation considerably (cf. interviewee no. 8, 20, 22). The overall situation of urban agriculture in the peri-urban areas was improved by the introduction of a regularly issued agricultural development plan (*Agrarstruktureller Entwicklungsplan*) (MA 58, 2014) in 2004/2005 as an outcome of a research project, taking inspiration from similar development plans in German cities. There, priority zones for agricultural use are defined (interviewee no. 8) [191]. However, this approach may be seen critically due to the criteria used to define these zones (focusing on industrial, large-scale production, while in fact, Viennese agriculture is still rather heterogeneously structured, cf. interviewee no. 8), and because of their limited extent, which reflects the growing use of land to expand housing (Exner et al. 2016, Kumnig 2017a, b).

Further areas of urban agriculture and food related activism, besides a growing food coop scene, some activities to build up Community Supported Agriculture (CSA)[192], circumscribed edible city initiatives in some parts of the city (interviewee no. 21, cf. 22), and practices such as food sharing[193], connect to fruit tree cultivation in the city. Although the respective department MA 42 itself has planted fruit trees until the 1990s in inner city districts, it currently opposes such plantings, presumably because of liability issues. The wish for fruit trees, which had been framed in civil society discussions as being part of reclaiming urban space and extending the commons, has given

190 http://garteln-in-wien.at/ [30.12.2017]
191 https://www.wien.gv.at/stadtentwicklung/projekte/landschaft-freiraum/landschaft/landwirtschaft/agstep.html [30.12.2017]
192 http://www.ochsenherz.at/ [30.12.2017]
193 https://foodsharing.at [30.12.2017]

rise to a petition to introduce a certain share of fruit trees in the city, which has been discussed by the respective municipal committee, but without concrete results (interviewee no. 21).

The growth of the urban area entails several problems for farmers in peri-urban space related to nuisances of production facilities for neighbors, the fragmentation of land or the lack of compatibility of the use of agricultural machines with urban traffic. The main problem for agriculture in Vienna is urban growth (interviewee no. 8; cf. 20, 21, 22), which all of the interviewees from the city executive and many others pointed out to be the major challenge for the municipality today. Thus, many farmers attempt to sell their land at a high price as soon as it becomes clear that it will be used for urban development, which constitutes a major problem for urban development and is countered by storing land for urban development in the hands of the agriculture and forestry department MA 48 (interviewee no. 8, 20, 23).

Regional procurement criteria that may be able to further support regional agricultural production in the vicinity of Vienna within *ÖkoKauf* are hard to implement, but a working group is attempting to solve this problem currently. Also soil conservation issues are a matter of some concern by certain actors in this regard. At the moment, the city executive has started to explore how the commitment to the *Milan Urban Food Policy Pact* may be implemented, and corresponding connections with the *ÖkoKauf* initiative seem possible. There are ongoing attempts by civil society actors to establish a Food Council (Ernährungsrat), which seems to go at least partly into a similar direction as the *ÖkoKauf* initiative, and the question remains open how plans a Food Council may develop could be implemented, since this probably requires action by the city executive (interviewee no. 8).

5.2. Berlin

Urban agriculture and gardening are not featured in smart city documents in Berlin, corresponding to the much narrower scope of related policies as in comparison with Vienna. Overall, agricultural issues are less relevant than in urban policy-making in Vienna (cf. interviewee no. 25). Urban gardening, however, has been well-developed in Berlin for many years, together with traditional allotment gardens, and a special commissioner shall be installed according to the current coalition agreement. Civil society agents demand a land portal, but this will not be feasible. Conflicts arise when initiatives settle in and then have to move. From the point of view of the administration, this amounts to a violation of a relationship of trust with potentially negative repercussions for future lending of land to gardening initiatives (interviewee no. 13). While community gardens are important for several purposes, for instance education and social inclusion in neighborhoods, they are not sufficient to pursue a structural change of food production and consumption patterns for the entire city. Civil society agents thus urge the city administration to adopt coherent food policies, e.g. in the form of comprehensive edible city strategies (interviewee no. 16, 18).

The urban-rural divide is more present in Berlin than in other comparable cities for different reasons. In the West, people were historically enclosed by the wall, for which reason there was no space for agriculture, while in the East, the population was temporarily enforced to do agricultural work such as harvesting potatoes. At the same time Berlin is regarded as the organic agriculture capital of Europe because of the steady growth in organic produce. However, only a little share of it is produced locally (in Brandenburg). Most of it is imported from other German regions or even from abroad, corresponding to the industrialized, world-market oriented pattern of Brandenburg's agriculture. Organic produce consumption is not necessarily politicized and food coops emerge rather due to price competitiveness. Users are rather from privileged social milieus. Within the boundaries of the city, not much agricultural land exists, but a sizeable number of farms is located there (interviewee no. 25). Agricultural agendas have been transferred to Brandenburg (interviewees no. 25, 18). Large-scale land investments in Berlin and Brandenburg are politicized by civil society organizations, which see land as a commons that needs to shared and supported by appropriate infrastructures against land grabbing[194]. Due to a long history of privatization politics, land is expensive and sound policies lack, while profit interests are favored. Only a minor share of agricultural land is still public property and further privatizations are pending (interviewee no. 25).

