

## Urban resilience of cities in the era of the Corona pandemic "A Case Study of the Administrative Capital - (Egypt's Future)"

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### **Abstract:**

The epidemics are hostile to urbanization. The world has faced an unprecedented series of crises, growing viruses and increasing economic collapse. In addition, millions of workers suffers and loses their jobs, and the political and social repercussions affecting the lives of human societies. We find that cities, urban spaces and skyscrapers were all designed to be mobile, collectively active and full of life, ignoring human density as the objective and main enemy in the era of covid-19 .

Hence, sanitary isolation has become a method of life, especially after the emergence of covid-19 pandemic and its various pandemics followed. Therefore, a new era has been emerged for healthy technological cities that require unique creative energy, honest confrontation and a new logic for the meaning of life, beside the value of a just economy, the future of human societies, and the role of architect who fights, resists and carries the concerns of his country and those of all human beings.

Given the urgent need to build millions of new housing units to meet the local needs of society in accordance with security and safety standards and precautionary measures to be taken in the design of housing interior spaces in line with achieving sanitary insulation in a more flexible, safer and more enjoyable manner, there is a need to have a practical and detailed thinking to develop contemporary designs for technological cities characterized by healthy, functional and economically efficient environment that meets current and future requirements and confronts sudden health crises, with a view to provide a healthy, safe, humanitarian and live able environment.

Hence, there is a need to apply strategies and factors of housing urban planning to the latest new cities of the vision of 2030 AD for the city of "Administrative Capital of New Republic", in accordance with the latest architectural, engineering and planning designs, achieving all safe and modern lifestyles suitable for different needs and tastes, to include: Economic , urban, design and technological standards, so as to become a technological, sustainable, healthy, self-sufficient and safer city, and be more supportive of social communication and physical distancing at the same time.

### **Key Words:**

Housing complexes , Health technology cities , Covid-19 pandemic , Urban spaces

**الملخص:**

إن الأوبئة معادية للتحضر، فلقد واجه العالم سلسلة غير مسبوقه من الأزمات والفيروسات المتزايدة، والانهييار الاقتصادي المتزايد، والملايين من العمال يعانون ويفقدون وظائفهم، والانعكاسات السياسية والاجتماعية المؤثرة في حياة المجتمعات البشرية، ونجد في تصميم المدن والفراغات العمرانية وناطحات السحاب كلها صممت لتكون متحركة ومشغولة بشكل جماعي ومفعمة بالحياة، متجاهلين الكثافة البشرية أنها الهدف، والعدو الرئيسي في عصر جائحة covid-19 ومن هنا أصبح العزل الصحي هو أسلوب للحياة، خصوصاً بعد ظهور جائحة covid-19 وما تبعته من الجوائح المختلفة، لينتشر حقبة جديدة للمدن التكنولوجية الصحية تتطلب طاقة إبداعية فريدة ومواجهة صادقة وإنتاج جديد لمعنى الحياة، وقيمة الاقتصاد العادل، ومستقبل المجتمعات الإنسانية، ودور المعماري والعمراني المقاوم المناضل المحمل بهموم بلده، وهموم كل البشر.

ومع الحاجة الشديدة لتشييد ملايين الوحدات السكنية الجديدة لتلبية حاجة المجتمع المحلية وفقاً لمعايير الأمن والسلامة والإجراءات الاحترازية في تصميم الفراغات الداخلية السكنية بما يتلائم مع تحقيق العزل الصحي بشكل أكثر مرونة وأكثر أمناً وأكثر متعة، الأمر الذي يدعو إلى التفكير العملي والتفصيلي لإعداد تصاميم معاصرة لمدن تكنولوجية صحية ذات كفاءة وظيفية واقتصادية تلبى المتطلبات الحالية والمستقبلية ومواجهة للازمات الصحية المفاجئة، لتوفير بيئة صحية وآمنة وإنسانية تقبل العيش فيها.

ومن هنا دعت الحاجة لتطبيق استراتيجيات وعوامل التخطيط الحضري السكني، على أحدث المدن الجديدة لرؤية عام ٢٠٣٠م، لمدينة" العاصمة الإدارية بالجمهورية الجديدة"، ووفقاً لأحدث التصميمات المعمارية والهندسية والتخطيطية محققة جميع أساليب الحياة الآمنة والعصرية متناسبة مع مختلف الاحتياجات والأذواق، لتشمل على: معايير إقتصادية، وعمرانية، وتصميمية، وتكنولوجية، وإجتماعية، لتصبح مدينة تكنولوجية ومستدامة وصحية ومكثفة ذاتياً وأكثر امان وسلامة و داعمه للتواصل الاجتماعي و التباعد الجسماني في وقت واحد.

