

Towards a relational conception of the compact city

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Abstract

Compact city strategies have become central to the development of urban sustainability politics. Cities across the globe are pursuing high-density, mixed-use developments and energy-efficient transportation systems. However, the correlation between compact city strategies and achieved sustainability is largely taken for granted in public and academic debates. Providing a spatial critique of the theory guiding compact city policy and practice, this article demonstrates how the prioritisation of urban form and territorial boundaries in measuring sustainability ultimately ignores the societal and environmental effects and foundations of current compact city approaches. Building upon this critique, I argue for a relational orientation that can attune research and practice to the compact city's intensive and extensive constitution and consequently to its actual and potential (re)production. Analysing Oslo's involvement in the EU network 'Sub>Urban: Reinventing the Fringe', and work that has followed from this network, the article develops three critical perspectives to advance compact city theorisation beyond traditional frameworks: (1) the relational topographies of the compact city; (2) the relational intensities of the compact city; and (3) the planetary constitution of the compact city. In doing so, a critical geography of how the compact city is produced – discursively and materially – is proposed.

Keywords

compact city, relationality, sustainability, topography, topology

摘要

紧凑城市战略已经成为城市可持续发展政治的核心。全球各地的城市都在追求高密度、多用途开发和节能交通系统。然而，在公共和学术辩论中，紧凑城市战略和实现可持续性之间的相关性在很大程度上被认为是理所当然的。本文对指导紧凑城市政策和实践的理论进行了空间批判，展示了在衡量可持续性时，城市形态和地域边界的优先排序如何最终忽略了当前紧凑城市方法的社会和环境影响及基础。在这个批判的基础上，我主张一种关系取向，这种取向可以使研究和实践与紧凑城市的密集和广泛的构成相协调，从而与它的实际和潜在（再）生产相协调。我们分析奥斯陆参与欧盟网络“Sub.Urban: 重塑边缘 (Reinventing the Fringe)”的情况，以及由此网络而来的工作，并在此基础上提出了三个批判性的观点，以推进紧凑城市理论超越传统框架：(1) 紧凑城市的关系拓扑学；(2) 紧凑城市的关联度；(3) 紧凑城市的全球结构。以此为基础，我们提出了一个关于紧凑城市（在论述上和物质上）如何产生的批判地理学。

关键词

紧凑城市、关系性、可持续性、地形学，拓扑学

Introduction

The relevance of compact city strategies has been actualised by the growing consensus that cities play an inevitable role in progressing sustainable transformations on a global scale (Creutzig et al., 2016a; Seto et al., 2014). The compact city has gained prominence, as it represents an alliance between ecological and economic perspectives where ‘the demand for reducing the ecological footprint can be realigned with cost-efficiency in spatial and sectoral planning’ (Knudsen, 2018: 67). This so-called ‘eco-spatial consensus’ is legitimised by the idea that ‘the climate imperative demands a denser settlement pattern’ (Knudsen, 2018: 67, 71), and is brought forth through the notion of the compact city. Largely conceptualised through spatial design, the compact city emphasises urban form as a determining factor in shaping sustainable societies and adheres to concrete growth boundaries to curtail sprawl (Westerink et al., 2013).

In contemporary debate, the compact city model has been legitimised through the idea of sustainable development and ‘the question of the contribution that certain urban forms might make to lower energy consumption and lower pollution levels’ (Jabareen, 2006: 38). Enabling efficient land use by providing dense clustering and mixes of housing, work, services and amenities, compact city strategies are understood as a precondition for lowering CO₂ emissions and creating sustainable mobility patterns (Ewing and Cervero, 2010; Næss et al., 2017; Newman and Kenworthy, 1989, 1999, 2015).

However, several strands of critique challenge the relationship between compact city development and sustainability. Criticism concerns affordability, social and environmental sustainability, the political economy

of urban models, just and inclusive city-making and the carbon footprint of compact urban developments (Burton, 2000; Echenique et al., 2012; Gibbs et al., 2013; Holgersen and Malm, 2015; Moran et al., 2018; Neuman, 2005; Ottelin et al., 2019). These critiques indicate that compact city strategies cannot be removed from the social, political, economic and environmental contexts in which they are situated.

Arguably, these issues expose the fact that compact city theory and practice ultimately overlook the societal and environmental effects and foundations currently constituting this approach.¹ As such, this article problematises two key areas, proposing that compact city strategies: (1) place excessive prioritisation on urban form in determining sustainability; and (2) operate within inadequate boundary systems of evaluating achieved sustainability.