Some food activism is ongoing and is partly supported by the respective *Senate Administration for Justice, Consumers' Protection, and Anti-Discrimination.* A *Forum für Gutes Essen* (*Council for Good Food*) was organized by the Senate Administration from 2015 to 2016, but criticism of lack of transparency and flexibility is voiced (interviewee no. 18). Before the council, a Food Council (Ernährungsrat) was formed in 2015. At this time, Berlin also signed the *Milan Urban Food Policy Pact*, which, inter alia, calls for the establishment of food councils. The self-organized Food Council, which does not have a formal status, is in contact with the Senate Administration and assembles a rather mixed group of food related actors ranging from NGOs to some food producers and community gardens. Due to criticism of the first attempt of a *Council for Good Food*, the Senate Administration is currently setting up an improved version. While the Senate Administration wants to include corporations, the Food Council is against explicit invitations. The Food Council is in favor of the edible city approach and supports food sharing, which has come into trouble with districts' policies, while other agents within the administration are in support (interviewee now. 18).

5.3. Barcelona

Despite the high technology-dominated and internationalized focus of recent urban development in Barcelona and the wider Barcelona metropolitan area, agriculture is of significant importance and urban gardening a well-developed social practice in the city. Moreover, agriculture and gardening

194 http://www.stopp-landgrabbing.de/?page_id=56 [30.12.2017]

are characterized by a considerable diversity (Giacchè/Tóth 2013, Maldonado et al. 2015). Although the service industry is the backbone of the Barcelona area, agriculture is the basis of the most important industry, which revolves on agri-food, mostly based on small farms, with a considerable share of cooperatives. There are numerous programmes concerned with urban agriculture, which is now well anchored in urban planning and public agendas, including labels for local food or for short food chains, public allotment gardens and educational gardening in schools. A large share of the land is protected for agricultural uses, partly through the agricultural park model targeting areas under heavy pressure from urban development (Maldonado et al. 2015), after decades of strong pressure connected to mega-projects (Camps-Calvet et al. 2015). Urban and peri-urban farmers often diversify production. A considerable number of squatting projects exists as well (Maldonado et al. 2015). Problems often identified with regard to agriculture relate to insufficient competitiveness, bureaucracy and lack of successors (Giacchè/Tóth 2013).

In the city, local food markets are very important, and no resident is more than a 10 minute walk from a market, so that the majority of fruit, vegetables and fish is bought at the markets (Daniel/Nestico 2015). Urban food markets in Barcelona are strengthened through investments and specific institutions (De Cunto et al. 2017), and were further supported by an URBACT EU project that ran from 2013 to 2015[195] and created a 10 year strategic plan for food markets in the city (Daniel/Nestico 2015).

Despite their importance in broader policies and public awareness, agriculture and gardening or food were inexistent in the smart city discourse under the Trias government. The digital city agenda of the current Colau government is not related to these topics either. However, food policies are rather actively developed corresponding to the *Milan Food Policy Pact*, which Ada Colau has signed in 2015[196], e.g., attempting to develop a common food strategy by different departments of the administration, and by including concerns of small food retailers. The person in charge is the commissioner of cooperative economy, social solidarity, and consumption. Corresponding to the overall orientation of the Colau government, the notion of food sovereignty is important for food policy developments (interviewee no. 31), and the associated role of the renowned NGO GRAIN in this regard testifies to the seriousness of this approach[197]. Besides food sovereignty, the government connects food to health issues, where cooperation with the *Ministry of Health* and the *Spanish Network of Healthy Cities* is sought. Food waste is a further area of policy development and action, where Barcelona is closely cooperating with Catalonia and the national level through a working platform financed through an EU project (De Cunto et al. 2017).

195 http://urbact.eu/urbact-markets [31.12.2017]

196 https://www.milanurbanfoodpolicypact.org/2016/08/29/activities-in-barcelona/, https://www.milanurbanfoodpolicypact.org/barcelona/ [31.12.2017]

197 https://www.milanurbanfoodpolicypact.org/barcelona/ [31.12.2017]

In Barcelona, community gardens can be distinguished from public gardens. While the former are the result of bottom up activities, which are self-governed, the latter are formally regulated allotments by the *Barcelon City Council*, and have been initiated in the 1990s after a pioneer garden had been created already in 1986 (Giacchè/Tóth 2013, Calvet-Mir/March 2017; cf. interviewee no. 28). Bottom up gardens have partly been established in association with the 15M movement (from which the current Colau government emerged), targeting speculative urban development and gentrification, and are characterized by social diversity (Giacchè/Tóth 2013). Urban gardening in Barcelona is in general often implicitly or explicitly political, in the context of a deep economic and social crisis after 2008, but this holds true in particular for bottom up gardens (Calvet-Mir/March 2017).

6. Discussion and conclusions

6.1. General remarks

Smart city has become a buzzword in policy discourse, a strategic urban development concept and a burgeoning field of research. Besides many publications with a prescriptive leaning addressing urban management problems, which are either sympathizing with or criticizing smart city, this subject has primarily been investigated with regard to globally operating corporations, power effects implied in new urban visions and technologies, and possible pitfalls and dangers associated with these. Important as these contributions are, nuanced investigations of actually existing smart cities still are scarce and spatially explicit, socially and politically contextualized research has only begun recently. This report links to research into actually existing smart cities by comparing smart city policies and public governance arrangements in three EU smart cities: Vienna, Berlin, and Barcelona. Municipalities in each of these cities claim a leading position in smart city developments, but are very different in political, economic, and social terms –as well as in the content, role and history of their smart city policies and projects. A combined qualitative and quantitative discourse analysis of representative newspaper articles allowed to elucidate the difference of public discourses on smart city in content and types of relevant actors. The recent urban development of these cities together with their histories can explain such differences, while processes of Europeanization and global dynamics help to understand common features.

