Impact of Covid-19 in shaping new resilient urban planning approach

S Aiswarya Raj¹, E J Angella and C Pooja
Department of Architecture, College of Engineering Trivandrum, Thiruvananthapuram - 695016, Kerala, India.
¹Email: aiswaryasraj95@gmail.com

Abstract. With unprecedented urbanization in the 21st century, world nations have been consistently working on addressing climatic challenges and improving urban life. The Covid-19 outbreak has exposed the consequences of our negligent approach to urbanization and planning. The Covid-19 pandemic has affected each of us globally and has left us questioning the way we lead our lives. Severe repercussions of Covid-19 are felt across every aspect of the society. However, though pandemics have devastated mankind, a look into history proves that, they have been critical in modifying the condition of the built environment. This paper primarily focuses on the impact Covid-19 has on urban spatial planning, with an understanding of the relationship between pandemics and various spatial planning aspects. There is a critical assessment of the long-term impacts Covid-19 has on urban life across the world. The various challenges caused by the pandemic, with focus on urban planning context and the changes that has happened in the planning field, during the pandemic have been discussed. Covid-19 crisis could fundamentally change spatial planning and the current way of life. This necessitates the need to understand the challenges posed, the failures, the potentials hidden; and thereby facilitate building pandemic resilient cities for a better tomorrow. The current innovations and trends in urban planning as coerced by Covid-19 is researched and developed upon keeping in my mind the past lessons and issues to usher a new sustainable-resilient urban planning.

Keywords: Covid-19, pandemic, urban planning, resilient cities

1. Pandemic and urban planning

Urban planning reflects emerging technological developments as well as major problems. The absolute most notable improvements and developments in urban planning, since history, have been as a response to major public health crisis. The history of mankind has consistently been hit by pandemics. According to the World Health Organization (WHO), a “pandemic” is the worldwide spread of a new disease. Though, pandemics have devastated mankind, they have also been critical in modifying or altering the condition of the built environment.

1.1. Relationship between pandemics and various spatial planning aspects

1.1.1 Mobility. At times of a global pandemic, like the recent Covid-19, it is the mobility and transportation sector that is the most affected. Disintegrated urban form and haphazard development, leads to narrow streets, congested junctions etc., which triggers the disease spread. Complete shutdown of these facilities affects the livelihoods of millions of citizens who are dependent on these. Pandemics therefore, call for the need for responsible mobility and innovative measures.

- Housing: Inadequate shelter or even homeless people are in the verge of threat, in the case of any pandemic. This part of the society is the worst affected by pandemics, as they have no...
access to basic services and live in unhygienic conditions. In case of pandemics, the spread in such regions is higher compared, to more civilized regions, with better living conditions. And most importantly, the spread doesn’t stop here and continues to spread into the so-called civil society, thereby turning into a huge disaster.

- **Density**: The population density in people per sq.km of area, has incredibly increased from the year 1961 to 2018 [1]. Since history, most of the health pandemics occurred has time and again proved that the spread is airborne. Studies point out to high urban density, for the probable spread of the infections. The condition is worse in the Global South, with nations like India, where a good percentage of the dense population do not even have access to basic service and facilities, aggravating the condition.

- **Open spaces**: Modern cities are overcrowded, leaving very little green space. In times of pandemics like, the recent Covid-19 or airborne disease epidemics like the influenza, the need for reachable open spaces has ever increased, as people have realized the role of open spaces in mental and physical health. According to an article, fear of contagion in closed indoor spaces may increase demand for more exterior spaces, this is where it can fulfill the gap. Such open areas play a key role in ensuring mental health, which is equally important in times of pandemics like the recent Covid-19. The importance of pedestrianization has also increased.

### 1.2. Influence of past pandemics on planning

**Yellow Fever and Cholera**: Cholera and the yellow fever epidemics triggered the introduction of modern urban sanitation systems and innovations in disease mapping. Introduced many planning reforms, cleaned the streets and set up sanitation departments over the next 50 years [1].

**Bubonic Plague**: Squalid and cramped living quarters were cleared in the cities, broadened boundaries, quarantine facilities were built, opened cluttered public spaces, and qualified professionals from surveyors to architects were employed. Tuberculosis, Typhoid, Polio, and Spanish Flu: Tuberculosis, typhoid, polio and Spanish flu breakouts in the 20th century prompted urban planning, slum clearance, tenement reform, waste management, and, on a larger scale. Respiratory Diseases and other Health Diseases during Industrialisation: After industrialisation, housing regulations were introduced around light and air as a precaution against respiratory diseases in overcrowded slums in Europe [1].

### 2. Covid – 19 and urban planning

Spatial measures such as quarantines, social distancing, reduction in the use of public spaces to decrease the spread of Covid-19 pandemic have severely impacted the urban centres and cities which thrive on social interactions and density.