I argue that advancing theory and practice beyond these limitations requires an ontological shift within compact city theorisation. Such fundamental reorientation of the constitutive relations of compact city strategies remains largely unexplored. In the existing critiques, which will be outlined below, engagement too often takes the form of the detrimental inevitability of neoliberal urbanism, or as arguments for adding another element to already existing theorisations. To move compact city theory and practice beyond these critiques, this article utilises relational theorisation, particularly the conceptual tools of topography and topology. This approach makes visible the problematic (i.e. Euclidean) spatial understanding currently guiding compact city approaches, and provides the foundation for advancing a critical geography of how the compact city is produced, discursively and materially.² Working towards such a

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relational theorisation advances the argument that there is no *true* compact city. The sustainability of the compact city is ultimately a matter of its extensive and intensive constitution.

This relational conception of the compact city is explored empirically through analysis of Oslo's involvement in the EU urban policy network 'Sub>urban: Reinventing the fringe' (see URBACT, 2018) and the concrete work following this network in Hovinbyen, Oslo. The 'Sub>urban' network was part of the URBACT III knowledge exchange programme, which ran from September 2015 until May 2018 (see URBACT, n.d.). Oslo's engagement within the 'Sub>urban' network can be seen as an embedded aspect of the city's compact city strategy. Hovinbyen, a post-war area east of the city centre, was chosen as the local case to work with in the network because it had previously served as a case area for Oslo's participation in a Eurocities network. From a compact city perspective, the area of Hovinbyen has the greatest potential for absorbing future population growth (Oslo kommune, 2018). Today, the area has about 40,000 inhabitants and is responsible for about 55,000 jobs. The planned densification of the area will add an estimated 30,000–40,000 housing units and 50,000–100,000 new jobs (Oslo kommune, 2016). With Oslo's population expected to rise from approximately 670,000 to 770,000 in 2030, and another 80,000 inhabitants in the following decade (Oslo kommune, 2018), Hovinbyen could play a central role in accounting for this growth.

The case presented herein is part of an ongoing qualitative research project examining how Oslo is developing its compact city strategies. This empirical research is based on interviews with stakeholders both within and outside the municipality, participant observation at network events and document analysis at the municipal, network and

European levels from 2017 to 2019. While the 'Sub>urban' network extends across nine European cities, fieldwork has only been carried out in Oslo. To overcome the sometimes-ephemeral participation by network actors, interviews and document analyses were complemented by participant observation at network events in Oslo. Overall, this case provides empirical and conceptual insight into the current contradictions within compact city strategies and unveils the relevance of developing a relational approach to compact city theory and practice.

Critique of compact city theorisation

The 'compact city' comprises a range of perspectives on, and measures of, city-making that have been successfully mobilised within the contemporary advent of sustainable development (Burton, 2002; Lee et al., 2015). The compact city can be characterised by dense and mixed clustering of housing, social services, shops, amenities and jobs, within an integrated system supporting efficient use of land and energy. It also entails the designation of green belts as boundaries for development, to ensure environmental and agricultural protection (Westerink et al., 2013). Engrained in compact city theorisation are the associated intricate systems and functions that support diversity, vitality and quality of life (Beatley, 2000; Burton, 2000; Jenks et al., 1996; Williams et al., 2000). More generally, the compact city can be described with reference to four approximate points, as outlined by Westerink et al. (2013: 474–475):

- Urban containment, separation of settlements, efficiency of land use.

- Viability of public transport, lower car dependency, lower travel costs and climate change

emissions, public health benefits of non-motorised travel.

Protection of the countryside, land for agriculture, ecological diversity.

Densification of urban neighbourhoods: together with indirect effects such as social mixing, social cohesion, economic diversity, etc.

These four points reveal how the idea of the compact city builds upon modern conceptualisations of space, in which prioritisation of urban form is fundamental for designating use and, ultimately, sustainability. Urban form can be defined as land use patterns, mobility systems and other ecological and urban design features making up the physical structure and spatial arrangement of human settlement (Seto et al., 2014; see also Wentz et al., 2018). Furthermore, the model assumes a traditionalist conceptualisation of the city (see Brenner and Schmid, 2014) in which it is possible to operate within a clearly defined system boundary for urban life and development. While Westerink et al. (2013) recognises that, as a spatial model, the compact city is ‘not stable over time’ (Hajer and Zonneveld, 2000: 341) and has been adapted to include socio-economic aspects, the Euclidean conceptualisation of space remains central in compact city theory.