**1. Introduction:**

"Humans are a biological danger, but machines are not", to force millions around the world to respond to the essential orders of public policy measures to sit down at home in order to limit the transmission of covid-19, bust most of homes designed are utilitarian spaces that cannot bear the life flows, they are considered as lifeless, dark and adjoining housing cubes, lacking the expression of human value, and they don't deserve to be re-constructed. They are similar buildings and dwellings in which families turn into numbers, and apartments turn into human warehouses, especially since most of them are poorly ventilated and lack natural light. Thus, the human and social life is absent and the features of belonging are deteriorated.

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**Research Problem**

The research problem indicates the urgent need to set standards on which urban solutions are based regarding the internal residential spaces in light of the new developments of covid-19 pandemic; as the states lacks this type of modern urban pattern to achieve security, safety and public health for members of society.

**Research Objectives**

- Using the urban design, in a more comprehensive and deeper way, to treat the urban spaces, in order to achieve more healthy protection for humanity.
- Interesting in setting safety and public health standards for the population inside housing complexes and units, applying all necessary precautions and protocols and taking into account the principle of physical distancing to reduce the spread of diseases and epidemics.
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**Research Questions**

- How can cities survive the global epidemic?
- How will architecture provide a new understanding of housing urban spaces?
- Is it necessary to build cities for robots or robots for cities?
- What are the new amendments of health technology building systems, which have been imposed by the Corona pandemic as a result of economic, urban, design, technological and social repercussions?

**Research Methodology**

In order to achieve its objectives, the research has the following methods:

**A- Descriptive Analytical Method:**

Studying the basic concepts of corona virus "Covid-19 pandemic", healthy cities, social justice in light of corona pandemic, contemporary cities and the issue of housing and analyzing the various methods and approaches used to develop the structure of modern cities and its changes in the era of the covid-19 pandemic, in order to build technological, safe, self-sufficient and environmentally friendly societies in light of the Corona epidemic.

**B- Applied Method:**

Applying the urban factors, urban strategies and technological treatments used in the urban cities system to a modern pioneering model (the New Administrative Capital City) to construct the urban cities in a more flexible, more enjoyable and safer way, to achieve results and recommendations that increase the cognitive value of research.

**2. Definitions & Concepts:****2-1 Concept of Covid-19 Pandemic**

It is a global and ongoing pandemic, caused by a virus associated with severe acute respiratory syndrome. This disease was emerged first in Wuhan (Chinese city) in early December 2019. Then, on 30 January 2019, the World Health Organization was officially declared a public health emergency for the world, reporting more than 211 million injuries in more than 188

countries and regions, more than 4,430,697 deaths, and more than one million injured people already recovered until July 2<sup>nd</sup>, 2021 [١] .

## 2-2 Concept of Healthy Cities

The healthy cities concept is accompanied by the construction of greener cities, always working to improve their natural, social and economic environment. The epidemic may change the type and distribution of green spaces necessary to be provided for healthy cities. We expect an increasing demand for small and large green spaces and afforestation projects, to serve as a haven away from loudness, noise and pollution, by creating more spaces for achieving the physical distancing by individuals [٢] .

The demographers' expectations indicates that 68% of the world's population will live in cities by the middle of this century, which makes the redesigning of cities very important to be able to confront epidemics and become an urgent priority in the future, so that the scenario of Corona pandemic is not repeated again [٣] .

The urban or engineering designs must be developed in cities that provide their residents with the practice of healthy behaviors within the urban range designated for them only, for example: "Melbourne city, Australia" as an experimental attempt to re-experience the neighborhoods, under the slogan "Twenty Minutes City", which is based on ensuring that the citizen has everything he needs, such as medicine, shopping, education and parks, only 20 minutes away from his place of residence. Providing these services near the citizen reduces the use of public transportation, in order to reduce congestion, pollution and accidents [٣] .

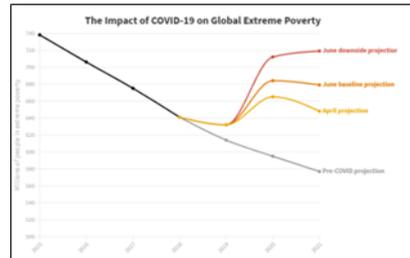
## 2-3 Social justice in light of Corona pandemic

(Unequal societies are unhealthy ones). So, we find that the World Health Organization calls for physical distancing and recommended sanitary sterilization, while millions share rooms and small accommodation facilities, lack of access to insurance, and dependence on their daily work. So, the weakest population in the world are the main and most vulnerable victims of pandemic, for example: Bogotá city, Colombia [٤], as shown in Figure (1).