In this way, our study allowed us to answer the two core questions of our research: (1) what is the relevance of the smart city concept and its articulations by different actors in a city, (2) how are varying interpretations of smart city concretized in diverse policies –especially considering the exemplary cases of housing, mobility, urban gardening and agriculture, and citizens' participation as a cross-cutting issue. Specific strategies of urban gardening and agriculture –if existing– were investigated in this regard. This enabled us to better understand the delimitation of smart city development in our case study cities in terms of actors settings and its rules of decision-making on

smart city policies, as well as it facilitated to account for the perception of smart city from non-technological and non-profit actors, who have been rather marginalized in the smart city literature.

Taking the notion of hegemony into consideration, we reframed our two core research questions by asking whether smart city imaginaries and policies are a tool for and the expression of a new hegemonial constellation in a city, or rather a shift in discourse that does not or not yet go along with a shift in the fundamental regime of power in a given city.

This report has described and analyzed how the public governance of smart city development unfolds over time in each of the three cities in terms of actors and their alliances, their power resources, rules of smart city policy-making, and its content. We elucidated the socio-economic context of public governance in this regard, and effects in terms of institutionalizations and conflicts. These conditions crucially involve power relations, as we have shown, and corresponding interests, which are specifically reflected by smart city policies.

After the literature review described at the beginning of this report, we have put forward the following hypotheses: (1) smart city will show different relevance, content, and effects depending on local conditions and history; (2) while smart city refers to a global imaginary, which has been constructed in global arenas, intermediate and local arenas will more decisively shape the concrete meanings and relevance of smart city in a particular context.

6.2. Comparing the three case study cities

In the following, we compare the three cities along the four dimension of the public governance arrangements of smart city development –actors, power, rules, and content– before drawing summary conclusions highlighting commonalities and particularities of our case study cities.

Vienna

Although strongly backed by the government, and despite a close cooperation with economic actors, especially *Siemens AG Österreich*, smart city policies in Vienna are primarily shaped by the comparatively well-funded administration and in particular by the urban planning department. The imprint of a well-funded administration appears to be one of the crucial factors that contributes to the high degree of complexity, comprehensiveness and coherence of the smart city policy in Vienna. On the other hand, it may explain the lack of representation of civil society actors. Smart city policies have been developed in a participatory manner in Vienna, but with a strict focus on administration, business agents and certain research institutions, especially with regard to technology, and often also in connection with business interests. Important features of the Viennese smart city strategy were developed in a narrowly defined circle of actors before a broader

participatory process started. The context of the actor setting of smart city policy development in Vienna is a close cooperation with the *Austrian Climate and Energy Fund,* a national funding agency, and the *Ministry of Infrastructure*. Also, cooperation with other municipalities in joint discussions and projects on smart city has played a certain role.

The strong power position of the administration with regard to smart city development can (1) be explained by the context of a one-party hegemony (by the social democrats) since WWII, which contributes to the blurring of government and administration; such blurring is characteristic of many contemporary government modes in general, but may be enhanced due to the very long-standing continuity of the development of the administration in particular. The power of the administration is (2) strengthened by a substantial public enterprise sector, which is responsible for the organization of all basic infrastructures in the city, and for a large share of housing as well. It relates (3) to a civil society that is relatively passive in comparison with Barcelona and Berlin, while a significant part of environmentally progressive initiatives has germinated and been pushed forward by officials within the administration. The power of the administration is (4) further enhanced by a high quality of life, which gives less reason for urban conflict than in the other cities; and (5), by locally anchored economic actors, which appear to be more closely associated with the city executive than in Berlin and Barcelona, where economic actors show greater self-organization and action independent of the city administration with regard to smart city (Berlin), or have a strong international leaning with a dominance of internationalized corporations (Barcelona).

On the level of content, and related to the specific competencies and outlook of the administration, Viennese smart city policies reframe long-standing policy goals especially in the fields of climate policy with regard to energy issues in mobility and in housing, together with social concerns, while a rather low level of attention is devoted to high technology. In this regard, the specific strengths of the Viennese urban structure are highlighted, above all a well-developed public transport system, and other social services and municipal infrastructures. The content of smart city policies in Vienna, which is primarily oriented towards resource conservation in general, and climate policy in particular, is tightly linked to the overall policy environment created by the *Austrian Climate and Energy Fund* together with further actors such as the *Ministry of Infrastructure*. These actors strongly engage with climate policies since many years, and took decisive action to respond to EU policy developments in the context of the SET plan, connected with the smart city concept.

Siemens plays the most important role in smart city policies in Vienna on the level of public-private business-relations, together with the *Federation of Austrian Industries*, while the *Chamber of Commerce* and the *Vienna Business Agency* are of minor importance in this regard. Due to the ongoing and close cooperation of the *Siemens AG Österreich* with the city executive, its history as a

formerly state-owned enterprise in Austria[198], and the limited technological breadth of the Viennese smart city strategy, the degree of internationalization of the Viennese approach to smart city is low. *Siemens* appears to be an obvious technology partner for large scale developments in Vienna. Besides *Siemens*, the municipality-owned enterprises covering major infrastructures and a large share of the housing stock play a central and even more important role in the context of smart city. Although *Siemens* is using Vienna and the support of the municipality for its own internationalization strategy, and the share of digital firms in the Viennese economy is high, smart city is not only related to technology, or even in a merely secondary way. With regard to mobility, public transport together with bike use are the predominant measures concerning smart city as envisaged by related policies, while energy planning in housing is connected not only to smart meters, which are introduced EU wide, but also to thermal insulation and urban planning. Indeed, smart grids and smart meters are a prominent element of smart city discourse and material praxis in Vienna. Although one may speculate about further motives and conditions of introducing such grids ranging from lobbying success to sell another technology to create further potentials for the surveillance of citizens, and although discussions about data privacy and security issues are justified, their potential value to accommodate the increasing volatility of a growing share of renewable energies and small energy producers seems to be beyond doubt.