Next, I will delineate this spatial critique of compact city theorisation. This discussion does not attempt to encompass the entirety of the compact city approach but aims to outline central weaknesses currently limiting compact city strategies. These weaknesses can be organised according to two main critiques, namely that compact city strategies: (1) place excessive prioritisation on urban form in determining sustainability; and (2) operate within inadequate boundary systems for evaluating achieved sustainability. While these critiques may appear to undermine the idea of the compact city altogether, that does not reflect the project of this article. As I later propose a relational reconceptualisation of

the compact city, I contend that a compact city approach holds potential for achieving sustainability by curtailing sprawl and intensifying relations through physical proximity. Yet, the central argument of this article contends that the current manner in which compact city strategies are legitimised according to sustainability objectives does not sufficiently account for the societal and environmental effects and foundations these cities constitute.

First, the argument that compact city theory places excessive prioritisation on urban form in determining sustainability can be traced to Newman and Kenworthy’s (1989, 1999, 2015) work on the relationship between automobile dependence and density. Their work has been influential in legitimising compact cities as a form of sustainable development, based on their argument regarding the relationship between urban form and emissions (Ewing et al., 2018). Newman and Kenworthy’s work is most widely disseminated through a graph (Newman and Kenworthy, 1989: 128) showing the negatively correlated relationship between gasoline use and population density. As Ewing et al. (2018: 167) state, ‘[d]ata points lie so close to a negative exponential curve that it seems to represent a universal truth’. However, this simplified relationship between density and gasoline use has been criticised (Ewing and Cervero, 2010; Ewing et al., 2018).

In their recent review, Ewing et al. (2018) present a comprehensive critique of Newman and Kenworthy’s (1989) original thesis. They describe how other dimensions, such as income, fuel prices, highway capacity, location accessibility, street connectivity and land use mix, are not accounted for, or are reduced to an implicit measure of density (Ewing et al., 2018). Some of these factors (such as location accessibility, street connectivity and land use mix) are brought into compact city discourse through the emphasis on urban form and associated categories. In

fact, a variety of attributive measures has been suggested by various research to enable a more comprehensive approach to the compact city (see e.g. Burton, 2002; Lee et al., 2015). However, other factors (such as income) reveal a blind field of compact city theorisation. Opening up theorisations of the compact city to such factors ultimately challenges the logic driving Newman and Kenworthy's (1989) correlative association between built form and emissions.

As such, the question of urban form outlines a disguised yet engrained logic within compact city theory, that is, the idea that urban form is a key determinant of urban life. This idea points to a long-going dispute within urban theory, as found with reference to debates regarding the American movement *new urbanism* (Fainstein, 2000; Harvey, 1997; McCann and Ward, 2010), and ongoing quests to develop sustainable urban forms (Burton, 2000). In fact, both compact city and new urbanist ideals are rooted in the notion of the traditional city; the idea that proximity and diversity support healthy economies and sustainable livelihoods (Burton, 2000; Gibbs et al., 2013; Neuman, 2005; Tunström and Bradley, 2015; Westerink et al., 2013). While the assimilation of views and interest driving the new urbanist agenda has undergone substantial criticism due to their particular assumption of the relation between physical form and quality of life (Fainstein, 2000; Harvey, 1997), the literature on the compact city has adopted a more nuanced approach, largely avoiding structural criticism of this relationship.

In the compact city literature, the relationship between urban form and social sustainability has been found to be inconclusive and dependent upon other variables (Bramley et al., 2009; Dempsey et al., 2012; Miles et al., 2012; Mouratidis, 2018, 2019). Similarly, studies of urban form and

environmental sustainability show that compact urban form affords the possibility of reducing certain emissions, but that it is constrained on its own since 'urban form does not control behaviour' (Milder, 2012: 281; see also Williams et al., 2000). While urban form alone exhibits considerable limitations in informing a measure of environmental and social sustainability, it remains a prioritised variable within compact city approaches.

The second overarching critique of compact city theory presented in this article is the problematic assumptions made in compact city approaches about the boundary systems for evaluating achieved sustainability. While critical urban theory has scrutinised compact city strategies for being aligned with and driving neoliberal urbanism, pointing to the socio-economic foundations and impacts of compact city projects and agendas, such structural criticism has, to a lesser extent, influenced the ways in which the sustainability of compact city projects and strategies has been evaluated.

Compact urban developments are often critiqued for driving urban growth agendas and spurring entrepreneurial strategies and post-industrial urbanisation (Brenner and Theodore, 2002, 2005; Holgersen, 2015; Holgersen and Malm, 2015). Such critique is representative of conceptualisations of contemporary city-making as caught up in processes of neoliberal globalisation, enabling increases in urban investments and land speculation (Allmendinger and Haughton, 2010; Blomley, 2004; Brenner and Theodore, 2002, 2005; Haughton et al., 2013). On the one hand, such perspectives can be seen as critiques of contemporary urban governance and neoliberal globalisation rather than of compact city models per se. On the other hand, the way in which sustainability ambitions have been fixed to the urban scale (Holgersen and Malm, 2015; Jessop, 2006;

While et al., 2004) justifies a research agenda focusing on the way in which compact city approaches are forged with reference to specific socio-economic policies. For example, recent urban housing research suggests a significant relationship between particular financial models and urban housing typologies (Blackwell and Kohl, 2018).