Hence, some policies is necessary to be adopted to improve public health throughout (formal and informal) cities. In addition, it is necessary to combat inequality, away from individualism and follow all Corona pandemic instructions, as illustrated in the diagram (Figure 2) of Corona pandemic impact on global poverty; as the current epidemic is not just a public health emergency, but a human rights and justice crisis as well [٥] .



**Figure (1): Deterioration and adhesion of houses of the poorest residents**  
([blogs.worldbank.org/ar/voices/covid-19-will-hit-poor-hardest-heres-what-we-can-do-about-it](https://blogs.worldbank.org/ar/voices/covid-19-will-hit-poor-hardest-heres-what-we-can-do-about-it))



**Figure (2): Diagram of Corona pandemic impact on global poverty**  
(<https://blogs.worldbank.org/ar/opendata/updated-estimates-impact-covid-19-global-poverty>)

## 2-4 Contemporary Cities and Housing Issue

Hence, it is necessary to develop laws, policies and detailed plans, in accordance with a strategy including the sustainable urban planning, in order to achieve the following basic objectives: [6] .

- Working on distributing population densities in urban areas, in a balanced way.
- Working on reducing the urban poverty, and its health, security and social repercussions.
- Addressing low-income housing, especially (slums).
- Paying attention to the technological infrastructure, smart city strategies and digital & interactive transformation programs.
- Enhancing the concepts of safe cities in accordance with internationally approved standards to build cities capable of facing disasters and crises by local bodies to prepare for crises, and within the integrated management system of cities.
- Taking care of secure holdings of government lands not built within residential areas to be used in crises times.
- Activating the role of neighborhood districts within the urban planning system and raising the operating efficiency of their service sectors, while defining their optimal places based on geographic information systems, to achieve the principle of equitable distribution and to meet the needs of local community, taking into account the physical distance standards.
- Developing health solutions and requirements to ensure the achievement of health and occupational safety for city workers, while obligating them to provide adequate housing in accordance with the specified controls.
- Activating the role of municipalities in times of crisis, allowing them to respond quickly according to the requirements of local situation.

## 3. Methods and approaches for the safe technological residential urban city system in light of Corona epidemic:

### 3-1 For public urban spaces:

- The means of transportation shall be diversified, the pedestrian paths shall be enlarged, the car streets shall be closed to open other one for bicycles and the sidewalks shall be enlarged to help residents maintain the six-foot distance recommended by the World Health Organization, as shown in Figure (3), to allocate a lane for bicycles, as well as encouraging cycling in order to reduce congestion on buses and Metro, in which it is difficult to keep safe distances, as the case in Milan city; as 22 miles of new bike lanes were constructed, in addition to enlarging sidewalks in general. [7] .
- Creating natural areas and public parks as a vital area commensurate with the construction of urban cities, by choosing the engineering design suitable for the site and climatic conditions of city. The maze that encourages physical distancing can be designed, in addition to its health and psychological benefits, so that this design saves 20 minutes of time in the walking paths that it can be completed, while keeping a safe distance between others, thanks to the gates indicating the times of occupation of paths individually, as illustrated in Figure (4).



Figure (3): Streets allocated for bicycles  
[arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus](https://arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus)



Figure (4): Designing the maze in public parks  
[arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus](https://arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus)

- It is possible to design seats for the public, equipped with glass partitions (shields) between those who sit on them, as proposed by Milan city in Italy) [8], as shown in Figures (5,6)

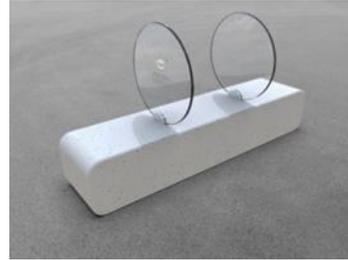


Figure (5, 6): Different forms of seats equipped with glass partitions to encourage social distancing  
<https://arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus>

- There must be diversity in land uses by performing many diverse activities inside healthy cities. For example: using colored ground signs to encourage passersby to keep safe precautionary distances that keep them away from each other in outdoor restaurants in open air, for example: suggesting a so-called “find your tropical island”, as the designer "Christopher Odosania" has evacuated the streets from cars and designed streets and alleys in small circular stages to determine the different activities “for each small circle, such as sewing, practicing yoga, selling food or sitting under the shades of umbrellas” by the size of individual circular “islands”, in order to achieve the principle of physical distancing. [9]



Figure (7, 8): Circular ground signs with different activities to achieve the physical distancing  
<https://arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus>

- A series of glass sunbathing boxes, which allow beachgoers to relax away from others and achieve physical distancing, in addition to be in separate spaces outside the restaurant (abravidro.org.br/blog), as shown in Figure (9,10). As well, an Italian company has proposed a new idea, which is 15 x 15 foot glass kiosks on the shore of Mediterranean Sea. [10].