#### 2.1. Understanding covid-19

Corona virus (COVID-19) is an infectious disease caused by the most recently discovered corona virus 2 (SARS-CoV-2). As in two preceding instances of emergence of corona virus disease in the past 18 years [1]; SARS (2002 and 2003) and Middle East respiratory syndrome (MERS) (2012 to the present), the Covid-19 outbreak has posed critical challenges for the public health, research, transportation sector, medical communities and livelihood means. On March 11, 2020, the World Health Organization (WHO) declared COVID-19 a pandemic [1]. People can transmit the virus without showing symptoms, but it is unclear how often this happens [1].

#### 2.2. Relation between covid-19 and urban life

According to the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services, "There is a single species that is responsible for the COVID-19 pandemic – us.” As the human population doubled and the global economy almost quadrupled, along with rural to urban migration has resulted in a change in the urban pattern, demographics, and consumer behaviour. A few major changes of our urban lifestyle that directly and indirectly led to the current pandemic:
Environmental changes: Our lifestyles have led to depleted forests and other natural areas to create spaces for urban settlements, entertainments, agriculture and industries. Consequently, we have destroyed delicate habitats, wildlife and degraded natural buffers between humans and animals. Climate change, greenhouse gas emissions, cause changes in temperature and humidity, which directly affects the survival of microbes. A new rapid assessment by UNEP and ILRI on zoonotic suggests that epidemics become more frequent as the climate continues to change.

Behavioural changes: Increased demand for animal products has led to the expansion of uniform cropland and intense livestock farming in rural areas and near cities. Informal markets such as wet markets, where live, wild animals are reared and sold, often in unsanitary and unhygienic conditions require special attention [1]. Genetic diversity builds disease resistance among animal populations and decreases the chances of outbreaks of high-impact animal diseases, according to a 2017 IPBES report. Conversely, intensive livestock farming can produce genetic similarities within herds and flocks, reducing resilience and making them more susceptible to pathogens. This, by extension, exposes humans to a higher risk [6].

Pathogen changes: With the increase of intensive farming and overuse of antimicrobial drugs in both animals and people, pathogens are becoming more resistant to the very medications that might have been effective in treating zoonotic disease [6].

2.3. Planning crisis due to covid-19
The current Covid-19 pandemic in the urban planning context presents seven main challenges namely; (1) Economic Challenge (2) Transportation Challenge (3) Urban density Challenge (4) Urban Life/Public Space Challenge (5) Food System Challenge (6) Restaurants and local markets/vendors/shops Challenge (7) Institutions (like schools, colleges, hospitals, etc.) Challenge. By March 2020, across the world, museums, libraries, performance venues, and other cultural institutions had been indefinitely closed with their exhibitions, events and performances cancelled or postponed[1]. Even, religious bodies have cancelled in-person services and limited public gatherings in churches, mosques, synagogues, temples and gurudwaras.

2.4. Changes/trends in planning during covid-19

2.4.1. Transportation. Authorities around the world are wrestling with how to sustain stable transport networks during the COVID-19 epidemic without creating new ways to expose consumers and workers to the virus. In several countries, governments are encouraging cycling for essential trips because of the Corona virus, instead of using public transport. Some of the initiatives taken are:

- Bogota, Colombia: Bogota has converted 100 kilometres of city streets into bike lanes to alleviate overcrowding public transit.
- Berlin, Germany: They use yellow tape to expand the bike lanes on busy roads.
- Mexico City, Mexico: Temporarily, the city wants to quadruple the cycle lane network.
- Vancouver, Canada: In the city park in Vancouver vehicles are no longer allowed so people have more space to exercise.

2.4.2. Urban parks. Many countries where they have eased the lockdown have to follow certain rules for using the urban parks. In London, the government had issued rules to prevent the spread of COVID-19. Some of them are; people should not visit if they have any symptoms of fever, toilets will be closed, to ensure social distancing etc and to follow Public Health England advice on hygiene.

2.4.3. Education system. The spread of COVID-19 has resulted in the closure of educational institutions throughout the world. Such closure has accelerated the development of the online learning environments within those institutions in order not to disrupt learning. Courses are offered online; examinations are taken online and assignments are submitted via email.
Figure 1. Changes planning of transportation, urban parks & educational institutes during Covid-19.

3. Analysis and inferences
After understanding the past and current trends, challenges and changes in the urban context, recommendations for a new resilient urban planning approach in 7 major planning aspects are formulated as shown in the table below.