Contextualising compact city strategies within such structural frameworks highlights the hazard of defining clear system boundaries when evaluating the sustainability of compact city strategies. An example can be given by looking to the evaluation of the relationship between compact cities and greenhouse gas (GHG) emissions. In general, system boundaries are commonly defined according to functional, administrative or morphological city boundaries (Seto et al., 2014). In measuring a city's GHG emissions, administrative boundaries typically figure strongly (accounting for territorial emissions). However, in their recent publication, Moran et al. (2018) show that by including indirect emissions when accounting for area emissions, a substantial portion of global emissions can be attributed to a small number of cities. Attributing income (as opposed to urban form or geographic location) as having the highest correlation with increased emissions in urban areas, Moran et al. (2018: 5) state that '[i]n most countries ... even the most footprint-intensive suburbs are outshone by the scale of consumption in urban centres'. By including scope 3 emissions (a consumption-based accounting approach)³ in a city's carbon footprint, Moran et al. (2018) argue that a city's attributed emissions can increase two to three times above the city's direct emissions and that these emissions cluster in affluent cities and neighbourhoods. Moran et al.'s (2018) argument highlights the structural correlation between cities, income and GHG emissions that is not captured by

measuring sustainability according to traditional system boundaries. Similarly, a study of the 20 largest cities in Finland showed that '(1) income and personal carbon footprint increase with increasing population, density, and the compactness of a city, and (2) the decrease in emissions caused by reduced motor fuel consumption is not strong enough to compensate for this' (Ottelin et al., 2019: 33).

Overall, this article argues that compact city theorisation is restrained by its spatial imagination. The critiques outlined emphasise the limited ability of Euclidean notions of space to capture the relationship between compact cities and achieved sustainability. First, urban form alone is limited in its ability to determine the GHG emissions or social sustainability associated with urban livelihoods. Second, and building on this, the system boundary issue of measured sustainability in compact city developments enforces a paradox between the built environment, urban livelihoods and their global footprint. In finding solutions for sustainable urban livelihoods, such discussions need to bridge the gaps between socio-economic structures and globalised relations, and between governance arrangements and concrete solutions sought 'on the ground'. To account for these weaknesses, I suggest that a relational orientation can be useful for attuning research and practice to compact cities' actual and potential (re)production.

Towards a relational conception of compact cities

Relational orientations within geography and urban studies understand cities as constituted through the social, material and political relations in which they take part (Heynen, 2014; Jacobs, 2012a). These perspectives provide a means for approaching

the compact city's discursive and material constitution in its extensive and intensive dimensions. Here, I make use of topography and topology to develop a relational framework for the compact city. These conceptual tools allow for articulating space as simultaneously real and conceptual (Martin and Secor, 2014; Lefebvre, 1991 [1974]), while neither the topographical nor the topological maps neatly onto either. Whereas topology provides a structural framework for relational theorisation, topography provides a framework for connecting, counting and comparing real and conceptual elements and places (Jacobs, 2012a; Katz, 2001; McFarlane, 2016; Martin and Secor, 2014). As such, topography can provide a language for describing the comparative geographies within and between places as well as the more general distribution of relations across Euclidean space, while topology can provide the means for describing the spatial operation of these same relations as well as the way these relations manifest with real discursive and material effects and foundations (McFarlane, 2016).

Following McFarlane (2016), this article understands topography and topology as two different, yet intrinsic, spatial registers; rejecting a binary understanding of the two. As such, topography and topology are conceptual tools for working through the extensive *and* the intensive dimensions of the compact city, with the ambition of understanding its political, social, economic and ecological expressions and configurations. For the purpose of developing such a relational conception of the compact city, I build on three partly overlapping theoretical fields that engage topographical and/or topological approaches in urban studies.

The first theoretical field represents a growing body of literature on what Jacobs (2012a: 413) calls 'new urban topographies of relationality'. This research looks to cities as global relational nodes where increasing

mobility and speed of knowledge, policies and expertise produce new geographies of urban development. As cities increasingly take part in a wide variety of networks, with the purpose of exchanging knowledge and experience across local contexts (McCann, 2008; McCann and Ward, 2011), new institutional spaces for policy development evolve (Haarstad, 2016; Oosterlynck and González, 2013). The policy mobilities literature has been at the forefront of highlighting the active production that goes into mobilising, mutating and assembling ideas and policies between and within cities (McCann, 2008; McCann and Ward, 2011, 2012; Peck and Theodore, 2015; Ward, 2006).

