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Pandemic and the planning of resilient cities and regions

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ABSTRACT

The emergence of the coronavirus pandemic motivated this paper, which revisits the nexus of public health and the city, itself a main source of a pandemic which similarly threatens the lives and properties of the world population gradually one glacier at a time: climate change. We argue that pandemics expose both the vulnerability and resilience of the urban system expansively, from rooftop to the region, but also serve as change agents for the planning of resilient cities and regions globally. The discussion of the urban system and the pandemic is comparative, with the recent coronavirus and climate change, a persistent, long-lasting pandemic. The historical and critical review and synthesis of the durable concepts of the urban system at the kernel of the theories and practices of urbanism is highlighted by place matters, cyberspace, density, access, and the city-region. We note the implications for reconfiguring the resilient urban system of the future effectively with pandemic as change agent and the comprehensive plan and its regulatory zoning ordinance as implementation tool.

1. Introduction

Public health and city planning have common disciplinary purposes. City planning’s professional identity is defined as a guardian of “public interest.” Standard City Planning Enabling Act (SCPEA, U.S. Department of Commerce 1928) is even more specific, defining municipal planning’s promotion of “health, safety, and general welfare” of the population. Public health is about identification, control, and prevention of disease. The common references to parks and open spaces with a physiological metaphor—the “lungs” of the city—connotes the nexus of public health and the city explicitly. City planning’s focus is the physical layout of the city in a manner that promotes health and prevents the occurrence of diseases in the first place. Concomitantly, city and regional planning and design theories, concepts, regulations, and practices emerge historically in response to public health crises, including pandemics, pollution with rapid industrialization, congestion with urbanization, and loss of green space in cities. The origin of modern city planning is aligned with sanitary, housing, and social reforms since the mid-nineteenth century and around the turn of the twentieth century—movements dealing with inadequate sanitation—itself a pandemic response—and limited access to air and sunlight in crowded tenement housing and dilapidated slums.

The coronavirus pandemic has at least temporarily significantly reconfigured city life—the relation of work and residence, and leisure, use of public space, safety and security of transportation, both public and private—and posed fundamental equity of access to resources. A smart planning scenario could not have anticipated and illustrated the wide-ranging, impactful socio-spatial dimensions of the coronavirus pandemic in entirety this vividly, let alone applied standard urban planning tools—the comprehensive plan and zoning regulations—proactively (Banai, 2013a; Kelly, 2010). It turns out, planning’s tool set are disproportionately limited piecemeal or disjointed compared to the magnitude and wide-ranging scope of the better known, durable pandemic of climate change. However, the global experience of the coronavirus pandemic also informs and suggests what kind of planning is commensurate with the dimensions of the challenges posed by climate change. It turns out, pandemics expose the vulnerability and resilience of the urban system, ironically with durable concepts of urbanism, highlighted from the rooftop to the region. The paper is organized by a discussion of durable concepts of urbanism, with implications for reconfiguring the urban system, aided by invoking urban planning’s standard tool—the comprehensive plan. The paper concludes with a discussion of planning resilient urban form of the future in the era of climate change.

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2. Pandemics and durable concepts of urbanism: from rooftop to the region

Oxford dictionary defines pandemic with its Greek origin in mid-seventeenth century, pandēmos, all (pan) people (demos) “prevalent over a whole country or the world.” Arguably, climate change, which is prevalent globally, fits that definition, just as coronavirus does. A question is immediately raised: which pandemic is more costly—coronavirus or climate change? Hint: One pandemic is a one-hundred-year event, compared to the other, with an incubation period that started with the industrial revolution in 1600s. However, the two pandemics have a similar pattern of spread: Exponential.