Figure (9, 10): Using glass sunbathing boxes by beachgoers to relax and achieve physical distancing  
<https://arabic.cnn.com/style/article/2020/05/17/cities-design-coronavirus>

- A temporary kiosk has been designed to protect healthy users from respiratory droplets spread by COVID-19 patients. This kiosk includes a Plexiglas box surrounded by or without plastic lids, to enable (the patient) to sit inside it. Then, the family can come, sit with him and visit him from outside the glass. This experiment has been applied to the residents of Magnolia Gardens in southern Pines on the canopy of the building main office, so that nurses can watch through the windows to ensure that the patient and healthy person keep a safe physical distance of about six feet as a minimum [11] , as shown in Figure (11,12).



Figure (11, 12): Glass kiosk in which the patient can sit, and the family can visit him from outside the glass  
[www.wkbn.com/news/local-news/mineral-ridge-nursing-home-comes-up-with-unique-way-to-allow-safe-family-visits](http://www.wkbn.com/news/local-news/mineral-ridge-nursing-home-comes-up-with-unique-way-to-allow-safe-family-visits)

### 3-2 For the design of housing urban spaces:

Interior design schools in Dubai, United Arab Emirates, have developed the concepts that reimagine urban life for a specific era through physical distancing, to help people to greatly benefit of what is limited by housing spaces, by designing modest spaces in light of the new reality resulting from the virus, [12] .

- An one-bedroom flat with an area of approximately 355 sq. ft. The interior space and vertical heights are greatly used by: Providing wall-mounted storage spaces, and a built-in sofa with a pull-out or foldable side table that is easily mounted to the wall to decorate the living area , as shown in Figure (13), achieving the physical distance between people.
- A bedroom upstairs on the mezzanine floor above, and a small table below for the dining area, as shown in Figure (14). The Floor-to-ceiling windows allow light and natural ventilation to the flat, as designed in Taipei city, Taiwan.

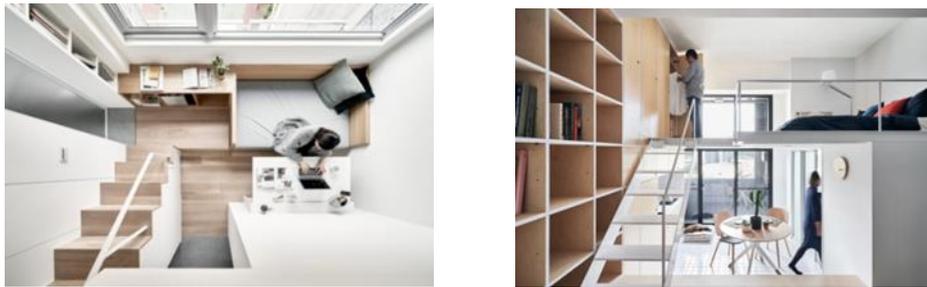


Figure (13, 14): Maximum utilization of small and narrow spaces

<https://archive.curbed.com/2018/6/28/17514112/tiny-apartment-modern-urban-living-taipei>

- It is also possible to turn a corner of the house into a window to communicate with the external world through (video conference), in order to conduct many video calls and meetings in light of the occurrence of pandemics and crises, as illustrated in Figure (15).



Figure (15): Turning a corner in the house into a window to communicate with the external world

<https://worldkings.in/category/architecture/>

- Hinges, slides and appropriate devices can be used: they are mobile mechanisms to take advantage of small spaces. Given the ease of using different types of wood panels for the manufacture of carpentry, we find a variety of them to close and open convertible and multi-functions corners of their rooms, for example: a living room can be converted to a bedroom by moving the walls of wooden panels, as shown in Figures (16,17). A fast food wall-mounted table can be pulled or folded, as well as a basin full of dishes can be showed or hidden. As well, the movement of doors and drawers has become soft and easy, which allows quickly creating an area of quarantine.