The research produced by the policy mobilities literature has highlighted that cities and city actors make a range of comparative gestures that academics would find both justifiable and unjustifiable (Clarke, 2012). While policy mobilities studies generally highlight the repetition of neoliberal policies in their work (Peck and Theodore, 2015; Peck et al., 2009), recent methodological critiques of these studies emphasise the potential for unpacking the naturalised narratives of urbanisation through these relational topographies, and consequently potentially produce radically different urban geographies (Bunnell, 2015; Jacobs, 2012b; Peck, 2015; Robinson, 2011, 2016). This critique outlines the methodological and theoretical limitations of working with a purely affirmative frame in relational case studies, as they easily collapse (potential) counter-topographies (Katz, 2001) into blindfields. While undoubtedly imbued with specific power relations, topographical networks provide an important ground for actors *to do* topography, that is, to carry 'out a detailed examination of some part of the material world ... in order to understand its salient features and their mutual and broader relationships' (Katz, 2001: 1228). Topography as such has no necessary end in

affirming or countering dominant discursive truths, yet '[t]opographies provide the ground – literally and figuratively – for developing a critique of the social relations sedimented into space and for scrutinising the material social practices at all geographic scales through which place is produced' (Katz, 2001: 1229). For compact city strategies, these relational topographies provide a critical frame for understanding the discursive and material construction of compact city policies and actions.

A second avenue of relational theorisation encompasses approaches that understand the city itself as assemblage (McFarlane, 2011). This perspective represents a shift from attributing relevance to individual elements, to attributing relevance to the *cofunctioning* of individual elements as assemblages (McFarlane, 2011). McFarlane (2011: 653) explains that, 'urban actors, forms, or processes are defined less by a pre-given definition and more by the assemblages they enter and reconstitute. The individual elements define the assemblage by their *cofunctioning*.' Thus, *cofunctioning* provides a language for reconceptualising the placement of urban form within the compact city thesis. Rather than being a constitutive and predefined element, urban form can be defined according to its actual and potential *cofunctioning* with reference to other elements, such as income, welfare policies, housing politics or carbon footprints.

McFarlane's (2016) topological approach to urban density holds potential for conceptualising the *cofunctioning* of elements within the compact city. While urban density is often discussed with reference to 'building heights', 'people per square metre' and other topographic and volumetric accounts, McFarlane (2016: 638) argues that:

density is never just a set of topographical calculations of people to urban form (housing,

infrastructure, and services). Instead, density topographies are always already interpreted as particular kinds of problems requiring particular kinds of solutions, and these interpretations have spatial imaginations and are often deeply ideological and contested.

This makes density a topological problem which 'cannot be conceived or acted upon in and of itself, because it is always a relation to other issues, spaces and actors' (McFarlane, 2016: 630).

From a topological conceptualisation, density can be understood as an expression of the *cofunctioning* of various elements and lived realities that constitutes the compact city. Distinctive from the topographical and volumetric densities typically applied within compact city theory, topological densities entail consideration for the articulation of the intensive heterogeneities (or homogeneities) that enable particular forms of urban life (McFarlane, 2016). As such, a topological understanding of urban density can provide a critical lens into the politics of the compact city's intensive and extensive relations. Where McFarlane (2016) emphasises densities as intensive heterogeneities, this article applies a more general terminology of *relational intensities* and their *planetary constitution* to advance the development of a critical geography of the compact city.

A third relational perspective comprises the extensive materialist (Harvey, 1996; Merrifield, 1993) approach provided by urban political ecology. Affording a lens for analysing (un)sustainable spatialities of the compact city, urban political ecology allows for the conceptualisation of compact city strategies beyond territorial boundaries. The relevance of this perspective results from acknowledging the relations of dependence between places; that is, sustainable practices in one place are constituted by (potentially unsustainable) practices elsewhere (Edwards

and Bulkeley, 2017; Heynen et al., 2006; Swyngedouw, 2006; Swyngedouw and Kaika, 2000). These uneven geographies are relational in the way that the advancement of socio-environmental qualities in one place produces other places too. Swyngedouw (2006: 105) states that '[t]hese disparate processes trace the global geographic mappings that flow through the urban and "produce" cities as palimpsests of densely layered bodily, local, national and global – but geographically depressingly uneven – socio-ecological and technonatural processes'. This uneven production of urban geographies is operationalised through the concept of socio-ecological *co-determination* (Swyngedouw, 2006).

