The strategy of reimagining urban design in preparation for facing epidemics after the Corona virus and its use in the future: lessons from global experiences

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Abstract:

With the emergence of the Corona virus, restrictions on the use of public places, confinement and social distancing were essential, and therefore taking policy measures to reduce transmission of the virus and protect public health was a given, and therefore we are currently in the midst of unprecedented restrictions on the use of public places around the world. The World Health Organization has called on more than half of the world's population to stay at home and reduce movement in public places, (here we mean the urban center, and given that infection may turn into a long-term threat, or a chronic threat, architects are asking how to adapt the design and despite the adaptation of many countries to the changes that resulted in urban design as a result of the Corona virus, there is still a great deal of uncertainty about how the Corona virus will affect urban design in the future? And the importance of urban design and the problems it faced under the Corona pandemic and the new social life, and the development of a proposed vision to re-imagine urban design for cities in light of the Corona pandemic and global life. In order to achieve the objectives of the study, the inductive and comparative approach were followed through the analysis of the study cases, given the nature of the study and the suitability of this approach to it.

Keywords:
 epidemics, corona virus, urban design

Research questions:
• Is it possible to adapt urban design and management to face epidemics, according to a crisis response strategy?
• Will this global experience lead us to rethink the urban design of the cities of the future and the way we develop and (re)design them?

Aim of the study:
This research paper aims to shed light on the emerging questions at the interface of the Corona virus and the problems that resulted in light of this pandemic, in order to reach a re-imagining of urban design for cities in light of the Corona pandemic and the new social life to reach livable cities in the post Corona virus world.

Research problem:
There is a strong need to intervene in the study of the impact of epidemics on urban design features after the emerging corona virus crisis and to research the depth and extent of the unclear

transformation and long-term effects, especially with regard to the design and future use of future cities, in order to reach a re-imagining of the design of cities capable of facing epidemics and crises.

Research Hypothesis:
If we have already entered the era of epidemics and rapidly spreading diseases such as the Corona pandemic, we need to design cities that have many means of protection from epidemics and rapidly spreading diseases so that they are livable and whose streets are not empty of residents once a new epidemic breaks out.

The research methodology consists of two parts:
• The first part (the inductive approach): in which it presents a set of concepts related to urban design, epidemics, the emerging corona virus and how it affects urban design and its ability to adapt to the current situation by studying and analyzing a set of global experiences that faced a set of problems.
• Part Two (The Comparative Analytical Approach): This part presents an analysis of a set of measures taken by a group of countries to develop urban design and conduct a comparative analysis of these measures, to arrive at the proposed work strategy to re-imagine the urban design of cities and transform social life in them, and thus reach the future vision to adapt urban design to the new situation.

1-Introduction:
Over the centuries, the relationship between epidemics and cities has been turbulent. In 430 BC, smallpox killed a fifth of the population of Athens. In 1334, within six months, the plague killed a third of the population of Florence of 90,000, and in the mid-nineteenth century, a cholera epidemic swept through London[1] and contributed to the formulation of the first urban public health strategies, and the outbreaks of many deadly diseases in recent years had dimensions. The outbreak of the Ebola epidemic in West Africa and yellow fever in Angola between 2014-2015 and in the Democratic Republic of the Congo in 2016 posed serious challenges in crowded urban environments, and with the emergence of the emerging corona epidemic, there are many changes facing countries in all fields, and accordingly, planners, architects and urbanists found that this epidemic is a great opportunity to rethink shaping the city so that it is able to face epidemics[2], given that resilience and urban resistance is represented in the city's ability to survive and prosper in the face of disasters and social changes within the communities by rethinking the urban design of cities and the reconstruction and exploitation of the available space and land in the future.