Smart city is used strategically in Vienna (1) to respond to EU policies that are tied to the funding of city projects, (2) to engage with the weak branding of Vienna as an international business location, and (3) to promote the functionally necessary integration of climate related department policies and activities that previously have not been harmonized by a common strategy. The background of this threefold function of smart city is a strong involvement of the national state in respective research strategies and the high ranking of Vienna in certain global smart city evaluations. This specific set of conditions, seen against the backdrop of the strong power position of the administration outlined above, can explain the lack of representation of civil society agents and of labor in the development of smart city policies in Vienna –in contrast with Berlin and Barcelona. The high level of support of the strategy within the executive and its coherence are not least due to the successful inclusion of many concerns of different actors within the executive, reaching from the government to municipal departments that are not directly related to resource conservation and climate policy. This makes the Viennese smart city strategy as comprehensive as it renders it complex. But it also safeguards and enables a certain support by other departments, thematic fields and interests.

To some extent, the smart city policy of Vienna realizes what older sustainability perspectives had in vein demanded: a holistic view on urban planning and development –although with less ambition in some regards than in the more radical variants of sustainability, and with a particular

198 https://www.wien.gv.at/wiki/index.php/Siemens_AG_%C3%96sterreich [29.5.2018]

technological dimension due to a changed economic situation. Although the relative importance of business actors in municipal policy-making processes appears to be a somewhat new element in Viennese urban development policies, especially if the exclusion of the institutions of labor is considered, the main innovation appears to be a potential hegemonial constellation with regard to climate policy within the administration. By procedural and thematic strategies (participation, thematic comprehensiveness), active support of or passive consent with the quite far-reaching climate policy goals of the Viennese smart city strategy is garnered. This effect may be further fostered by the specific imaginary of smart city that appears to be more attractive for business in comparison with the notion of sustainability. Seen in this way, the Viennese smart city strategy signals an innovative meta-governance, which is promoted by the self-organization of engaged agents within the administration. Although this is not a new feature of the Viennese administration, it may have found a new realm of activity under the specific constellation of social forces described above. That this innovation has indeed material effects is most visible by the guiding role of the smart city strategy for the current urban development plan and its related thematic concepts.

Berlin

Smart city has developed quite differently in Berlin, as compared to Vienna. It was driven by specific agents within the administration, although these were important. Rather, smart city was first pushed by a constellation of industrial and business interests, supported by business-related research institutions. The Senate Administration responsible for urban planning led the process of the development of a smart city strategy of the city executive, and included further Senate Administrations, together with other actors, mainly from business, and technology experts. In contrast to Vienna, some NGOs and labor institutions participated, although in a very limited way. That business actors are less integrated with the city executive in Berlin than they are with the executive of the municipality in Vienna is also visible with respect to lighthouse projects, which are steered by private companies in Berlin. While in Vienna, the Seestadt Aspern and –to a lesser degree– urban development in Liesing are connected very much to the public relations of smart city and its development, this is not the case to the same degree in Berlin. In fact, two of the lighthouse project areas there, Tegel and Tempelhof, appeared in the charta for a smart city issued by the *Smart City Berlin Network* demanding a better cooperation with the city executive (see above).

The weaker influence and steering power of the administration is probably due, inter alia, to the relative weakness of policy coordination within the administration, which may be more difficult not least for structural reasons, i.e., a lower degree of centralization than in Vienna. The department most engaged in smart city issues to date is the Economy Senate, which is in correspondence with the business-driven smart city agenda visible in Berlin. As the media analysis has shown, the important role of the former economy senator (Cornelia Yzer, CDU), testifies to the technology and business oriented character of smart city in Berlin, although this orientation is not strongly bound to

a single company or sector except a certain focus on e-cars. Civil society appears to be much more active in Berlin than it is in Vienna, is pressing frequently for major policy demands and sometimes also gains visible influence. This may explain the greater concern for citizen participation in the Berlin smart city discourse in comparison with Vienna, as well as it probably has left traces in the smart city strategy document, most strongly in the recurring concern for data security, which is treated as a highly sensitive topic in the strategy document (unlike in Vienna). However, in crucial areas such as public infrastructures and service provision as well as in housing, there is indeed more reason for concern for critical civil society actors in Berlin than it is in Vienna (cf. interviewee no. 19; see also interviewees no. 12, 13, 14, 17). In any case, directly including citizens in smart city development has not been realized yet, but is envisaged to be implemented (interviewees no. 9, 11). Recent privatizations of municipal energy service providers are contested with reference to smart city in public discourse, but so far have not led to re-municipalization. The much weaker position of public utility companies and public housing probably further explains the lower influence of the administration or of the city executive on the whole with regard to smart city as compared with Vienna. Notably, it is mainly the city government, i.e., politicians, who most consistently promote smart city, namely Cornelia Yzer (CDU) and Michael Müller (SPD). Whether this is accompanied by a relative lack of self-organized engagement within the administration with the topic, is unclear. In any case, the shift from Müller, who formerly led the *Senate Administration of Urban Development and the Environment*, to the office of the governing mayor in 2016 may have weakened the relevance of the smart city topic in the overall context of a city with many urgent problems that are not discursively associated with smart city (interviewee no. 9).

The multi-level character of smart city governance, which is so important to understand smart city policies in Vienna, is less developed in Berlin. The relative misfortune of actors that had applied for EU funding and the restructuring of the city executive after the 2016 elections may be two of the explanations. A further factor is the weaker support of smart city by the national government. Moreover, Berlin seems to suffer city competition within Germany regarding smart city.

