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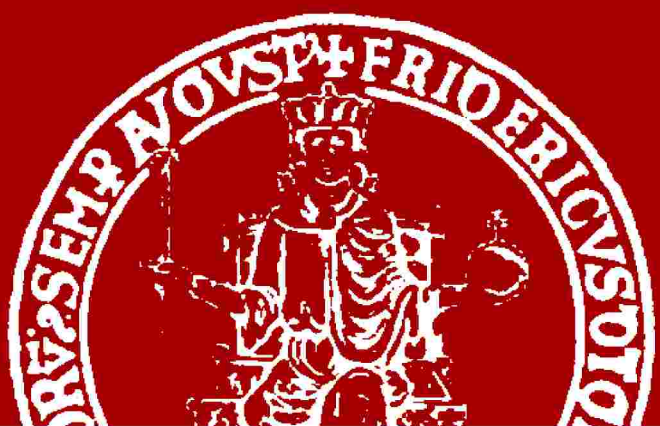

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Public Spaces, Nature-based Infrastructures and Common Goods

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Indice/Index

ASSESSING THE BALANCE BETWEEN URBAN DEVELOPMENT AND DENSIFICATION: CONSOLIDATED PRACTICES AND NEW CHALLENGES

Elisa Conticelli, Claudia De Luca, Simona Tondelli

Abstract

The high-density city has been considered a controversial model, since it does not ensure sustainability *a priori* if not supported by a control of the just density and the promotion of natural spaces in the urban environment, fostering good living conditions and wellbeing. Understanding the right limit between urban development and densification, accompanied by the enhancement of urban natural spaces and ecosystem services, has becoming crucial to prevent pandemic effects as well. To this aim, assessing frameworks are already available to urban planners to make informed decisions as well as the knowledge on the role of green infrastructures and ecosystem services that can guarantee urban health and quality life. The paper aims at rediscovering these findings in the new perspective of the pandemics.

Keywords: urban densification, strategic environmental assessment, ecosystem services

VALUTARE IL GIUSTO EQUILIBRIO TRA ESPANSIONE E DENSIFICAZIONE URBANA: PRASSI CONSOLIDATE E NUOVE SFIDE

Sommario

Da tempo la città densa è stata considerata dagli studiosi un modello controverso, che non garantisce la sostenibilità a priori se non accompagnata da un controllo della giusta densità e della promozione degli spazi naturali in ambito urbano, che garantiscano cioè elevati livelli di vivibilità. Comprendere il giusto limite tra espansione e densificazione, accompagnato dalla valorizzazione degli spazi naturali urbani e dei servizi ecosistemici diventa determinante anche prevenzione di effetti pandemici. A questo scopo sono già a disposizione degli urbanisti strumenti valutativi per prendere decisioni informate e conoscenze sul ruolo delle infrastrutture verdi e dei servizi ecosistemici che possono garantire una vita sana e di qualità. Il paper intende riscoprire questi strumenti, anche alla luce della recente pandemia.

Parole chiave: densificazione urbana, valutazione ambientale strategica, servizi ecosistemici

1. Introduction

The recent pandemic has posed new short, medium and long-term challenges not only to health systems but also to all the economic and social sectors of the urban and regional systems, bringing into play the way these systems are organized and planned. Urban planning is therefore facing major challenges posed by the COVID-19 pandemic, but this situation is not uncommon in the history of urban planning.

Public health has always been treated in relation with the city structure and form and urban planning was born as an independent discipline in the XIX century, to provide effective solutions to combat epidemics and diseases due to poor hygiene conditions and overcrowding in cities. The first urban planning theories, such as the Garden city theorized by Howard or the rationalist city promoted by the Modern Movement, were largely focused on identifying the right urban density, expressed mainly in terms of population density at building and urban scale, to ensure health, quality and pleasantness in living.

Since decades, urban densification has been advocating by numerous urban planners as contrasting measures for limiting urban sprawl, energy consumption and air and noise pollution, ensuring the implementation of more efficient urban services (M. Breheny, 1995; Burton et al., 2003; Newman & Kenworthy, 1989). Densification has been frequently adopted as a strategy able to stimulate deep renovation of the existing building stock, with special regards to the need to improve the energy efficiency and seismic safety of the built environment. It has also been advocated as the model opposed to urban development and sprawl, as cause of land-take and therefore of ecosystems loss and environmental degradation.