Measured by loss of human life, unemployment, underemployment, social isolation, public expenditures, reduction in gross domestic product, and supply-chain interruption, the costs of coronavirus are immense. However, compare the cost of climate change. Green House Gas (GHG) traps pollutants in cities. Combine tailpipe and smokestack pollution from vehicles, buildings, factories, and heat islands in cities, and there is risk for respiratory illness, including asthma and cardiovascular disease, consequential for the children, the elderly, and populations predisposed with genetic chronic health conditions. Parenthetically, people with respiratory and cardiovascular illness and diabetics, which are also linked to urban form-induced obesity as well as poor diet, have a lower chance of surviving the other pandemic: coronavirus.

Furthermore, consider the costs of entire islands inundated due to sea-level rise, or so-called king (or high) tides that infiltrate coastal cities’ groundwater table with sea salt, threatening drinking water and causing frequent surficial flooding depositing sewage into rivers and lakes (Chicago), and disrupting traffic in city streets (Miami). Add the mitigation costs of levee, dike, and sea-wall construction in coastal cities globally, like New York City, New Orleans, Amsterdam, Venice, and London. Include droughts that threaten agriculture, causing food insecurity that subsequently threatens employment and national security (even a source of failing states), and induces population migration in search of survival.

This is not an exhaustive itemized costs brought about by the silent pandemic of climate change gradually taking its toll on the built and natural environments. The evidence of climate change pandemic and its consequences for cities and regions is compelling. The itemized list in the comparison of pandemics of climate change vs. coronavirus is tentative with respect to consequences of coronavirus. The juxtaposition of the two pandemics, however, is instructive. Ironically, one pandemic has a positive impact on the other (see Fig. 1). Images in the media show clearer skylines and iconic, ground-level landmarks, such as the Eiffel Tower, to be more visible than usual due to quarantines in otherwise congested, polluted, populated, heated-up cities. There are even the images of Venice’s canals and waterways looking clearer than ever, as the coronavirus quarantine leaves them undisturbed.

U.S. Environmental legislation has ensured public health of the city with clean air and clean water for the past half-century, abating GHGs—carbon dioxide, sulfur dioxide, nitrate dioxide. Similarly, clean water legislation regulated the disposal of cities’ waste into rivers, the sources of drinking water and aquatic life. Ohio’s Cuyahoga River was once so polluted that it caught fire, but owing to the Clean Water Act, it’s now home to marine life. However, the images of clean waterways and clear skylines during the coronavirus epidemic suggests next steps toward further management of waterways and air pollution in cities.

We hope for a vaccine that will cure the coronavirus, but no such thing can solve the pandemic of climate change. It takes more than a shot in the arm.

Surreal images of cities known for their population density, air pollution, and traffic during the pandemic appeared in the media—skyline visibility but with empty streets, deserted downtowns, blighted parking lots surrounding commercial retail stores, empty office buildings, locked college and university gates, and desolate public parks. In the pre-coronavirus era, empty stores and parking lots and desolate public spaces were regarded as indicators of intolerable blight, justification for urban revitalization. Ironically, among the vestiges of blight and sprawl is the drive-in movie theatre, revived because of the pandemic as a safer alternative than the big-box movie theatre. And the impact of social isolation on mental health is also recognized. How could cities and regions sustain the public health benefits of cleaner air and water with a resilient urban form and a smaller ecological footprint post-coronavirus?

The coronavirus pandemic, despite its devastatingly inimical tolls on humans, sheds light on the architecture of urbanism, revealing strengths and vulnerabilities of the urban system. The pandemic has in effect enabled a social experiment with controls that are usually possible only in the closed system of a laboratory, not in the open system of a society; however, this experiment calls for a rethinking the urban system with expansive concepts of resilience in planning cities and regions. We note the implications for the comprehensive plan in the face of climate change.