In Berlin, smart city policies are primarily constructed in a limited technological sense with little relevance in broader urban development policies so far. Smart city shall contribute to reposition Berlin in the production of high technologies for expert by fostering multi-actor arrangements in business and research as well as start ups, which partly is the result of a high degree of business influence in the understanding of smart city in Berlin. For business actors, e-mobility is a matter of particular interest, which is reflected in the smart city strategy and to a certain extent also in media discourse, and which may be rooted in the political clout of the German car industry. A second focal point is e-government. Neither of these two are as prominent in Vienna as they are in Berlin. The strategy document includes some deliberative aspects and has a more critical, cautious leaning than the Viennese smart city strategy. Moreover, it is much more narrowly conceived. In contrast to Vienna, the current urban development plan in Berlin provides the context of the smart city strategy,

and not vice versa. Correspondingly, smart city appears as one concept connected to urban development among others in the Berlin media discourse and is not a comprehensive guiding vision for urban development such as it is in Vienna. This is in accordance with the utterances of actors from the administration as well as those from other realms. Smart city is recurringly related to the idea of industry 4.0 and the creation of jobs to combat the long term problem of a rather high level of unemployment in the city, which also marks a difference in comparison with Vienna, where industry 4.0 is sometimes alluded to in discourse, but not with a focus on the creation of employment as sharp as in Berlin.

Barcelona

Smart city has a rather turbulent development in Barcelona, which again differs in many respects from both Berlin and Vienna, not least due to the particular socio-economic context and political history of a region that is part of the semi-periphery, contrary to Germany and Austria, which are part of the center (if world-systems terminology is applied). While smart city was the key policy frame of the former government under the liberal mayor Xavier Trias until 2015 and went along with several institutional changes and investments, the current government under the left-wing and social movement related mayor Ada Colau mostly rejects to be identified with smart city. However, important policies of the Colau government are based on investments undertaken or initiated by the Trias government and take place in an overall institutional and socio-economic context that continues to bear some of its marks. Basically, the smart city policy of the Trias government has been relegated to a service role for the broader goal of a democratic city, and has been reframed in terms of a digital city in view of technological sovereignty. In parallel, some of the socially and environmentally more progressive ideas of smart city under Trias, which were not pursued effectively, have been revived with somewhat greater determination under Colau. It thus is warranted to both outline basic continuities, but also marked differences of policies connected to digital technologies, which characterized smart city in Barcelona and which continue to play a prominent role in Barcelona also under the current government.

The smart city strategy under Trias was designed and implemented mainly by the government, and especially by the deputy mayor Antoni Vives, who –being supported by the mayor Xavier Trias– effectively reorganized a large part of the administration under his command through a super-department *Hábitat Urbano* integrating urbanism, infrastructure, housing, environment as well as urban services and ICT, which gave him much leeway to pursue privatization policies and urban development projects geared towards maximizing international public relations. Like in Vienna, smart city under Trias came along with a functional integration or closer cooperation of different municipal departments, according to the thematic breadth and relevance of the concept for urban development in Barcelona. But while this cooperation was a rather participatory process between the different sections of the administration in Vienna, which created the conditions for a stronger

harmonization of urban development, it was steered top down by political fiat in Barcelona, together with a political centralization of important strategic decisions in view of contracting.

Multi-level governance processes were important, too, since Vives and his smart city policy were very much connected to a broader regional alliance of like-minded architects and institutions. Business interests were in the center of smart city in Barcelona, where the city executive itself acted much more as a business agent than the municipalities in Berlin and Vienna. This was done predominantly through *Fira de Barcelona*, but also through *Mobile World Capital*, which connects the international, national, provincial and local governance levels in a joint effort of corporations, public-private partnerships and state agencies on the national, provincial, and local level. The internationalized strategy of smart city in Barcelona was –so to say– a high technology variant of the tourism related model of urban growth in the branch of business tourism linked to the *Fira*. Although multiple levels of policy-making thus were engaged with smart city in Barcelona just as they were in Vienna (but less so in Berlin), the focus of these multi-level bodies of political decision-making and economic promotion was on technology and business, not on environmental issues like in Vienna. In this context, a certain group of global corporations played a central role in the smart city Barcelona, especially *Cisco* and *Schneider*. The most important and original products developed or implemented with or by such companies in Barcelona are sensor systems and integrated data management platforms. Civil society was effectively excluded as in Vienna, and as was mostly the case in Berlin as well. But the context in Barcelona was very different because of the strong top-down character of a public relations-focused policy that was not substantially supported by a broader consensus within the administration, as it seems, let alone civil society.

In short, smart city was understood by the Trias government primarily as a new urban development concept integrating a business-friendly technology focus with some ecological and social concerns. It continued the project-type of urban development by mega-events, a high profile of ICT and a strategic focus on city branding in the context of a strong and dynamic internationalization strategy based on private business in partnership with public bodies.

Although the current government rejects smart city as the overriding development narrative that was crucial for its predecessor, important policies related to it are upheld, but in a different political context marked by a shift towards social issues. Although the label “smart city” has recently been replaced by the notion of the “digital city” in Barcelona and the political context of smart or digital city in Barcelona has changed, the city still suffers strongly from the social aftermath of the financial crisis of 2008. The attempt to deal with the burst of the housing bubble is the specific background of smart city in Barcelona. The public-private business partnership of *Fira de Barcelona* proved to be resilient to the crisis, offering several high technology and explicitly or

implicitly smart city related congress events that are increasingly exported[199]. In the context of a strong dependence on tourism and international fairs and a lack of public enterprises, smart or digital policies remain important for the municipality in Barcelona. The few changes in agreements with companies signed by the previous government have not been disruptive overall and the further expansion of digital technologies has in fact been supported by the current government, although with a somewhat different focus and a reduced importance in the general urban development policies. This is true in a similar way for the strong role of internationalization, which is also pursued by the current government in terms of a cooperation of municipalities and the involvement in international debates on urban development in different fora, albeit within a different framing.