Figures (16, 17): Using hinges and slides to convert rooms' corners to multi-functions ones

<https://www.archdaily.com/947153/hinges-and-slides-mobile-mechanisms-to-take-advantage-of-tiny-spaces>

#### 4. Strategies and factors of residential urban planning for technological, sustainable, healthy and self-sufficient cities

According to the United Nations estimates, it is expected that about two-thirds of the world's population will live in urban areas by 2050 AD, under the ambiguous conditions of epidemic outbreaks, which enables us to redevelop, design, urban planning for cities, create socially distant ways to navigate the urban scene in the long term, strengthen the role of cities and enhance their ability to withstand and be ready for crises, if it occurs in a better way for the future, and through the following factors: [13]

##### 4-1 Economic Factors:

Reconsidering the distribution balance of population densities in urban areas, absorptive capacity of future cities, size and design of public space and its spatial distribution, such as: sidewalks, open spaces, parks and public facilities like: community centers and libraries, and alleviating urban poverty, especially in crowded neighborhoods where the family is large and home area is limited, in line with urban standards, in order to obtain housing units in a healthy and safe environment, achieving physical distancing.

Paying attention to the diversity of housing options to include (studios, housing units, villas), which helps reduce the population density in the residential neighborhood and contribute to make an interaction between residents and the residential environment, and reduce injury and infection between people.

##### 4-2 Urban Factors:

Considering the criteria of humanizing cities by providing population, social, economic, recreational, service, technical and other activities within housing complexes, to ensure that community members are helped to overcome emergency crises. [14]

Paying attention to the planning of site, heights and distances between buildings, so that a building doesn't prevent the natural light to enter to the other one if it is close to, or faces, it, while maintaining green areas, easy access to. [15]

##### 4-3 Design Factors:

Using simple, flexible, self-cleaning, anti-microbial and anti-viral building materials, and achieving many principles of sustainable design.

Providing a healthy environment through the use of air purification systems to take into account the factor of air purification, by relying on modern systems designed to have clean fresh air equipped with filtering systems that quickly remove airborne germs, using a high-quality environmental design.

The design shall allow to easily move between the interior spaces of the housing unit, with the application of healthy methods that apply the principle of distancing in movement paths and regular design in all interior and exterior housing spaces.

It shall be placing safe distancing between family members through: placing a protective wall of insulating glass for the quarantine room, especially in most areas where the family gathers, such as the outdoor garden, for example, to ensure that infection is not transmitted between family members, and Allocating an appropriate room to isolate the infected persons in the event of discovering new cases of infection, which is characterized by air purification systems and its

view of the external garden to change the patient's psychological state, in accordance with the standards of typical quarantine units imposed by the country, as shown in Figure (18).

The sanitary isolation room equipped with all its facilities and services, with an insulating glass wall, overlooking the outer garden of the house .

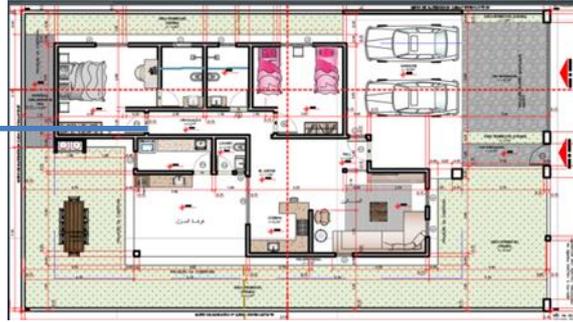


Figure (18): Design proposal for a dwelling containing a quarantine room - Reference: researcher

#### 4-4 Technological Factors

Creating a huge electronic database (digital platforms), which contribute to achieve smart management and comprehensive development of citizens starting from distance learning to online shopping, in order to contain crises through smart electronic applications. [16]

Activating the role of artificial intelligence, Internet of things and urban robots when dealing with crises and disasters, in addition to supporting early warning systems to play a major role in fighting Corona virus.

### 5. Introduction to apply the integrative vision to safe technology cities: Case Study of the New Administrative Capital "Egypt's Future".

#### 5-1 Introduction of project:

It is a new Egyptian city of the fourth generation ones launched by the Egyptian government and the Council of Ministers. The project is located 45 kilometers from the center of Cairo, 80 kilometers from Suez and 32 kilometers from Cairo Airport, with a total area of 170,000 acres, It includes about 6.5 million people and 2 million job opportunities. as well as the presidential headquarters, ministries, foreign embassies and parliament. [17]

#### 5.2 Project Location

It is a new Egyptian city of the fourth generation ones launched by the Egyptian government and the Council of Ministers. The project is located 45 kilometers from the center of Cairo, 80 kilometers from Suez and 32 kilometers from Cairo Airport, as shown in Figure (4), with a total area of 170,000 acres, as indicated in Figure (19,20). It includes about 6.5 million people and 2 million job opportunities. It also includes an international airport with an area of 16 km, as well as the presidential headquarters, ministries, foreign embassies and parliament. [18].