Swyngedouw's attention to the relational constitution of cities and nature situates the idea of the compact city within a framework of its active (re)production of structures, natures, economies, livelihoods and opportunities within and beyond its territorial realms. For the constitution of compact cities, urban political ecology's application of socio-ecological co-determination finds revived relevance through Brenner and Schmid's (2014, 2015) use of Lefebvre's (2003 [1970]) perspective on the planetary processes of urbanisation. Different from acknowledging that urbanisation is a global phenomenon, a planetary perspective understands urbanisation to be the social condition of our time. While relations of co-determination are part of global flows in varying and differing ways, their planetary constitution is a reflection of the fact that the way in which a city urbanises matters to far-off places with no obvious connection to this specific city. Such a planetary perspective represents a simultaneously topological and topographical approach in which the concrete and abstract relationality of all places must be viewed in conjunction with each other.

The following analysis brings these relational theorisations into dialogue with

qualitative research carried out in Oslo, with the aim of advancing compact city theorisation beyond traditional frameworks. Building upon the theory presented, the analysis is structured using three critical frameworks: (1) the relational topographies of the compact city; (2) the relational intensities of the compact city; and (3) the planetary constitution of the compact city. This analysis shows that the work pertaining to the 'Sub>urban' network in Hovinbyen is attuned to a relational conception of the compact city, yet the moves that have been made are partial and fragmented. For example, while Oslo's participation in the 'Sub>urban' network shows a conscious move towards learning across different contexts and the work pertaining to the concrete projects pays attention to the qualitatively different intensities that could constitute the compact city, a planetary perspective is missing and different actors frame the compact city within a local or regional perspective.

The relational topographies of the compact city

The stated purpose of the 'Sub>urban' network was to redevelop urban fringe areas typically developed after the Second World War, which were characterised by mono-functional use and low-density development (Van Tuijl and Verhaert, 2016). With each of the participating cities working with local cases through the network, the idea was to share ideas, experience and knowledge on how to transform fringe areas into compact city areas and, as such, offer an alternative to sprawl. Overall, this network exemplifies the way in which the new urban topographies of relationality are formally addressed through political institutional networks and activity. However, such formal network activity did not ensure a cohesive shift in how actors approached their understanding

of the compact city. In fact, a network approach seemed to allow for a more discursively uneven landscape, ultimately unearthing the idea of a 'true' compact city.

On the one hand, the compact city perspectives guiding the work within the 'Sub>urban' network can be seen as reflective of the compact city policies of the European Union (Van Tuijl and Verhaert, 2016). On the other hand, many of the reflections and actions brought together within the 'Sub>urban' network and in Hovinbyen reflected sometimes conflicting and even radical intentions in the name of compact city-making. The grounded nature of the 'Sub>urban' network, with a multiplicity of local actors in a transnational framework, suggests that such a fragmented network structure encompassed diverging agendas and strategies. Actors found ground to question the discursive cohesion of the compact city by forging new relational topographies through the network.

The relational topographies created provided space to challenge the future of Hovinbyen. The work initiated through the network arguably contributed to establishing a different 'referencescape' (McCann, 2017: 1821) for the compact city in Oslo. Here, the municipality's willingness to 'create a space to think differently' (Plan-og bygningsetaten, 2018: 18) through temporary use and a process-oriented focus was significant in unmaking the discursive consensus of the compact city. This creative space was enforced by the political mandate of the network itself. As one local planner stated, 'we could do many things without following the line of hierarchy'.

The connections made between rather divergent cities through the network allowed common challenges to be identified across differences. As a local planner argued, 'regardless of how different you are [as cities], you are struggling with much of the same. You are struggling with participation;

you are struggling with establishing good neighbourhoods.' Similarly, a city adviser discussed how study trips to the other participating cities in the network challenged naturalised assumptions regarding, for example, housing provision. The adviser emphasised how similar housing projects situated in different national and urban contexts produced radically different livelihoods.

By *doing* topography, actors unearthed the idea of a 'true' compact city and were able to re-evaluate how they 'defined the compact city' (local planner). Unpacking the naturalised narratives of the compact city and establishing new lines of comparison provided ground for challenging collective references guiding the development of Hovinbyen.

The relational intensities of the compact city

These discursive and differentiated topographies of the compact city were further developed through concrete projects and workshops within the network. Two workshops on the topics of the 'productive city' and 'artists as a productive force in urban development' presented a range of local and international examples of the ways in which Hovinbyen could be reimaged as a compact city. As such, the relational topographies, developed through the network, initiated discursive space for challenging how the compact city could be produced differently. Such spaces encompassed critical dialogue on the type of densities that ought to drive the future development of Hovinbyen as a compact city. Density unravelled as a 'topological problem' (McFarlane, 2016: 634), and the relational intensities desired in Hovinbyen unfolded as political questions.