6.3. Summary conclusions

In all three cases, smart city is crucially related to three types of international dynamics: (1) companies are increasingly seeing cities as potential markets and supporters of their business agendas; (2) cities have reoriented themselves towards entrepreneurial forms of management and governance in relation with the privatization of public services and an increasingly competitive world market since the 1980s; (3) since the financial crisis of 2007/08 the EU has put smart city as a technological driver of growth on its agenda. However, the three case study cities relate differently to these dynamics due to local conditions. Likewise, while all three municipalities engage in specific preferential relations with certain companies in view of smart city, this happens for specific reasons and in different ways. Moreover, the relation to provincial, national and EU policies as well as the relation with international institutions and the world market in terms of smart city varies, too. Although the case study cities have institutionalized smart city to a certain degree, the character and extent of this institutionalization differ widely.

To summarize our findings, there is no single meaning of smart city, but there are multiple meanings related to this label, which serves different functions depending on local conditions. In no case do municipalities react passively to the strategies pursued by corporations or the visions they promote, as has been suggested by part of the literature on the subject. Rather, municipalities co-produce the smart city both as an imaginary and as material change. Furthermore, intermediate levels of policy-making are important for urban smart city policies. While in Vienna, smart city rather serves to safeguard continuity of long standing social, environmental and locational policy patterns, and shall enhance a certain type of international recognition of its tradition by applying the smart city vocabulary, this very label marks the attempt to radically break from the political past in Barcelona –and was again replaced by a different political terminology by the subsequent government. However, material policies regarding digital technologies and their role in Barcelona remain rather stable as do urban development approaches and in general reproduce long run patterns

199 in the sense of being organized in other countries, too.

in urban development regardless of labeling issues. In Berlin, smart city is discursively constructed as a rather narrow strategy of technology research and development. Neither hit as severely by the financial crisis of 2007/08 as Barcelona nor being in a rather subaltern position within the global hierarchy of cities as Vienna, the benefits of the smart city label in Berlin are limited.

The following Tables 2 and 3 summarize the findings and relate them to the typology of governance arrangements proposed by Arnouts et al. (2012).

		Vienna
Public governance arrangement		Closed co-governance
Primary policy goal		Climate protection
Actors	Local	Primary: administration (Urban Planning Dept., public utility companies); secondary: business actors, research institutions
	Provincial/national	Austrian Climate and Energy Funds, Ministry of Infrastructure
Power resources of the primary actor		Institutional power
Rules of the game	Rule type	Non-hierarchical bargaining
	Arenas and mechanisms	Applied research projects; formalized stakeholder involvement, top-down steered by administration
Content		Overall urban development strategy; broader sustainability approach to climate policy (focus: public infrastructures, smart grids), plus economic concerns
Context	EU	EU funding (explicit references to SET plan)
	International	Good rankings
	Demographics	Urban growth
	Economy	Relatively prosperous

		Berlin
Public governance arrangement		Open co-governance
Primary policy goal		Industrial promotion
Actors	Local	Network of business actors and research institutions (Smart City Berlin Network) and government/administration (Urban Planning Senate, Economy Senate, Chief Executive Office)
	Provincial/national	---
Power resources of the primary actor		Financial resources
Rules of the game	Rule type	Non-hierarchical bargaining
	Arenas and mechanisms	Self-organized dynamics of business and research actors; formalized stakeholder involvement, top-down steered by administration
Content		Technological approach as modernization and internationalization strategy (focus: e-mobility, e-government)
Context	EU	---
	International	---
	Demographics	Urban growth
	Economy	High unemployment, high public debt

Table 2: Summary of stylized findings and governance arrangement types according to the typology of Arnouts et al. (2012) relating to smart city and digital city in the case study cities.

		Barcelona 1 (Xavier Trias, 2011-2015)
Public governance arrangement		Hierarchical governance
Primary policy goal		Industrial promotion, place branding
Actors	Local	Government
	Provincial/national	Institute for Advanced Architecture for Catalonia (IAAC), Catalonian government, Ministry of Industry
Power resources of the primary actor		Institutional power
Rules of the game	Rule type	Command
	Arenas and mechanisms	Top-down steering
Content		Overall urban development strategy; technological approach as internationalization strategy (convenience of services)
Context	EU	EU funding
	International	Good rankings, international and EU awards
	Demographics	---
	Economy	High unemployment, social crisis

		Barcelona 2 (Ada Colau, 2015-now)
Public governance arrangement		Closed co-governance
Primary policy goal		Participatory democracy/empowerment
Actors	Local	Primary: government, secondary: social movements/citizens
	Provincial/national	---
Power resources of the primary actor		Social movements; competence
Rules of the game	Rule type	Deliberation
	Arenas and mechanisms	Combined participatory bottom-up and top-down processes
Content		Part of democratic city; technological approach to empower citizens and foster job creation in neighborhoods
Context	EU	EU funding
	International	Social movement discourse, municipalism
	Demographics	---
	Economy	High unemployment, social crisis

Table 3: Summary of stylized findings and governance arrangement types according to the typology of Arnouts et al. (2012) relating to smart city and digital city in the case study cities.