However, this position has been questioned in the urban planning debate being considered controversial and even contradictory in terms of promoting sustainable urban environments (Williams, 1999). Moreover, the social distancing and the lockdown measures introduced by the COVID-19 pandemic seem to have reinforced the debate around the validity of the compact and dense city model form in terms of citizens' health and wellbeing.

If we analyze the first studies concerning the correlation between population density and pandemic spread, the alarming positions against the high-density city model does not appear to be justified. Density is not the cause of contagion itself, but rather overcrowding, lack of affordability and access to basic services and disparities (Flint, 2020). But indeed, the outbreak and the need to adapt our life and working styles to the new circumstances make it necessary to investigate how to achieve the balance between the motivations to densification and the availability of natural spaces in the urban environment, which guarantee high levels of livability and health while ensuring the respect of the new social distancing rules.

Understanding the balance between the densification and the greening of the city will allow to define a "livable compactness" of the urban environment, setting the conditions for increasing the quality of life and also for helping the containment of the contagion for current and future epidemics.

To this aim, urban planning should incorporate an even greater attention to the enhancement of urban natural spaces and to the exact identification of ecosystem services and related benefits that they can ensure, assessing the impacts and effects on health and wellbeing of alternative planning decisions prior to their implementation.

This contribution intends to present and discuss the principles supporting the "livable compactness" concept, assumed as a sustainable city model, outlining a possible pathway for the transition towards the concept of livable and healthy compactness.

2. Density in cities: the need to achieve a livable compactness

The compact city has been clearly promoted since 60s to combat the negative effects of urban sprawl. Since the late 80s and with the introduction of the sustainability principles (OECD, 2012), more compact urban forms have been tightly linked with the idea of more environmentally sustainable cities and with improved quality of life. By reducing distances, concentrating people and mixing different uses, high density cities could optimize energy and transport flows reducing air and noise pollution, enabling social interactions and the access to basic services and facilities, while preserving the natural environment by reducing land take and urban sprawl. This thesis has been endorsed by important institutions worldwide, such as the American Planning Association, the European Environment Agency and the United Nations (Neuman, 2005), pushing towards planning more compact cities worldwide.

While the promotion of denser urban environments was becoming wider, some scholars have expressed concerns, casting a shadow on the idea that high density urban spaces are always sustainable and accepted by the people. Higher densities can negatively affect the quality of life, resulting in potential increase of traffic congestion and energy consumption (Gordon and Richardson, 1997; Mindali *et al.*, 2004) reduction in green spaces (Haaland & van den Bosch, 2015; Jim, 2004), with negative consequences on health (Ng, 2009). Therefore, living in decentralized locations remain attractive for the majority of people (Breheny, 1997), even though the urban locations are revived and revitalized with new uses and facilities.

More recently, reference institutions pointed out these risks, by suggesting the need of more conscious and informed approaches, especially for what concerns promoting and maintaining natural spaces and biodiversity within the city. The New Urban Agenda recommends combining densities and compactness with adequate enlargements for ensuring a sustainable urban development (UNGA, 2016). This implicitly means that increasing the density might undermine the livability and the environmental sustainability of the urban systems, reducing the presence of open green spaces, questioning the need of understanding which is the limit for densifying the urban environment. On the other side researchers and institutions concentrate more on building knowledge on better understanding and measuring compactness and density to better inform density-related policies and strategies (Mubareka et al., 2011; OECD, 2012).

This position is advocated also by the Urban Agenda for the EU and especially through the work done by the Partnership on Sustainable land Use and Nature Based Solutions. In the Partnership's Action Plan (SULP, 2018), the concept of livable compactness is presented as the result of an articulated decision making process that aims to find the balance between compactness and the need to achieve high standards of quality of life in a healthy urban environment through the efficient use of land, providing adequate amount of public and green spaces as well as affordable housing and improved living conditions.