The temporary programming of the Vollebekk area in Hovinbyen is the first

example of how the relational intensities of Hovinbyen were brought into critical dialogue. An empty building, named *Vollebekk Industries*, provided space for actors to challenge the future constitution of Hovinbyen as a compact city. Building on the workshop held on the ‘productive city’, *Vollebekk Industries* was based on a circular economy approach and the local community was invited to initiate social entrepreneurial projects and initiatives.

Vollebekk Industries emphasised that different densities could be established in Hovinbyen, that is, the densities of manual workers, social entrepreneurs, small-scale industrial and residential infrastructures, artistic production, recycling and upcycling schemes, circular economic models, etc. These densities were understood as potentially producing a more environmentally sustainable compact city. Challenging the common perceptions of what the compact city ought to entail, a local planner stated that it is ‘not just offices, housing, business and the service sector that make up the dense city’. However, *Vollebekk Industries* only alluded to the relational intensities that could constitute these qualitatively different densities in Hovinbyen. Because of the temporary aspect of the project, *Vollebekk Industries* remains ephemeral in character. While expressing an imaginary of potentially more environmentally just densities of the compact city, it did not address the cofunctioning of factors that could enforce its continuation beyond the present state of exception (as a temporary project).

The second case provides greater insight into the cofunctioning of individual elements, which may ensure more long-term shifts in the relational intensities enacted in the compact city of Hovinbyen. The project ‘Artist Housing in Hovinbyen’ arose as a direct result of the process-oriented focus of the ‘Sub>urban’ network and was

established as a tri-part collaboration between the ‘Young Artist Society’, an architecture firm and the municipality of Oslo. Artistic involvement in the development of Hovinbyen had been an early focus by the municipality, and the artistic community had voiced its critique regarding the use of artists and art in preparing the area for further development. Artist-driven urban development was described as the use of temporary infrastructure for artistic activity and practice – mirroring events typically occurring during gentrification. A critical discourse developed, questioning how Hovinbyen could be a place of long-term artistic production (Plan-og bygningsetaten, 2018: 69). The question of artistic production in Hovinbyen augmented a discussion of the structural dimensions of the compact city and brought forth an emerging politics of urban density in Oslo where affordability and housing policy were brought into the discussion.

The artist housing project presented a model for integrated affordable housing and studios for young artists in Hovinbyen. The project emphasised the need for alternative housing models for artists due to the group’s generally low and unstable incomes and the curtailing of urban underutilised spaces, such as old industrial buildings, typically occupied by artists through affordable rental agreements. Drawing inspiration from historical artist housing projects in Oslo, the model also drew on flexible building structures, the legal structures of building societies (a fragment of Norway’s post-war housing politics) and the municipal opportunity to provide long-term leasehold agreements on municipal-owned property (which is not typically used for housing provision currently). The project was planned as a non-commercial venture that would provide long-term rental agreements for tenants. The concrete elements of this project resulted

from the active presencing of Norway's post-war housing politics and alternative European housing models in combination with modern wood construction techniques.

The topological makeup of the 'artist housing project' highlights how the cofunctioning of the unconventional factors, when brought into play, conceptualised an ideologically, economically and politically different kind of urban density. Whereas urban form remained largely unchallenged, urban life was reimagined when density was conceptualised as a 'topological problem' (McFarlane, 2016: 634) of housing politics, land ownership and organisation models. The structural conditions for achieving differential densities in Hovinbyen were rendered legible. This project, still in its planning stages, has recently been suggested as a potential pilot for Oslo's political ambition of realising a 'third housing sector' (Oslo kommune, 2019: 141).

In the same way as the topographical approach provides a way of analytically navigating the relative and concrete constitution of the compact city, this topological perspective provides a language for reassembling the political constitution of the compact city in question. However, the political question of planning for 'more socially [and environmentally] just densities' (McFarlane, 2016: 631) cannot be viewed without reference to externalised relations, that is, their planetary constitution.

The planetary constitution of the compact city

Moving towards a planetary perspective of the compact city represents a shift from viewing the city as a contained entity with localised or regional effects, to viewing the city as an active creator of places, lifestyles and emissions in multiple elsewhere. The co-determination of the compact city of Hovinbyen represents both real and abstract relations to a myriad of other places. The

contours of such a conceptual shift have been largely absent from the 'Sub>urban' network and from Hovinbyen more generally. However, and with reference to GHG emissions, trans-local relations have recently become a prioritised consideration within the city of Oslo.