Three types of public governance arrangements of smart city policy-making can be identified. Vienna corresponds to a closed co-governance type, which is dominated by the administration, but includes several further actors. In Barcelona, policy-making related to digital technologies (which were the material core of smart city under the Trias government in this city) under the current Colau government belongs to the same type. However, the type of actors included is different, since these are social movements and SMEs rather than corporations and big research institutions such as in

Vienna. Berlin corresponds to an open co-governance arrangement, where overall smart city policy-making is governed rather loosely by a more open, flexibly composed and collaborating network of certain groups, basically a constellation of business actors together with research institutions on the one hand and the city executive on the other hand, where particular departments and politicians take a lead. Under the Trias government, smart city policy-making in Barcelona was hierarchically organized. A range of corporations was important for the arrangement, but rather as a contextual condition, not for the policy-making itself, the terms of which were mainly set by the government, and, above all, by the mayor and the deputy mayor.

The content of the governance arrangements related to smart or digital city widely differs in our case study cities. Vienna has an environmental focus with a strong presence of social concerns and a rather secondary role of business interests, while smart city in Berlin has primarily a business and technology oriented focus, with environmental concerns being secondary, together with social issues. In Barcelona under the Trias government, the business and technology focus was even stronger, with citizens' convenience as consumers as a secondary goal, while under the Colau government, the newly conceived digital city policy has a strong technology focus, too, but is decisively oriented towards participatory democracy and technological sovereignty, underscoring social aims as the prime driver, although economic concerns do play a role in this view as well.

The socio-economic context varies decisively. While Berlin is the capital of the hegemonial center of the European Union, although its economic and social situation is problematic for German standards, and Vienna is a regional power center and part of the EU center states as well, the context of Barcelona is a semi-peripheral country (in world-systems theoretical terms), and located at the political and economic periphery of the European Union –although it is an economic powerhouse in the context of Spain and has a much more internationalized standing than Vienna, and is possibly also somewhat more internationalized than Berlin economically. Thus, employment policies are much more important in Berlin politically than in Vienna, and they are even more so in Barcelona. Moreover, the housing situation is socially desastrous in Barcelona and very problematic in Berlin, and still shows problematic tendencies such as rising rents in Vienna. Although housing issues are thus highly relevant politically in all three cities, the gravity of the associated problems differs. Moreover, housing challenges are very much associated with (though not reducible to) urban growth in Vienna and Berlin, while urban growth is less an issue in Barcelona.

The governance arrangement in Vienna shows most strongly a multi-level character, connecting levels from the local to the national state and the European Union, but multiple policy-making levels were also visible in Barcelona under the Trias government and still are relevant under the Colau government. In any case, both governments have a strong internationalized outlook, although the first one with an exclusive business focus, while the latter is much more oriented towards the building up of cooperative links and political alliances between cities in the sense of municipalism.

The EU level was and is relevant for smart or digital city policy-making in Barcelona, but was more decisive in Vienna and Berlin, and was more closely related there to the EU SET plan.

6.4. Broader outlook

Despite these particularities, smart city points towards a general shift of cities towards a role of economic actors *sui generis*: urban management in itself becomes a sphere of capital fixation and a possible realm of productivity gains of private businesses; even more so, cities become test sites for smart technology producers or municipalities act as co-producers of technologies that shall be sold to other cities. It is unclear to date whether smart technologies indeed will have lasting material effects beyond pilot projects, exaggerated expectations (or fears) or a label for a catching up with technological standards that are already conventionalized in other cities, not least depending on the financial capacity of municipalities as consumers as well as opposition to or social demand for smart technologies. To the extent that such technologies will have lasting material effects, the urban fabric as such becomes technologically productive and the productivity of the collective work force and societal factory, which the city is, is increased by technology. This could be achieved in two ways, depending on local development trajectories and power relations: by increasing surveillance and thus disciplining the labor force, as dystopian imaginaries of smart city stress; or by enhancing creativity. In both ways, cities may be drawn deeper into capitalist valuation processes and world market competition than already is the case. Even in very particular interpretations of smart city as in the Vienna framework strategy or in the vision of slow, renaturalized neighborhoods in a fast, hyperconnected city as by Vincent Guallart in Barcelona, the crucial feature is, in the final instance, the expansion of digital technology within the urban fabric. Underlying this feature, however, is the concept of efficiency, which is somewhat pliable to accommodate different demands including social ones and those not related to technology (as Viennese smart city policies illustrate).

Though not for identical reasons, the most pressing political issue in each of the case study cities has been affordable housing since some years. This issue can be accomodated with smart city policies in three ways: (1) the meaning of smart city can be broadened so that it is able to integrate conventional policy goals in efficiency terms aiming to provide equal or better quality housing with the same amount of money or even less; (2) the meaning of smart city is narrowed so much that it is far from implying an overarching urban development policy; (3) the demand for high quality and affordable housing is neglected. Against the backdrop of strong social movements like in Barcelona and Berlin or an entrenched social democratic urban consensus like in Vienna, only the first two options have proven valid so far, the first one in Vienna –where smart housing basically means smaller flats with equal comfort, together with enhanced concern for urban planning contexts of housing projects– and the second one in Berlin. Although the discontent with the Trias government in Barcelona had more dimensions than housing alone, it is not by chance that the current government has strong roots in the housing activism that spread in the city after 2008. As much as

the Trias government attempted to distinguish itself symbolically from the previous political period by adopting the smart city label for its urban development approach, the current government signals political distinctiveness by the introduction of the digital city label, which narrows down smart city to the technological component, and to technological sovereignty, which relates to the concern for closing digital gaps, local job creation and democratization.