2.1. Place matters

The literature on the importance of place, and the related discussion of place-making in urban studies abound. Much of the discourse of the new urbanism which emerged in the 1980s is about civic places, which disappeared in the private, subdivided spaces of suburbia (Katz, 1994). The American dream of a house, a yard, and car excluded community, as Hayden (2003) argued (see also Calthorpe, 1993; McHarg, 1969/1995). The mainly residential suburbs bereft of civic spaces could not accommodate a social place for the teenage population without the car, with the exception of vacant lots and buildings under construction. Suburbia segregated commercial-residential-public land use, in contradistinction to the historic American Main Street with fine-grained, mixed land use, and an accessible park. The comprehensive (master) design plans of new urbanism aimed to remedy this shortcoming with integrated land use and pedestrian-friendly access, with enhanced public realm elements, which occupy prominent landmark locations with water feature and articulated surficial materials of the sidewalks anchored by gazebos and pocket parks, heeding the pedestrian as well as vehicular circulation.

When the pandemic limited or prohibited access to the public realm, its significance became even more apparent, albeit with an eerie sense of a public realm that is no longer a public domain. The longing for the city’s public realm, temporarily off-limits during the pandemic, was expressed through the building balcony, which architecturally transitions between public and private space. The balcony substituted for an inaccessible public realm—from the street, the town square, the park, the waterfront, the cemetery, to places for religious gatherings, church, synagogue, mosque—places that functioned, albeit with some adaptation, aided in cyberspace, and occasionally in defiance of any imposition of control (see also Oldenburg’s (1991/1999) notion of the necessity of “the third place” where essential human interaction occurs beyond work and home; see also Calthorpe & Fulton’s, 2001, page 37 elaboration). The limit of the experience of physical place via cyberspace is readily revealed if reminded by Lynch’s (1960) cognitive mapping of the five elements that makes the city legible or imageable, and the sense of place attributes including ambience, sound, smell, topography (steepness of roads) and the like. If eclipsed in dense theoretical academic writing, commercial and social media alike exemplified the significance, actual experience of and the longing for the city’s public realm, particularly during a pandemic.

The vitality of the city is determined by place. Where else? Vitality is among the five “performance dimensions” of good city form, defined by Lynch (1984, page 118) as “... the degree to which the form of the settlement supports the vital functions, the biological requirements and capabilities of human beings—above all, how it protects the survival of the species.” (See also Banai & Rapino, 2009.) Where better to observe
the function (or dysfunction) of the settlement form but in the city's public realm, particularly in a pandemic.

It is not just the pandemic of an infectious disease that is consequential for the vitality of the city's public realm. Climate change's extreme weather pattern with heavy rain events threatens city's vital public realm element with street flooding. The point- and non-point-source pollution during intense rain events threatens city's water bodies. The comprehensive plan can increase cities' resilience by rezoning blighted, abandoned industrial and commercial properties as green open space buffers that absorb or slow surficial runoff that creates hot spots of pollutants in cities' rivers, creeks, and streams.

A dominant element of the public realm is the suburban arterial street. The wide arterial street is enhanced if “shared” equitably accommodating movement of pedestrians and vehicles. The long-term comprehensive plan is a tool to accomplish this aim, by physical design alterations that “calm” traffic and thereby increase public safety. Integration of green space in the arterial street in the form of medians or embankments enhances pedestrian safety while abating runoff during the intense rain events that characterize climate change.

2.2. Cyberspace

Telecommunications technology and cyberspace substitutes for risky in-person communication in physical space during an easily transmittable pandemic. Communication theorists widely touted the benefits of interaction at a distance even pre-coronavirus. Among others, Webber (1964) argued the case for “community without propinquity.” The coronavirus effectively revived and reminded us of the merits of the arguments for and against more widespread online communication. Arguments in favor of communities of place rather than communities of interest in cyberspace (Calthorpe & Fulton, 2001), however, suggest plausibility with the experience of communication during pandemic and the longing for interaction in physical space of place and neighborhood, and the (physical) public realm, even in defiance of state control. Economic and urban theorists up the ante by privileging the benefits of interaction with economies of agglomeration in physical space necessary for efficient business transaction (see also Lynch 1984). Notwithstanding the facility of communication in cyberspace, still an urban form of the future—the aerotropolis—is defined by a physical space that accommodates agglomeration of firms and business transactions in a central location akin to the city's central business district (CBD) (Kasarda, 2006, Kasarda, 2011, Kasarda and Lindsay 2011). The pandemic showed us the inequity of access due to lack of broadband technology—the digital divide—so the comprehensive plan is an ideal tool for enhancing city's resilience by a planning infrastructure that not only includes water, sewer, and roads, but also broadband service (see also Kelly, 2010). We learned from the pandemic how vital functions are interrupted—education, from pre-school to college; health care; and access to jobs and services. Broadband access is not a luxury but a necessity when in-person access is interrupted or not an option. Parenthetically, a similar logic holds in planning transit-supportive or transit-oriented developments. The urban form, with its land-use mix and proximity to the centrally located retail and office services are desirable features because of walkability, regardless of the availability of transit (Calthorpe, 1993; Calthorpe & Fulton, 2001).