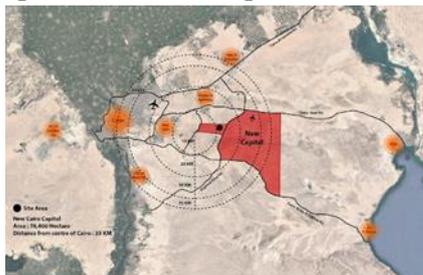


Figure (19): Location of city on Egypt's map

<http://www.acud.eg/>

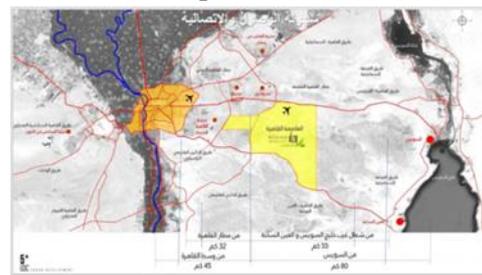


Figure (20): Easily access and connect to city location

<http://www.mhuc.gov.eg/Programs/Index/>

**5-3 Objective of building the city: [18].**

- **Green city:** The per capita share is 15 m<sup>2</sup> / person of open and green areas in accordance with international standards of life quality.
- **Sustainable city:** It uses the sustainability standards in energy and waste recycling with a percentage of 70% of the rooftops covered by solar energy.
- **Smart city:** The city's services are fully connected to the global information network to become an electronic city.
- **Housing and live able city:** It contains all types of housing with the same standards of life quality and various services.
- **Pedestrian city:** All neighborhoods of city are connected by a dedicated road network with a percentage of 40% of pedestrian and cycles paths.
- **Connected city:** It takes into account the gradation of all networks of transportation, railways, trains, trams and trolleys.
- **Business city:** It contains a business and finance center with a percentage of 30% of total area of city to serve the Greater Cairo and the Suez Canal.

**5-4 Applying strategies and factors of housing urban planning to the city, through:****5-4-1 Economic Factors**

Through the outline of land uses of Administrative Capital city, it was found that all housing patterns have the same standards of life quality and different services and are suitable for physical distancing in times of pandemics; as 35% of high-density housing have areas of 50-100 m<sup>2</sup>, 50% of medium-density housing have areas of 100-200 m<sup>2</sup>, 15% of Low-density housing have areas of 200-350 m<sup>2</sup>, and 30% is allocated for housing and living with an amount of 1.5 million housing units, [19]

**5-4-2 Urban Factors**

A- Real images of actual implementation indicates how easy to move on foot between housing buildings and all commercial and recreational facilities close to each other, at appropriate and planned walking distances according to the appropriate plans during the occurrence of pandemics, as shown in Figure (21).

B- Equal heights of buildings to ensure that the natural lighting and ventilation of buildings are not blocked from each other, due to its essential role in creating a healthy environment for the housing units, and greatly reduces the risks of infection, as shown in Figure (22).

C- Movement paths in lobby and internal courtyards of housing complexes are suitable for the number of residents or visitors, so that they enjoy a better quality of life, which can be adapted to the physical distancing, as it is necessary to keep two meters or one and a half meters, at least, between each other, as shown in Figure (23).



Figure (21): Wide Streets between housing buildings



Figure (22): Equal heights of buildings in the housing district



Figure (23): Good planning of green spaces in the housing

[http://www.newcities.gov.eg/know\\_cities/newcapital/default.aspx](http://www.newcities.gov.eg/know_cities/newcapital/default.aspx)

D- Availability of so lively public places by designing streets, pedestrian movement paths, wide squares and public parks in the city between residential complexes, and providing them with statues, fountains and artificial lakes whose water is recycled to soften the internal climate and help people enjoy the pleasure of walking, meditation and relaxation to improve the psychological state of society members at the time of pandemic. , while adhering to precautions and preventive measures, as shown in Figures (24, 25).

E- Good and systematic planning of green spaces, as in the "Islamic Garden" in the Administrative Capital, which was built in the style of Islamic architecture of a distinguished nature. This garden is directly linked to residential neighborhoods and includes various segments of society, to ensure that society members are helped to overcome emergency crises, as illustrated in Figure (26).