In each city, smart city policies are related to certain constructions of the citizen, who is conceived of as passive consumer or passive or active provider of data, but not as political subject. In this regard, the current government in Barcelona marks at least a discursive change concerning the role of digital technologies, because these are conceived in terms of a democratization of the city and an enhanced political role of citizens. However, the material effects would have to be investigated further. Housing issues are only related decisively to smart city in Vienna, especially as far as energy consumption is concerned, while mobility in smart city terms plays an important but varied role in all three cities. Within the context of smart city, mobility is mainly seen as a public transport task together with an increasing role of bike use and walking in Vienna, but is more related to the expansion of e-mobility in Berlin as well as Barcelona. Urban agriculture and gardening only play a role within smart city concepts in Vienna and in Barcelona, but hardly do so in practice.

To date, smart city policies in our case studies are less of a rupture with or radical break from the urban development patterns and dynamics since the 1980s than part of the on-going modernization of social relations that are contingent upon local histories and power relations whose trajectories reach into decades before the advent of the entrepreneurial city after the decline of Fordism. This does not preclude that smart city is doing a work that would otherwise not have been achieved.

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APPENDIX - LIST OF INTERVIEWEES

The order of interviewees does not correspond to the numbers used in the text. Dates of the interviewees are added.

Berlin

Exploratory interview

- Steffen Kühne, expert on social-ecological transformation at the Rosa Luxemburg Stiftung (RLS), 30.3.2017

Actors within city executive

- Jacqueline Brüschke, Division Manager BauWerk Planungsbüro, DeGeWo, 19.6.2017
- Britta Havemann, Contact for smart city in SenVWi - Abt IIIB 12 Wirtschaft, Senatsverwaltung für Wirtschaft, Energie und Betriebe, Abteilung Wirtschaft, 20.6.2017
- Beate Profé, Head of Dept. I - Stadt- und Freiraumplanung, Senatsverwaltung für Stadtentwicklung und Wohnen, 20.6.2017
- Jochen Lang, Head of Dept. IV - Wohnungswesen, Wohnungsneubau, Stadterneuerung, Soziale Stadt, Senatsverwaltung für Stadtentwicklung und Wohnen, 21.6.2017
- Thomas Letz, Politische Grundsatz- und Planungsangelegenheiten, Senatskanzlei Berlin, 11.8.2017

Private business actors

- Marek Witt, City Account Manager Berlin, Siemens, 8.8.2017

Civil society actors

Urban agriculture and Food

- Willi Lehnert, Campaign Manager, Bündnis junge Landwirtschaft, 26.6.2017
- Christine Pohl, speaker of Food Council, employed at Inkota, 26.6.2017
- Maike Majewski, initiator of ‟Transition Town Pankow”, 22.6.2017

Mobility

- Denis Petri, activist at ‟Volksentscheid Fahrrad”, 23.6.2017

Housing

- Enrico Schönberg, initiator of ‟Stadt von Unten”, 23.6.2017

Vienna

Actors within city executive

- Alfried Brauman, Staff Unit Economic Policy and EU Affairs of the Management Board, Vienna Business Agency, 31.5.2017
- Dieter Groschopf, Deputy Managing Director, Wohnfonds, 30. 8. 2017
- Veronika Haunold, former Director of the Smart City Agency (TINA), 19.7.2017
- Ina Homeier, Head of Smart City Unit at MA18, 18.7.2017
- Pamela Mühlmann, senior expert, Smart City Agency (TINA), 5.7.2017
- Bernhard Kromp, Head of the Institute, and Katharina Posch, manager of "Garteln in Wien"; both: Bioforschung Austria, 6.7.2017

Private business actors

- Johannes Höhrhan, Managing Director of Federation of Austrian Industries (IV) Vienna, 6.7.2017
- Georg Pammer, Managing Director of Aspern Smart City Research (ASCR), Siemens, 10.7.2017

Civil society actors

Urban agriculture and urban development

- Pete, initiator "Wilde Rauke", 4.7.2017
- Anna Karall, founding member "Paradeisgartl" and Citizen's Initiative "Donaufeld", 21.8.2017
- Peter A. Krobath, initiator "Stadtfrucht", 24.7.2017

Labor relations

- Thomas Ritt, AK Wien, Head of Dept. Municipal Policy, 11.7.2017

Housing

- Mara Verlic, activist at INURA, Project Manager at Caritas, 11.7.2017

Mobility

- Markus Gansterer, senior expert, Mobility Policy, VCÖ, 25.7.2017

Barcelona – current city executive

Actors within city executive

- Miquel Ortega Cerdà, Assessor (top executive), Tinència d'Alcaldia d'Ecologia, Urbanisme i Mobilitat, Ajuntament de Barcelona, 20.6.2017
- David Martínez Garcia, Coordinador Comissió 22@, Ajuntament de Barcelona, 21.6.2017
- Ester Vidal Pujol-Xicoy – Directora, Direcció de Serveis d'Economia Cooperativa, Social i Solidaria i Consum Gerència de Política Econòmica i Desenvolupament Local, Ajuntament de Barcelona, 26.6.2017
- Josep Maria Marquès i Ferre, Director de Desenvolupament Organitzatiu, and Montse Rodríguez, Responsable de Estudios y Estrategia, both: Barcelona Activa, Ajuntament de Barcelona, 29.6.2017
- Pilar Piquer Caballero, Coordinadora de la xarxa d'Horts Urbans, Direcció d'Espais Verds i Biodiversitat, Medi Ambient i Serveis Urbans-Ecologia Urbana, Ajuntament Barcelona, 30.6.2017

Private business actors

- Albert Martínez Siles, Màrqueting i Comunicació, Poblenou Urban District, 22.6.2017

Civil society actors

Energy

- Maria Campuzano, speaker of APE (Alianza en contra de la pobreza energética), 28.6.2017

Housing

- José Antonio, activist at PAH Barcelona (Plataforma de los afectados por la hipoteca), 20.6.2017

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