2.3. Density

The environment-behavior nexus was investigated more than half a century ago by the then-burgeoning subfield of environmental psychology. These well-known laboratory experiments revealed how rats develop abnormal behavior when subjected to crowding. Concomitantly, the classic environmental-behavior studies informed
how urban form likely impacts the physical and mental health of the urbanists. Even obesity (body-mass index) is linked to urban form (walkability), elucidated in the contrast of compact vs. urban sprawl (e.g., Frumkin et al., 2004; Ewing et al., 2011). Commentators, backed by empirical evidence, touted the public health benefits of cities that promoted walkability with multi-modal regional mobility, thereby abating obesity, and which contained places of work as well as residence and leisure, thereby minimizing stressful commuting to work. (Ewing et al., 2011; Frumkin et al., 2004).

The urban-studies literature has given considerable attention to density. Density figures prominently in urban studies since the feasibility of a vital element of urban form—public transit—is contingent on population density’s minimum threshold.

However, even predating the laboratory experiments of the environmental psychologists, an English thinker (Howard, 1898/1902) around the turn of the century proposed and later constructed a Garden City that meant to address the health, safety, and general welfare of industrial city residents exposed to all the negative consequences of industrialization, crowding, congestion, pollution, sprawl, and lack of parks and open green space. Arguably, the small, low-density Garden City land use in balance with the natural environment is a more resilient model of urbanism than the compact, high-density New York City in the face of epidemic guidelines that call for social distancing and low population density of the public realm.

Durable concepts of urbanism originate prominently in the contrast of two prominent thinkers, one English and the other French. The French modernist architect-urbanist Le Corbusier (1934/1967) touted his tower-in-the-park skyscraper concept of Contemporary City as a better solution to the rapid urbanization of population and congestion spurred by industrialization. The Contemporary City accommodated 100 times the population of the Garden City with only 30,000 that his English predecessor, Howard (1898/1902) had proposed in skyscrapers (LeGates & Stout, 1998). The “popular response” to Plan Voisin, a later version of the Contemporary City proposed for central Paris in 1925, was “outrage” (LeGates & Stout, 1998; see also Birch, 2009). However, Corbusier’s concept of a dense, modern urbanism with the iconic skyscraper endures globally in cities, famously in the iconic New York City (see Lang, 1994). The pandemic cast a negative image of urban density, and its corollary, public transportation, as hotspots of the coronavirus (New York City, Los Angeles, and compact Spanish, Italian, and English cities).

Density figures prominently in contemporary accounts of new urbanism since density correlates with walkability in the “transit metropolis” (Cervero, 1998). Even before the coronavirus pandemic, the dense high-rise buildings—particularly for public housing in neighborhoods disconnected from the rest of the city—connoted the image of the vulnerability of their impoverished, isolated, low-income residents. The destruction of St Louis’s Pruitt Igoe—designed by a renown modernist architect—demonstrated the unsustainability of the high-rise public housing project. In contrast, modern high-rise buildings could densely accommodate residents in resort towns with a premium view and rent. Their residents could weather the lock-down, shelter in place guidelines during the pandemic. However, public housing, following federal guidelines like Hope VI and Choice Neighborhood, is now low-rise with a front porch that resembles houses in older American city neighborhoods before the suburbanization of businesses and population spurred by post-war national interstate highway system.