In many cities around the world, the comprehensive closures to confront the Corona pandemic have made daily life much closer to rural life at a much calmer pace than before, as there emerged in the early days of the crisis a great deal of discussion about the need to expand sidewalks and redesign pedestrian crossings for convergence, provide bike lanes and reduce vehicle lanes. Many countries have begun to put a set of permanent changes in outdoor spaces such as London, Boston and Portland where these cities began to develop a plan to reconfigure streets to accommodate more cyclists and pedestrians for longer distances[3], thus cities are at

the forefront. Responses to the emerging coronavirus crisis, as COVID-19 has accelerated the shift towards a new urban model and thus towards inclusive,[4] green and smart cities. ( )

2-Lessons learned: to rethink urban design in a post-coronavirus world:
The coronavirus pandemic has highlighted social and spatial inequalities within cities in an unprecedented way, with tight, crowded working-class and poor neighborhoods such as most Queens in New York or migrant worker housing in other cities bearing a heavy burden of injury and loss of livelihood. As countries emerge from the crisis of this pandemic, there is an urgent need to help cities reshape areas of economic density and to work on making the urban fabric inclusive and sustainable for all segments of society.[5] ( )

1. Public space planning, provision and protection: It is very important to reconsider the size, design and spatial distribution of public space, including sidewalks, parks and open spaces as well as public facilities such as offices and community centers, and this is of great importance in crowded developing cities where home spaces are limited and families are generally large, it will help improve social distancing and recuperation and will provide opportunities to strengthen the response to and recovery from the Corona virus.

2. Changing regulations to provide a more built-up space: Although crowding increases density by decreasing the average available space per person, elevation achieves economic density by increasing floors and built-up area, yet strict density regulations, set limits on building heights and the number of properties that can be built, and this unduly limits the area that can be built, as we see in the central regions of São Paulo, Brazil, and Mumbai, and we must organize the cities.

3**. Mobilizing funding for urban infrastructure projects to strengthen the capacity of local government agencies and the local community to improve living conditions in poor areas and slums:** The most important needs are the provision of drinking water and sanitation services. Water taps and public toilets are basic services, but they also represent hotbeds for disease transmission, because of the close friction between users, and therefore, it is necessary to expand the scope of targeted interventions that enhance the capacity of the state and the local community as well as increase funding for infrastructure projects and services.

4. Securing land and property rights: Without securing these rights, poor residents, whether squatters or residing in slums, will have little incentive to improve the conditions of their shelters.

5. Striving to not pollute the environment: When interventions to stem the spread of this virus led to vehicles being pulled off the streets and polluting closed facilities, residents in many large developing country cities enjoyed seeing clear skies and breathing clean air for the first time in decades.

6- Using artificial intelligence to tackle the Corona virus: Since the emergence of the epidemic, the public and private sectors around the world have used artificial intelligence as

one of the most effective tools to tackle the "Covid-19" epidemic; In the healthcare sector in particular, AI has been used extensively given the urgent challenges posed by the virus, particularly in the field of diagnostics and drug and vaccine development.

Given the severity of the "Covid-19" outbreak, most countries have taken measures for physical distancing and asked their citizens to stay in their homes as much as possible, despite this, government agencies, companies and institutions by activating means of remote communication using artificial intelligence tools were able to maintain activity, economic and workforce productivity, while providing adequate levels of health care, education, and other basic services. The experience of the "Covid-19" epidemic has proven that robots can perform the necessary tasks to respond to crises in situations that are considered unsafe for humans, such as the crisis of this epidemic. To protect people from exposure to this virus, robots have been programmed to roam the streets and appeal to residents to maintain physical distancing and follow safety precautions in many cities around the world. [6]

Thus, through the previous theoretical study and analysis of lessons learned from the experiences of countries to redevelop urban design to address the Corona virus, it is possible to reach the existence of a multidisciplinary conceptual framework to address the urban and socio-spatial effects of Corona virus measures in different cities, and then arrive at the proposed action strategy to reimagine an urban design for the cities of the future.

3- The strategy of reimagining an urban design in preparation for facing epidemics after the Corona crisis and its use in the future as follows:
Table (1) shows the strategy of re-imaging urban design in preparation for facing epidemics after the Corona crisis and its use in the future

Elements	The strategy	Future vision
urban public places	Considering public spaces as an important asset in times of crisis.	• Public spaces are essential in providing space for the rapid establishment of temporary and secondary facilities that can be used for longer than originally envisaged, so they must be flexible, multifunctional and adaptable. Public spaces are a critical asset in a time of crisis, supporting alternative mobility, providing important opportunities for recreation, sport and for many poor people a source of livelihood.
	Create a well-connected and integrated system for public spaces including streets.	• With nearly half of the world's population under or out of lockdown, vehicular traffic has dropped dramatically on our streets and public transport ridership has fallen by as much as 80% in some cities, so cities temporarily and some have to re-allocate road space permanently from cars to provide more space for people to move around safely.