Figure (24): Distribution of land uses among housing complexes



Figure (25): Artificial lakes, fountains and statues



Figure (26): Islamic Garden

[http://www.newcities.gov.eg/know\\_cities/newcapital/default.aspx](http://www.newcities.gov.eg/know_cities/newcapital/default.aspx)

F- Providing job opportunities for the city's residents to help them well concentrate and produce for the city itself better, with a view to reduce the pendulum movement for them, which reduces their effort and exposure to any health crises at the time of pandemics.

G- Paying attention to Landmark "distinctive signs" in different shapes, types, colors and connotations, as each area has a Landmark and a distinctive sign different from the other, which helps to distinguish each residential complex from the other, so that members of society can reach and meet easily and quickly without having difficulty of hardship, especially at the time of pandemics, as indicated in Figures (27,28,29,30).



Figures (27, 28, 29, 30): Shapes, types and colors of landmarks in Administrative Capital  
Source: Researcher

### 5-4-3 Design Factors

A- For example: The green avenue project [20]

is one of the first environmentally friendly projects, and the most distinguished ones established on four main streets, near the Green River and the New Cathedral. In addition, its residential units have different spaces, directly connected to green spaces, artificial lakes and fountains, while adhering to the principle of physical distancing.

The project area is estimated of 11.5 acres, an area sufficient to keep privacy, located in the R7 area, as shown in Figure (31), in front of the largest international university in the Administrative Capital, which guarantees having a great investment opportunities on a distinctive land, with a construction percentage of 18.5%, on the City Walk, a branch of the Green River.

The green spaces were used and about 79% of the total area of project was allocated in the internal courtyard of residential complex, which makes the freshness of nature a part of daily life, in accordance with the principle of nature imitation "Biomimicry", as shown in Figure (32).

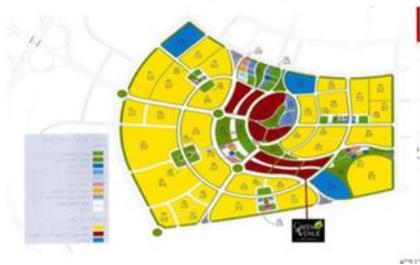


Figure (31): Location of Green Avenue project in R7 region



Figure (32): General location of Green Avenue project

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The lobby is also very wide and the waiting spaces support the physical distancing of people. The seating places are divided and arranged in a distancing way, which contributes to easily apply safety standards and physical distancing. As well, many materials that achieve the principles of sustainable design in many spaces have been used, in addition to the diversity of materials, as indicated in Figure (33).

A sophisticated modern design with a beautiful view of buildings on the most beautiful green areas next to all the main and recreational services. It is also the first place dedicated to graphic drawing and talents, the first dancing fountain, and the first stars illuminated in the evening with

solar energy, while adhering to the principle of physical distancing, as shown in Figures (34, 35).



Figure (33): Internal courtyard of Green Avenue complex



Figure (34): Place designated for graphics between housing units



Figure (35): Ground night star lighting between housing units, Reference: researcher

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B- For example: housing unit U 01 in green avenue area

The movement paths of interior spaces differs depending on the difference of housing unit of complex, so that the movement paths are characterized by being horizontal and vertical ones, and are compatible in line with the kinetic spaces of internal spaces. Although the various functions of these spaces, they were divided in a professional manner, so the person can move easily and smoothly, And there are not any appropriate public places and facilities allocated to isolate infected persons in case of detecting new cases according to the standards of typical isolation units imposed by the State. Accordingly, it is possible to propose and re-design to allocate appropriate facilities to isolate infected persons in the event that new cases of infection are detected in housing units, as follows. For the one-room housing unit of 80 m<sup>2</sup>, It is difficult to allocate a room for sanitary isolation, because the area is small, unlike the three-room housing unit, as show in figure (36). For the three-room housing unit of 175 m<sup>2</sup>, It is possible to allocate a room for sanitary isolation, as it is the main room, its bathroom and its balcony, which enable family members to isolate the infected one in a special room completely isolated from the whole housing unit for the rest of family members, as shown in figure (37,38).