This position is rooted in the idea that urbanization is not an adverse phenomenon in itself but can be a viable option if the alternative is to deprive urban areas of enough spaces for nature and socialization to guarantee urban livability and health. Indeed, there are situations

where increasing the urban density can undermine the optimal levels of green areas and ecosystem services for the inhabitants, or the efficiency of the urban infrastructures and systems. In these cases, the comparison between two alternative scenarios, further concentration vs. land take, is necessary, to choose the more sustainable solution on each specific situation.

The debate around urban densification has been continuing and increasing during the COVID-19 outbreak, posing new challenges related with the pandemic spread within high-density urban systems

Since the beginning of the pandemic, the idea that density was a driver of the epidemic was very common because of the high number of COVID-19 cases and death rates registered in the main urban areas; in fact, it has been argued that living in spaces with higher population densities made generally more difficult to keep the necessary distances (Rocklöv & Sjödin, 2020). This generated a sudden loss of the polarizing power of the bigger cities (Fistola & Borri, 2020), increasing the original attitude to seek more suburban and rural places to live.

In a later stage, the correlation between the spreading of the virus and the urban density has been investigated by different scholars, achieving important results. Although there are not still many findings on this topic and the research is still ongoing, apparently there are no evidence about the correlation between population density and the virus spreading. A study on 76 cities worldwide (Adlakha & Sallis, 2020) does not reveal any association between high population density and the COVID-19 cases and death rates.

Two similar studies conducted on the urban counties of the United States (Carozzi *et al.*, 2020; Hamidi *et al.,* 2020) found that density was indeed speeding up the outbreak especially in metropolitan areas, but no evidence emerged about the correlation between the population density and the COVID-19 incidence after the adoption of social distancing measures. In high density counties there was a better management of the social distancing and easier access to good delivery and health care services than in low-density counties, and this allowed to contain the spreading of the virus during the second phase of the pandemic. Indeed, Hamidi found that COVID-19 death rates were higher in low-density counties, in part due to differences in access to health care (Hamidi *et al.,* 2020). Besides, Hamidi *et al.* (2020) identified connectivity as a more impactful factor on the gravity of the pandemic spread and lethality than density. According to their findings, more connected centers (no matter if they are high density or low-density ones) are more hardly hit by the virus.

These first results seem to confirm that the compact and high population density city should not be addressed as an unsustainable and unhealthy model on its own. At the same time, urban density relates to urban systems, functioning and dynamics that are rather unexplored in relation with the pandemic spread. Planners and policy makers should investigate to what extent densification is possible by considering the multifaceted responses of high-density environments to the pandemic spread. In this game open green spaces can play a crucial role to ensure the respect of social distancing, which is difficult to control in crowded urban neighborhoods and city centers, and stimulate social interactions, ensuring citizens' quality of life, wellbeing and eventually mental health.

In other word, if in the last decade the compact city form has been debated in terms of quality of space, permeability and climate change adaptation, evoking the idea of urban resilience, today the city resilience should be assessed and planned by also considering quality of life, wellbeing and health risk with a clear perspective on the role of green

spaces. Density itself is not the problem, nevertheless reallocation and distribution of outdoor spaces can be crucial in cities' planning of tomorrow. This means to revise the traditional urban form for ensuring enough green open space and distance that allow for appropriate hygienic conditions. In our perspective, this makes necessary to evaluate under which conditions – when and where – a further densification is allowed, and the contribution given by open spaces to the city quality, health and wellbeing.

3. The role of green areas for ensuring a livable and healthy compactness

Even though compact cities result to be efficient in terms of transport, land-use change and energy efficiency, an increasingly stronger debate is raising around dense cities' liveableness and quality. Indeed, a consequence of densification could be to fill urban voids with high density and efficient buildings, taking out space for citizens recreation and wellbeing. Minimum quantity of public and green areas is ensured and maintained in most of the European cities, but the real accessibility and quality of such spaces does not always allow the effective share of green per citizens. The careful distribution and the quality of green spaces – beside the mere quantity - and the services offered by such green spaces, is thus a key issue to be considered into city planning.