		• Establishing a network across the city, facilitating movement, and respecting the rules of physical distancing. • Creating more walkable streets and investing in city greening to reduce carbon dioxide emissions and improve air quality, which also affects people's health and well-being and reduces COVID deaths.
	Expand the land area for public spaces including streets.	• Physical distancing requires the ability to leave enough space between people when in public places, and therefore the area of land in cities designated for public places must be expanded to be able to create more flexible cities. • Widening streets for active commuting is seen as an effective measure to make physical distancing possible on sidewalks, particularly in countries that already have a high proportion of pedestrians walking on insufficient footpaths, such as in informal settlements and slums.
	Build job flexibility to be flexible in times of crisis.	• Public spaces must be multifunctional, flexible and constantly adapt to the situation, as we need to build resilience through rapid adaptation, for example, integrating (temporary) food markets into neighborhood/community spaces such as parking lots or streets to ease congestion in markets current. • Transforming small neighborhood spaces into pop-up community health centers, food distribution spaces, or making space for food gardens in marginalized communities and slums where food is essential. • Programming of streets and spaces to allow organized street selling on specific days or times of the day, ensuring multiple use and shared use of spaces. Reallocate street space by expanding sidewalks to facilitate safe walking, skating and jogging, and introducing (temporary) bike lanes to enable safe mobility
	Providing livelihoods for the poor in public spaces.	• The most affected by the epidemic are poor families, many of whom depend on public places to earn a living. More than 60% of urban employment in Africa is employed in the

		informal sector and each group of informal workers produces goods or services essential to the functioning of the economy. So it is important during the lockdown, to allow the street vendors to continue working and to make a space for it. • Streets can be adapted to provide space for vendors at a sufficient distance from each other to sell their wares and to provide street vendors with protective equipment to continue to earn a living.
	Transforming public space into a platform for sharing (connecting places and people).	• Public spaces that remain open for use provide opportunities to share information about prevention measures such as the importance of physical distancing and hand-washing hygiene. • The government can provide clear and accessible information in these public places where there is a lot of misinformation about it. • These spaces can also provide a platform for dialogue and negotiation to enable government, the poor and informal workers to jointly discuss and come up with relevant frameworks to prevent the spread of COVID-19.
	Equitable distribution of public spaces at all levels.	• The pandemic has shown how unevenly distributed public spaces are in many of our cities, especially in slums, where there are few common spaces such as parks, gardens and playgrounds within a 10-minute walk of the house, and despite the importance of parks, green spaces and playgrounds in contributing to reducing stress levels, improving mental health and well-being and contributing to children's development, it is still considered a privilege. Local governments need to ensure open spaces are evenly distributed across the city, connected by a network of streets that promote walking and cycling while adopting physical distancing and ensuring flexible, multifunctional use of public spaces and streets to limit the spread of the virus.
	Plan for a Self-Contained Neighborhood or	• With the pandemic and movement restrictions, the 15-minute self-sufficient compact city is a model that can contain the spread of the virus

	"15 Minute City Neighborhood."	where all residents can meet all their needs - whether for work, school, shopping, health, leisure or culture - within 15 minutes from their doorstep, without having to venture around town. This can only work if there is a fair distribution of basic services, streets and public spaces.
	The design, management and maintenance of public spaces and materials used are key factors in combating the spread of the coronavirus.	• The COVID-19 virus resides in the air and on surfaces for long periods of time, and therefore maintenance and hygiene must be provided within them, especially on common surfaces, handles and furniture.
	Building "Social Resilience.	• The COVID-19 virus has negative and positive effects on how people interact with each other in public places and as part of the social fabric, the pandemic and the nature of the virus impacts the way we socialize, challenging existing cultural and familiar practices, which can create tensions in public spaces. The social and communicative elements of public spaces remain important and can enhance resilience in communities such as designing balconies above streets where community members gather to connect with one another, or converting neighborhood streets into cinemas, theaters or sports classes
Sectors Sharing	Advocating for richer partnerships for many sectors.	• The experience of the COVID pandemic is leading to richer partnerships across sectors, from health care to public housing agencies, to funding for community development and community organizations, to philanthropy and research that can influence policy. • Create a common policy agenda where urban planning, community development, architecture, green building, and public health - all are incentives to work towards better policies to limit the spread of the COVID virus.
	A participatory planning process	• The tool facilitates the opportunity for broad dialogue and provides an assessment against all