| Planning Aspect | Scenario | Issues noticed during Covid 19 | Recommendations |
|-----------------|----------|--------------------------------|-----------------|
| Density (Case considered: Shanghai, China) | Cities with high density means it attracts people towards better facilities. Growing density is viewed as an indicator of the city's success. | High density cities have more interaction among people, making them possible hotspots for the accelerated spread of pandemics. | The cultural shift of working remotely and diminished traffic during Covid proves that density may no longer determine the city's success. With advancements in digital interaction made possible by remote working, even low-density towns or villages will spark agglomeration economies. |
| Inclusiveness (Case considered: Addis Ababa, Ethiopia) | Certain communities, in any country, face barriers or challenges that prevent them from actively contributing to the nation's political, cultural and social life. | Washing hands with soap and keeping distance were the two steps to stop the pandemic, but millions of people lacked the facilities needed to socially distance and confine themselves. It was only a few, mostly white-collar jobs that had the privilege to work at home. Those employed in retail, factories etc who had to travel, suffered. A huge disparity in the distribution of health systems and food, increasing domestic violence, further pronounced issues of inequality. | It is important to provide policies that allow people who are infected or at risk of infection, to stay at home, without having to fear, loss of livelihood. Government and local agencies should provide access to basic water and sanitation facilities for free. Reducing social inequality through equitable distribution of income opportunities, health services, food security, self-help groups and personal safety through easily accessible platforms. |
| Public Spaces & Streets (Case considered: Delhi, India) | Currently in India, there is no strict urban street planning guidelines existing. Streets in India will mostly be occupied by street vendors, beggars, hawkers, etc. Pedestrian pathways are common only in planned cities. | To encourage social distancing in public spaces, queues in shops have been marked with circles at one metre apart, for the customers. -Lockdown has shown an increase in use of urban parks, terraces and balconies. -Ensuring that all streets and footpaths meet at least the minimum width as per the planning guidelines. -Shifting importance of streets, public spaces to terraces and balconies as social systems and urban parks. |
| Health care systems (Case considered: Ministry of Health & Family Welfare (MoHFW), with NITI Aayog & Board of Governors (BoG), Medical Council of India (MCI).) | The increased global demand for better health care systems is attributed to a growing and aging population, better infrastructure investments, etc. Worn out hospital facilities, physical and emotional fatigue of healthcare workers reflect that health care systems lack the requisite tools to deal with the crisis. The increasing backlog of procedures in the health care sector. Consultations worldwide have dropped among general practitioners. Greater investments on digital platforms and ever increased dependence on artificial intelligence (AI) for tele-medicines-based treatment. Also, the demand for protection equipments of health workers would mean development of alternate supply chains. Flexible hospital design is the future for pandemic resilient cities. |
| Movement of goods and people | The persistent increase in movement of people and goods, reflecting the increased importance of mobility. Across the world, movement of goods and especially people have been restricted, to prevent the virus from spreading. Important supply chains are disrupted. During the pandemic, there is an increase in demand for essential goods, which increases the price of air cargo. As per OECD, to keep international trade going in future, a strong, shared, open knowledge base is crucial. There is a considerable shift to e-commerce and digitization. There could be a surge in sustainable modes of transit, like cycling. Public transit could however face a severe crisis, due to pre-existing challenges and uncertain funding. |
| Migrant population movement (Case considered: Kerala, India) | Migration was a global phenomenon of socio-economic importance. While some nations faced economic and manpower loss, majority of the nations witnessed high migrant population movement. International and internal migration suffered from restrictions in travel, due to lockdown. Migrants were stranded because transport services had been suspended. In India hundreds of thousands of migrants have been forced to walk hundreds of miles back to their hometowns, some of them dying on their way. -Providing temporary housing and shelter for the migrants with access to basic infrastructure facilities -In case of any movement restriction, informing them beforehand will allow them to get prepared for the same way before the situation gets worse. -Providing them with jobs to sustain their lives during the crisis. |
Travel & Tourism (Case considered: Italy)

| A 3.5% increase was recorded by the travel & tourism sectors in 2019. Both the sectors have generated millions of job opportunities worldwide, making it the best collaborator for governments to create jobs. | Tourism has been hit hard, with millions of jobs at risk in one of the most labour-intensive sectors of the economy. As per statistics by World Tourism Organisation, the pandemic has led to a considerable decline in the international tourist arrivals, by the beginning of 2020. This has affected many livelihoods that depend on the industry. | 1. Re-thinking the tourism sector. The crisis provides an opportunity to consider a more sustainable and resilient future for the tourism industry. 2. Rebuilding destinations and the tourism infrastructure system. Support and recovery measures should be taken. Accessibility, connectivity, and transport should be given top priority. 3. Investing and innovating in tourism. |

4. Conclusion

The paper is an exploratory study on the close relationship between pandemics and evolution of urban planning. Challenges in urban planning during Covid-19 were felt in economic, transportation, urban density, public space, food systems and institutions. The major trends and adaptive measures taken to overcome these challenges were studied.

Access to adequate health care and other basic infrastructure facilities favouring the wealthy sections of the society. Domestic violence, gender discrimination are some other issues that became significant during the pandemic. Travel and tourism are the worst-hit sectors during the pandemic; the paper discusses resilient planning recommendations for these sectors. Addressing the concerns of refugees should be one of the top priorities. Planning for safe public places and streets should be one of the many planning goals for resilient cities. Also, self-sufficient neighbourhoods, with adequate housing and sustainable mobility, which contributes to pandemic resilient cities, is the need of the hour.

The last section of the research paper offers suggestions for strategic planning to add resilience to a range of chosen planning areas such as density, inclusiveness, public spaces and streets, health care systems, financial services, movement of people and goods, migrant population, institutional systems, and travel and tourism after examining and assessing the situation of the mentioned planning aspects before and after the pandemic.

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