Green areas are indeed providers of a range of benefits that improve environment and citizens' health and quality of life, directly and indirectly. Such benefits that humans derived from urban green areas can be identified and categorized through the Ecosystem Services (ES) framework (Nelson *et. al*, 2005)

The Ecosystem services framework defines four categories of services: provisioning, regulating, supporting and recreational services (Costanza *et. al*, 1997). Specifically, in urban areas, urban ecosystems provide humans with:

- regulating services: air filtering (gas regulation), micro-climate regulation, noise reduction (disturbance regulation), run-off control and water purification (water regulation), pollination;
- supporting services: habitat for species (refugia), genetic resources;
- provisioning services: food production and fresh water (water supply);
- cultural services: recreational and cultural values (spiritual and educational services).

The improvement, maintenance, management, and planning of such services, taking into consideration three intrinsic aspects of supply, demand from population and actual flows of benefits, could strongly support urban areas in creating healthier and more sustainable urban environments. Several cities have already started to work on their transformation through the integration of Urban Ecosystem Services (UES) into sustainable urban planning (Cortinovis and Geneletti, 2018, Woodruff and BenDor, 2016). The real provision of such services depends on several factors such as:

- supply of ES: Quantity, quality, location and availability of urban ecosystems (Baró *et al*., 2016);
- demand of ES: population distribution within the city, citizens diverse needs based on different age, gender and culture, vulnerable groups' needs (Villlamagna *et al.*, 2013);
- perception and awareness of citizens – co-production of ecosystem services (Andersson *et. al*, 2019);
- resilience of the same urban ecosystems and related services to external and internal drivers and changes (i.e climate change, demographic change, COVID-19) (Biggs *et al*., 2012).

Urban planning and environmental disciplines are recognizing the crucial role of UES (Kabisch *et al*, 2015; Kaczorowska *et al.*, 2016) into urban policies, strategies, and plans, however the gap between research and practice is still varied. In recent years, the academic community focused on this topic (Kaczorowska *et al.*, 2016; Woodruff and BenDor, 2016; Cortinovis and Geneletti, 2018) and the findings are contributing to a better understanding of what is still needed to improve UES integration into urban plans and policies.

4. Assessing frameworks for managing density and health

While research on assessment and evaluation of ES supply provided by urban green areas is raising in numbers and quality (Barò, *et al.*, 2016, Haase *et al*., 2014) and the integration of ES is incrementally common in urban policies and plans, studies on ES diversified demand, citizens' perception and co-production are lacking, and just starting to raise attention (Andersson *et al.*, 2019). Assessing and evaluating citizens' demand and perception, together with a better knowledge on the quality and the distribution of urban ecosystems, would largely raise awareness on people needs in terms of open green spaces and could support planners and decision makers at the moment of making decision on urban densification.

Also, studies on ES resilience to external and inherent drivers of change are needed to support planners in understanding how to design resilient urban ecosystems against possible future scenario (ageing population, shrinking or increasing population, climate change, pandemic, etc.). Such studies and related practices do not need just innovative methods and tools but, most of all, they require an interdisciplinary and transdisciplinary collaboration within the same local authorities (i.e. different departments of the same city council such as planning, environment, health, mobility, housing, etc.) and among different urban stakeholders (De Luca *et. al*, 2020).

An important step in this direction is therefore to equip urban planners with proper tools for taking informed decisions for controlling the limits of densification policies and balancing the distribution and amount of artificial and natural space, exploiting all the possibilities offered by the urban ecosystems.

Many consolidated evaluation frameworks and tools are already available to urban planners (Gasparatos, 2010). They have been studied over the last decades with the aim of dealing with urban problems in the long term (Ameen *et al*., 2015). Frameworks are structured procedures deeply focused on comparing different policies or project alternatives, even if the analytical techniques of comparison are not specified a priori, while evaluation tools are the analytical techniques and methods (e.g. multi-criteria analysis, indices and indicators, cost-benefit analysis, ecological footprint, etc.) applied for operating this comparison (Gasparatos, 2010). Typical examples of assessing frameworks are the Strategic Environmental Assessment (SEA) and the Environmental impact Assessment (EIA) which have been formally introduced in the European context respectively with the EU Directives 2001/42/EC and 85/337/EEC as codified procedures for assessing those policies and projects that impact the environment significantly. SEA is carried out for those plans and programmes which are likely to have significant effects on the environment. Notably the assessment is obligatory for plans and programmes which are prepared for town and country planning or land use, and which also set the framework for future development consent of the projects listed in Annexes I and II to the EIA Directive (article 3). A specific set of tools is represented by the so-called urban sustainability assessment methods, such

as BREEAM Communities and LEED-ND, which have been receiving great attentions for the sustainability assessment of urban developments, but are showing also some limits in covering all the aspects concerning urban sustainability (Ameen *et al*., 2015).