Figure (36): Housing unit in Green Avenue project of 80m<sup>2</sup>- Source: Green Avenue company



Figure (37): Housing unit of 175m<sup>2</sup> Source: Green Avenue Company

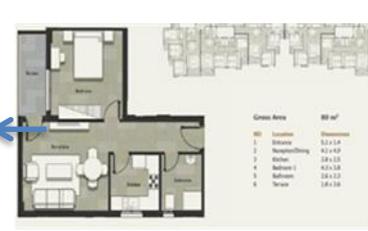


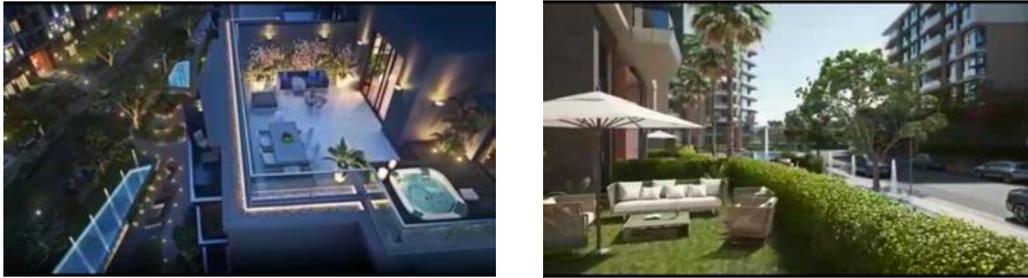
Figure (38): Proposal of a sanitary isolation room in the housing unit of 175m<sup>2</sup>. Reference: researcher

The traditional local building materials were used, However, the conditions of new pandemics must be taken into account by using the self-cleaning, antimicrobial and antiviral building materials that aren't harmful to human health in interior and exterior finishes, which achieve many of sustainable design principles.

The housing complex was designed to be easy to move between the interior spaces, according to the principle of distancing of movement paths and the regular design in all interior and exterior spaces of housing.

The windows were directed in housing internal design, and their places were chosen to receive the greatest amount of ventilation and good and appropriate natural lighting in case of applying sanitary insulation.

The cultivation of roofs and walls was taken into account. The open external balconies were provided, whether on the ground or upper floors, in addition to using the water bodies in the urban mass, as shown in Figures (39, 40).



Figures (39, 40): Beauty of external balconies on the ground and upper floor for the Green Avenue project. Source: Green Avenue Company

However, the conditions of new pandemics must be taken into account by using the self-cleaning, antimicrobial and antiviral building materials that aren't harmful to human health in interior and exterior finishes, which achieve many of sustainable design principles.

#### 5-4-4 Technological Factors

The renewable energy and solar panels can be used better, to face the dangers of pandemics and work to reduce its damages in all areas of life, through:

A- Using the lighting of large curved main gate in the form of a circular tower, as the most important and unique structural and architectural landmark in the world for the Administrative Capital, as shown in Figure (41), in order to be used in the city entrance gates for citizens and visitors, with a view to measure the temperature degree, detect those infected with pandemic and apply the self-sterilization, [21] as shown in Figure (42) "Self-Sterilization gate used in the Prophet's Mosque".



Figure (41): Curved main gate of Administrative Capital,



Figure (42): Self-Sterilization gate used in the Prophet's Mosque-, Reference:

B- Using the renewable energy and solar panels to charge mobile smart robots, which can be used in the streets for the purposes of: service, cleaning and sterilization for city residents by measuring temperature, detecting infected people, reminding them of the need to adhere to the principle of social distancing, and urging not to be in crowded places. [22]

C- The smart lamp posts in the streets can be benefited from, by: integrating them into monitoring and infection detection functions, and collecting and analyzing data on air quality and vehicle exhaust to reduce air pollution by raising it above the standard of living to provide a healthy and safe environment for city citizens.

## 6. Discussion and Results

The basic human requirements have been achieved with the natural reality in the Administrative Capital, the most prominent of which are: comfortable and safe housing, economic activity that provides job opportunities for residents whether inside or outside the city, activities of recreational areas suitable for the ages of residents and their cultural and scientific levels, road and transportation network to help residents to easily move inside and outside the city, planning health, educational and community services, and providing a high-level infrastructure of services and facilities, in accordance with the planning and design directions and policies to strengthen the role of cities and enhance its ability to withstand crises, while adhering to all preventive and precautionary measures.

## 7. Conclusion

In light of evaluating the Egyptian experience of managing cities, as a result of the radical changes that have occurred in the world as a consequence of an unprecedented series of crises and growing viruses, by creating a modern urban system in line with the methods of electronic management of activities, services and facilities, and the required infrastructure of digital and electronic communications, as well as physical infrastructure, such as roads and means of transport and communications, in addition to the tangible change of land uses distribution, with distancing principle between people, with the need to allocate appropriate public places and facilities to isolate infected persons in the event that new cases of infection are detected inside the housing units of city, moreover the planners and decision-makers have to review urban planning policies for modern cities in light of emergency crises when occurred and consider the effective alternatives to overcome them, emphasizing on the necessity of adopting the concepts of safe cities, healthy cities and self-sufficient ones, as an important and indispensable planning policy.

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