	for building urban resilience in small towns, or neighborhoods in megacities.	potential risks. The end product is the City Resilience Framework, which sets out the initial actions for building a city resilience building.
	Participatory progressive urban design.	• A gradual methodology is being adopted to support national governments within small and medium-sized cities in developing countries in order to implement the principles of the new urban plan and the sustainable development goals in urban planning and design practices, by guiding users through a participatory gradual process divided into phases, parts and activities while making use of tried and tested methods to build local capacity and encourage ownership. In light of that objective and frameworks of urban design and planning, local governments can set and follow a specific path to achieve sustainable urban development for the benefit of inclusive societies.
Infrastructure	Providing essential services needed for marginalized communities during the pandemic.	• Provide clean toilet facilities, water points and/or appropriate cleaning products that can help the non-dwelling or the poor to protect themselves. Many open spaces in informal settlements can provide hand washing facilities to ensure the survival of families without running water.
	Promote the sustainability and effectiveness of water utilities through partnerships of water utility operators.	• Support settlement water and sanitation operators of all sizes to help deliver essential services to inclusive, safe, resilient and sustainable cities.
	Sustainable waste management	• Design and implement solid waste management strategies, including resource extraction from waste and energy generation from organic waste.
	Planning for water, sanitation and infrastructure investments.	• Develop comprehensive and fundable medium-term investment programs in water and sanitation infrastructure to assist national

Urban mobility		governments and water and sanitation service providers.
	Shifting to sustainable urban mobility.	• Support the creation of a nationwide urban transport strategy (different from national transport) and local sustainable urban mobility plans committed to deep decarbonization.
	Reduce emissions	• Support the realistic identification and dissemination of ITS interventions, and increase the absorptive capacity of public authorities to define, obtain and manage the scope, budget and needs.
	Share transportation	• Directing the transport quota heavily towards mass transit and active travel in cities.
	Use of an electrified public transport system supported by high levels of active mobility.	• Minimize the use of private cars and it will be part of a multi-system, private motorized transport will become electrified, and increasingly rely on traveling by small vehicles or traveling using electric vehicles (e-bikes, e-scooters, skateboards, etc…
	Updating the regulatory and legislative framework to include regulations that facilitate the achievement of a clean and sustainable transportation system.	• Searching for long-term and sustainable sources of financing for public transport and environmentally friendly mobility and reconsidering the institutional framework governing transport and mobility, while creating an integrated coordination framework between the different entities.

4-Results:

1- Participating architecture and urban design can provide the necessary solutions and development strategies in the time of epidemics, by focusing on following the sustainable development goals for urban cities as follows:

• Inclusive and vibrant neighborhoods and communities

It contributes to urban renewal reducing spatial inequality and poverty by transforming underserved areas of cities into connected, dynamic, diverse and vibrant neighborhoods that embrace development for the entire city and the hinterland. UN-Habitat's innovative approach will include a strong focus on human rights and increased accessibility for persons with disabilities, older persons, youth, children and women while opening pathways for broader social and economic transformation.

• Smart cities that focus on the human factor

It promotes the shared prosperity of cities and regions by providing digital transformation for the benefit of all, and works towards greater sustainability, inclusiveness, prosperity and realization of human rights along with other major programs in collaboration with other UN agencies.

• Resilient settlements of the poor in the urban area

It improves the social and economic prosperity of the urban poor by reducing climate disruption and enhancing service delivery and community resilience. It also works to provide comprehensive technical assistance to integrate pro-poor climate action into national and local policies, planning frameworks and participation at the local level to facilitate community-led profiling and planning.

If we have already entered the era of epidemics, how do we design cities that remain safe and livable and whose streets are not empty once a new epidemic breaks out?

5- Recommendations:

2- The research recommends rebuilding cities again to be able to cope with pandemics through some necessary modifications, such as increasing hand-washing facilities and equipping sewers with tracking devices, which may be sufficient to limit the spread of infection. Cities will be more prepared for epidemics as long as they are less crowded, have more open spaces and have the resources to ensure their self-sufficiency.

3- The research recommends setting up services within cities through the use of public transportation, especially during the outbreak of pandemics. That is why the cities of the future must be equipped for cycling.

4- Cities in the future may not be able to resist epidemics unless they have sufficient resources and space to build these temporary centers quickly.

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