By considering the goal of informing decisions at planning stage, the potential of the Strategic Environmental Assessment is more effective if compared with tools and assessing procedures at project level. This is even more crucial when it is necessary to assess alternatives such as new developments intended as compensation for desealing, or urban greening interventions of inner portions of the urban areas with respect to densification actions for avoiding land take and for regenerating and revitalizing already developed urban areas. SEA should allow to adopt win-win strategies combining the reduction of land take with urban greening improvements. This aim has been highlighted by the Partnership on Sustainable land Use and NBS in its Action Plan, calling for the need of strengthening the role of SEA to this purpose.

Indeed, SEA can be effective in terms of embedding the idea of well-being in a broad sense not only by taking into account the role of green areas for improving the health and wellbeing of cities but also by considering all the health related factors (UNECE, 2012), given its potentials for what concerns the identification of win-win options combining opportunities for new developments within the carrying capacity of ecosystems.

SEA is a systematic and anticipatory process that influence type and location of developments in relation to the effects on the environment by addressing cumulative and large-scale effects within the time and space boundaries. The added value of the SEA for supporting a sustainable development, if compared with EIA or other assessing tools, is that it assesses the urban development from the earliest stages of its preparation and through its implementation. This is a critical feature with regards to densification policies. Indeed, as stressed also by Williams (1999), it is crucial to consider and monitor the cumulative effects of densification, since it is an incremental process. The UNECE (2012) stressed the need of including the human health - intended broadly as wellbeing - in SEA well before the pandemic has made evident this need, by identifying which determinants or factors influencing health may be significantly affected by the implementation of a plan, as well as by integrating the approach characterizing other specific assessing procedures usually applied in the health sector, such as the Health Impact Assessment (HIA). The idea of integrating HIA in urban planning decision-making processes was also encouraged by the WHO European Healthy Cities Network, stressing the urgency to take account of people's health and well-being while developing policies, programmes and projects to address the determinants of health (Nowacki, 2018).

The SEA directive recalls the "human health" component among those which need to be assessed, even if in a generic way, stressing the possibility to further deepening urban factors and determinants affecting health, as well as integrating these aspects into more articulated considerations including also the other components, an integrated assessment approach involving high-density environment, urban ecosystems and health issues.

SEA applications on current urban and spatial plans have therefore several challenges to tackle: to consolidate assessment procedures targeted to balance urban densification interventions with maintaining and consolidating the presence of accessible natural spaces in cities, accounting the effects of these options on human health.

5. Conclusions

The compact city has been challenged by the recent pandemic, which has been questioning its validity. It can still be a resilient city model even if compared to health risks as long as it is adequately planned, by carefully analyzing the diverse and contradictory phenomena generated by the pandemic (Fistola & Borri, 2020). Today there are specific tools and knowledge at disposal to urban planners yet, showing a potential for addressing health crises such as those underway, but also existing problems as to find the limit of urban density. Studies conducted on green spaces and ecosystem services already have a clear focus on providing important benefits to urban life and the health and well-being of human beings. At the same time, evaluation tools such as the Strategic Environmental Assessment have a potential that has not yet been fully expressed or explored regarding the assessment and comparison of different urban planning options which ensure efficient use of land and accessible and high quality green spaces at the same time. In addition, there is the still little explored possibility of including more specific assessments regarding the effects of planning actions on health and wellbeing.

The challenge is therefore not much to build new tools or abandon existing urban models but rather to achieve full integration of these topics into the decision-making process, trough the adoption of assessing frameworks that support these decisions. The final auspice is to develop more systematic and in-depth studies on this field, to ensure that our cities can achieve a livable and healthy compactness.

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