Within the 'Sub>urban' network, territorial perspectives on the compact city dominated. For example, the lead experts in the network, Van Tuijl and Verhaert, wrote that 'reinventing the fringe means simultaneously thinking about the consequences of new plans and ambitions on two levels: the level of the city region and the local level of the intervention site and its immediate vicinity' (Belman et al., 2018: 7). This quote depicts how the scope of urban development was conceptualised with reference to local and regional scales. This territorial logic enforces the perspective that compact city solutions providing housing, tertiary sector jobs and services are more sustainable than, for example, industrial- and small-scale production. As such, the circular economy and the productive city solutions activated through the temporary initiatives in the 'Sub>urban' network find less substantial ground for legitimation through an environmental perspective. This logic is enforced by production-based emissions accounting, commonly used by cities to calculate their emissions. The coupling of production-based emissions accounting and the territorial demarcation of compact city strategies disguises the unequal relations of emissions that are produced from a planetary perspective.

In Oslo, the city's master plan bases its GHG emissions budget on production-based emissions accounting. The city has a goal of becoming a zero-emission city and pays considerable attention to recycling, consumption and transportation. Overall, transportation is identified as the biggest emission source, accounting for about half of Oslo's climate emissions (Oslo kommune, 2018). However,

the city has recently shown interest in addressing scope 3 emissions and is currently working in collaboration with other cities to develop such an approach. While recognising the methodological challenges of accounting for scope 3 emissions (Creutzig et al., 2016a, 2016b; Moran et al., 2018), incorporating such accountability at the city scale provides an opportunity to avoid the trap of allocating consumption patterns to individual responsibilities and choice (see e.g. Moberg et al., 2019). If Oslo were to adopt a consumption-based emissions approach, a different topography of emissions could be revealed and a different topology of emissions drivers and clusters could be found, potentially shifting the logic currently guiding compact city strategies.

Ultimately, this planetary perspective ascribes a different collective responsibility of compact cities as actors *in the world*. Through the temporary activities established in Hovinbyen, such as the circular economy approaches adopted in Vollebekk Industries, the attentiveness to such relational responsibility is apparent. However, the co-determination of Hovinbyen in the world was not brought into a framework that enabled its articulation within a compact city perspective. Adopting a planetary perspective of the compact city could legitimise a different, relational toolkit for evaluating the sustainability of adopted strategies.

Conclusion

The purpose of this article has been to initiate a discussion on the possible conjunctures of the compact city. Prompted by the idea that there is no true compact city, I have argued that the sustainability of the compact city is a matter of its extensive and intensive constitution. By making use of the conceptual tools of topography and topology, I have suggested a relational reconceptualisation of how the compact city is produced, discursively and

materially. This conceptual shift consequently asks different questions of the compact city. It questions the political constitution of the eco-spatial consensus (Knudsen, 2018) that the compact city currently manifests, as well as the possible political conjunctures that could manifest qualitatively different compact cities. This entails asking questions, such as what is the relationship between housing policy or land ownership law and urban form, urban containment boundaries and/or consumption-based emissions? Importantly, and with relevance for relational thinking in urban studies more generally, such an approach works towards operationalising a non-deterministic and relational understanding of structure.

As shown by the analysis of the Oslo case, however fragmented and partial, practitioners are attuned to such relational reconceptualisation. By working through the relational topographies of the compact city, practitioners may forge entirely new comparative geographies. By critically engaging the relational intensities and planetary constitutions of diverging compact cities, such relational topographies may progress compact cities towards sustainability.

In terms of empirical research, this relational orientation confers methodological implications. First, it suggests that the sustainability of a compact city should not be evaluated merely based on individual factors in isolation, or within local or regional growth boundaries alone. For both quantitative and qualitative research, this entails re-evaluations of case boundaries. Case boundaries may be defined analytically and by empirically identifying key drivers within diverging contexts, rather than through territorial means. Similarly, individual elements could be researched through their co-functioning with other elements. This would not negate the identification of key drivers of (un)sustainable compact cities but would reject the prioritisation of universal

categories (such as has been the case with urban form). Second, this relational orientation suggests that learning across differences can advance compact city theory and practice. For compact city research, this means researchers should challenge established notions of comparability (e.g. Jacobs, 2012b; Robinson, 2011, 2016) as they and others may in fact draw theoretical and empirical lessons across very different compact cities. Finally, this article invites policy makers to take a hard look at the types of regulations, laws, practices and alliances that might be enacted to enable more sustainable compact cities.

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Notes

1. I thank Referee 1 for pointing this out.
2. I thank Referee 2 for pointing this out.
3. See Seto et al. (2014: 937, Box 12.2) for a description of different methods of GHG emissions accounting at the local scale.

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