However, density is still a hard sell in popular discussions of real-estate markets. Low-density single family rather than multi-family housing is politically palatable to politicians who count votes with rooftops, even though compact land development is arguably environmentally more sustainable particularly in the face of climate change and demographic shift (immigration) that increase demand for housing and ancillary urban services—water, sewer, and road.

In urban-studies literature, discussions of density and how higher thresholds are tolerated, particularly by urbanites accustomed to low-density suburban sprawl, extend to the justification of trade-offs, i.e. how density is plausibly compensated with other factors, (urban) design features that enhance aesthetics of place, and (land-use) diversity that improve proximity of housing to jobs, services, and amenities like parks and open space—so-called 3Ds (for impact on travel, see Cervero & Kockelman, 1996). Density correlates with demography. In the context of the pandemic, still other factors must be added to the 3Ds in deference to public health: demography, disaggregated by racial composition, ethnicity, age, and income. The correlations among the factors are instructive. At risk are residents characterized by compact living and commuting, transit-dependent population, or workplace-residence separation exacerbated by the digital divide. For the purposes of public health during the epidemic, the aforementioned factors require optimization simultaneously. The comprehensive city plan is a logical tool for that optimization.

2.4. Access

Let us posit the concept of access inclusively with Lynch (1984) as a dimension of the performance of urban form, not merely by modes of travel to work or services, but also availability of resources. Perlman and O’Meara (2007) remind us that the urban poor are likely located in “ecologically fragile areas of cities,” without adequate water and sewers. Coronavirus-prevention guidelines include frequent hand-washing. How could these hygiene standards be met when there is no access to running water in poor settlements of the global North and South? The Navajo settlement is but one example in the U.S. (see also www.digdeep.org). War-stricken regions of the world whose populations are victimized by global power play, such as Libya, Yemen, Syria, Turkey, and Afghanistan, and refugees in Greek Islands, are among other examples. Once again, pandemics—be they climate change or the coronavirus—reveal the vulnerability of the population in urban, peri-urban, and rural areas with global inequity of access to the resources fundamental to human survival. The coronavirus pandemic had a positive effect too, with the U.N. Directorate’s declaration to halt ongoing wars globally, particularly in the Middle Eastern countries most heavily impacted. The impact of military conflicts on the global population and environment is rarely discussed in the literature of climate change. The advocacy planning argument of the 1960s and 1970s that posed the “plural plan” responsive to the underrepresented, marginalized, disenfranchised, colonized population revives the discussions of the equity of access to resources with environmental justice in the twenty-first century, particularly in the face of pandemics (see Davidoff, 1965).

2.5. The city-region

The wealth of nations is created in cities, Jacobs (1984) reminds us. Global environmental sustainability starts with urban environmental sustainability (Perlman & Sheehan, 2007). Cities provide economies of agglomeration, and of scale with efficiencies of resource utilization. However, the idea of abating pressure on resources concentrated in urban centers, like London and New York, and striking a balance of nature and development by spreading population to the larger region did not stop in England with Howard’s concept of the Garden City, noted above. The Garden City idea influenced a group of regionalists, or de-centralists with English connections in New York. A multi-disciplinary team, journalist (Howard), socio-cultural critic (Mumford), social reformer (Bauer), economist (Chase), biologist (Geddes), sociologist (Perry), forester-naturalist (MacKaye), a developer (Bing), and several architects (Ackerman, Whitaker, Wright and Stein) formed the Regional Plan Association of America (RPAA, 1920s; see also Banai, 1993, 2013b). An exemplary feature of this regional planning is its multi-scale scope: from neighborhood to the region. It turns out, the “neighborhood unit” (Perry, 1929) is an enduring concept manifested in new urbanism that emerged in 1980s.
The economist member of the Regional Plan Association of America (RPAA 1920s), Stuart Chase, considered the bigger picture of the efficiency of the urban and regional economy as a problem, stated thus:

“The regional planning of communities would wipe out uneconomic national marketing, wipe out city congestion and terminal wastes, balance the power load, take the bulk of coal off the railroads, eliminate the duplication of milk and other deliveries, short circuit such uneconomic practices as hauling Pacific apples to New York customers by encouraging local orchards, develop local forest areas and check the haulage of western timber to eastern mills, locate mills near cotton fields, shoe factories near hide producing areas, steel mills within striking distance of ore beds, food manufacturing plants in small giant power units, near farming belts.”

(quoted in Hall, 1996, pp. 151–152)

For further discussions of local vs. global, economic vs. ecologic tensions in urban development, see Korten’s (1996) political-economic critique of capital markets, deemed as exacerbating ecological systems, Shuman’s (1998) “replacing imports” in self-reliant local communities in a global age, and Roseland and Soots’ (2007) “strengthening local economies.”

The break in the global supply chain during the coronavirus pandemic made the dire consequences abundantly clear, particularly for the health-care sector with loss of life. How “uneconomical,” Chase might ask, is the practice of offshoreing industrial and manufacturing production and sending the finished products, in whole or part, back to the country of origin by air, sea, river, rail, and road? Parenthetically, airline tickets now relay magnitude of carbon footprint in trans-Atlantic passenger flights. For a sustainability assessment of a futuristic concept of urban form anchored by a “globally networked economy’s airport”—the aerotropolis—see Banai (2017). Air transportation’s contribution to global climate change remains awaiting the development of technologies that economically sequester atmospheric carbon.

The idea of the city and the region as a unit is at the kernel of how the U.S. census defines the metropolitan region, metropolitan statistical area (MSA) determined by commuting (see Banai & Wakolbinger, 2011). Parenthetically, this very commuting among inner city and suburban municipalities aids in the transmission of coronavirus, from high-density urban to low-density rural counties. Young (2020) quotes the governor of New York, “Many people in the new York city metro area live and work across three states’ borders, so just as they coordinated shutting down various businesses during coronavirus, it makes sense to eventually together bring people back.”

The holistic concept of the metropolitan region that highlights the functional links among urban and regional economies also reveals the strengths and limits of the urban system, and thereby informs the comprehensive city plan’s objectives of enhancing sustainability and resilience of the built and natural environments of climate change.

3. The straw that broke the camel’s back: one planet

Human activity’s gradual degradation of the natural environment has a long history that has only intensified since the onset of the Industrial Revolution, with exponential growth in carbon emission due to burning of fossil fuel—coal, oil and natural gas—sources of GHS. A popular idiom is aptly invoked. The planet Earth’s holding capacity, like the proverbial camel, is finite, continually burdened with harmful human activity, diminishing gradually by each melting glacier, like straw on a camel’s back. (Formally, economists use the term “margin,” or “last unit” to explain concepts, as in the cost of producing one more unit of a product, the marginal cost of production.) The precise tipping point, or better stated, breaking point for the planet Earth beyond any recovery, is in debate. The signs are visible in the built and natural environments, with droughts, fires, floods threatening food security, national security, employment security, rising poverty, inequality, and global diaspora (Brown, 2009, 2011).

Wackernagel and Rees (1996) measure ecological footprint by amount of land needed to sustain human needs for production of food and disposal of waste. Land is a finite resource. By that definition, Wackernagel and Rees (1996) illustrate that if everyone lived like people in the Netherlands, then two additional planet Earths would be needed. Parenthetically, the Netherlands example is ironic, given the compact Dutch urban form integrated with nature and exemplary sustainability practices (see Bentley 2014). Furthermore, Amsterdam’s Schiphol airport is regarded as a model for the “aerotropolis,” a futuristic concept of urban form (Kasarda and Lindsay 2011). There is no literature on the public heath aspects of the aerotropolis; however, comparing it to the exemplary Amsterdam metropolitan region that contains the airport (Schiphol) offers some clues. The region is characterized by the historic structures, integrated urban development and nature, compact, mixed-land use with multi-modal regional mobility archetype of European cities (See Bentley, 2009). European countries with net zero are the ideal of how we should live next.

However, Pacala and Socolow (2004) offer a variety of existing technological solutions that limit carbon emission over the next fifty years (see also Calthorpe, 2011). The limit is achieved by a combination of alternative sources, from renewable energy (solar, wind, hydro) to conservation to nuclear power.

Interestingly, in Spain, a country hit hard by one pandemic (coronavirus), the road to recovery is through solutions to the other pandemic—climate change—such as pledging to outlaw fossil fuel—coal, oil, natural gas—toward 100% renewable sources of energy.

4. Conclusion

The pandemic has a global reach, by definition. The method of the approach and presentation of this paper is comparative by juxtaposing the pandemics of climate change and coronavirus, and through a historical and critical review and synthesis of the durable concepts of the urban system at the kernel of the theories and practices of urbanism expansively, from rooftop to the region, highlighted by place matters, cyberspace, density, access, and the city-region. The urban system connotes a holistic approach, with a synthesis of concepts of the urban system elements that are heretofore regarded individually particularly in dealing with resilience. The holistic notion of the urban system thus sheds new light on the resilience of system parts when regarded as a whole.

We have juxtaposed the recent coronavirus pandemic with climate change, a persistent, long-lasting pandemic which threatens civilization, not merely urbanization (Brown, 2009, 2011). Pandemics expose the vulnerability and resilience of the urban system ironically with durable concepts of urbanism, from rooftop to the region. The recent pandemic has posed the dilemma of physical vs. virtual space. The accounts of this distinction appear with durable concepts of place and space in urban studies, which shed light on recent pandemic-related discussion.

Cyberspace and physical space are related concepts. The distinction made between “community of place” vs. “community of interest” is revisited in urban studies, particularly with the concepts of place-making. There are limits and possibilities in both cyberspace and physical spaces. The critical role of access is also posed in both spaces, with respect to efficiency and justice. One space asserts the dilemma of a “digital divide,” whereas the other asserts the dilemma of public vs. private transportation with equity and efficiency. Place density is also a durable, controversially held concept of urbanism. We have highlighted discussion of density dating from first decades of the twentieth century, relating to the challenges of public health. The recent pandemic posed anew the challenge of public health with urban density.

Pandemics, while exposing the vulnerabilities of the urban system, are also a driver of positive change in planning resilient urban form of the future. Reconfiguring the urban system in the era of climate change...
is compelling with the majority of world population living in cities and regions. At the outset of the paper (pages 1–2), we pose the kind of planning that is commensurate with the dimensions of the challenges posed by the pandemic needed for resilient cities. We argue the case for comprehensive planning, and provide specific interventions toward resilience, with place matters, cyberspace, density, access, and the city-region. The logic of the long-term comprehensive plan is compelling given the interrelated elements of the urban system. The argument is that resilience of the whole is dependent upon the resilience of the individual parts. The paper thus provides specific areas of how the parts are addressed with elements of the urban general or comprehensive plan. For brevity, the discussion of the application of comprehensive planning as a mode to enhance resilient cities is limited. The comprehensive plan with a legal backing is long-term oriented, with parts that account for key physical elements that prepare the urban and regional system to confront the challenges of climate change. The comprehensive plans rarely include physical elements that enhance the urban and regional resilience proactively in the face of climate change. We have identified how the urban system is reconfigured, from the infrastructure of the public realm (the street, town square, park, and open space) to place density with a human-scale, telecommunication, regarded at par with essential infrastructure of water, sewer, and road, to integrated urban and regional economies that enhance efficient, sustainable local production and distribution of resources. Further studies fruitfully build on our comparative, evaluative framework of pandemics as drivers of change toward resilient cities of the future.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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