Conference Proceeding

Proposed Post-Pandemic Design Guidelines for Design Districts

Omar Ahmed Zahran[1*2] iD, **Salma Mohamed Roushdy**[1] iD, **May Fakhri Kassem**[1] iD, **Arig Amin Hussein**[1] iD, **Habiba Raafat Elshimy**[1] iD, **Mona Hassan Sakr**[1] iD, **Ashraf Mansour Habib Mansour**[2,3] iD

[1]Department of Architecture, October University for Modern Science and Arts (MSA), Egypt
[2]Central Asian University, Tashkent, Uzbekistan
[3]National Research Centre, Cairo, Egypt
 E-mail: omar.ahmed76@msa.edu.eg

Abstract: This paper delves into bridging the gap between theory and implementation in the context of post-pandemic workplace design. It examines challenges and solutions in translating theoretical principles into practical architectural applications. The global impact of COVID-19 has underscored the need to address workplace design to mitigate virus transmission risks and create safer environments. Workplaces, due to their high occupancy, can facilitate virus spread, prompting international health organizations to release pandemic-related standards. These standards have influenced the redesign of internal workspaces, necessitating adaptation to new safety measures. This study explores post-pandemic design principles for workplace layouts and their significance for architectural firms striving to provide safer workplaces while adhering to new guidelines. It offers an overview of workplace safety measures in the Design District, a unique creative hub in Egypt. This district showcases innovative design features aligned with the pandemic-induced changes, encompassing offices, showrooms, exhibits, entertainment spaces, serviced apartments, and various amenities. The study underscores the incorporation of key criteria like accessibility, transportation, safety, population density, surroundings, views, air quality, noise, and technology. Additionally, it emphasizes the expansion of space dimensions, circulation, indoor/outdoor connections, technology integration, and biophilic elements due to infection concerns. The objective is to create a healthy, safe, and adaptable environment. To achieve this, the research employs a mixed-methods approach involving a literature review, questionnaires, interviews with industry experts, case studies, and data analysis. This multifaceted approach aims to comprehensively understand modified design guidelines and their implications post-pandemic. The paper's outcome will provide enhanced design solutions, offering a detailed comparative analysis between pre- and post-pandemic spaces. Such an analysis is crucial to elevating operational efficiency and development in projects like the Design District. The ultimate goal is to create spaces that are resilient and optimized for evolving challenges.

Keywords: Egypt 2030 agenda, design district, post-pandemic design guidelines

1. Introduction

The COVID-19 pandemic outbreak has necessitated the establishment of comprehensive health and safety guidelines for the design of workplaces, as declared by the World Health Organization (WHO) [1]. These guidelines aim

to mitigate the transmission of airborne viruses and safeguard the well-being of individuals. In response, the WHO has mandated a minimum physical distance of one meter between individuals, imposing significant challenges on the design process and necessitating innovative solutions within the constraints of existing work standards [1]. Consequently, the spatial requirements of post-pandemic designs, as observed by Cook [2], have witnessed a substantial increase of 40%. These developments have greatly influenced the design process, particularly in the creation of design districts, which serve as exclusive hubs for creative professionals, including architects, interior designers, and fashion designers, to collaborate, innovate, and display their work, according to McKinsey & Company [3].

This paper addresses the urgent need to develop comprehensive post-pandemic design guidelines specifically tailored for design districts. It highlights the criticality of incorporating these new guidelines into the regulatory framework governing such buildings, as they have not been adequately considered within the existing regulations in Egypt. By analyzing existing theoretical frameworks and considering the current conditions, this study seeks to evaluate published warnings and recommendations for workplace design in the post-COVID-19 era. Dişli and Arslan [4] highlight the significance of aligning workspaces and public areas within design districts with the prevailing regulations to enhance their effectiveness and adaptability. Therefore, this research aims to establish fresh design principles that not only improve the effectiveness and adaptability of these spaces but also ensure their alignment with the current "new normal" regulations. By doing so, this research aims to contribute to the establishment of a framework that enables design districts to flourish in the post-pandemic landscape while prioritizing the health and safety of their occupants.

The design district under examination in this paper serves as an exemplar for showcasing design elements that support and drive the transformation it advocates. This study analyzes workspaces and outdoor areas within the design district to propose design guidelines that address the specific challenges posed by the COVID-19 pandemic. By bridging the gap between theoretical concepts and practical implementation, this research aims to advance the understanding and application of post-pandemic design principles within design districts, ultimately fostering environments that facilitate creativity, collaboration, and innovation in a safe and secure manner. Moreover, it underscores the importance of updating the regulations governing design districts in Egypt to reflect the newfound emphasis on health and safety in the post-pandemic era.

2. Methodology

This research paper investigates the changes in design guidelines that have occurred in the wake of the COVID-19 pandemic, with a focus on the design of district spaces. To gather data for the study and establish a theoretical foundation identifying key factors relevant to the study, a comprehensive literature review on the spread of infectious diseases and the nature of contagious diseases was conducted. The process is shown in Figure 1. To identify specific flaws and limitations in current design practices, a questionnaire and interviews were conducted with individuals from various creative industries and users of design districts. The questionnaire focused on two main questions:

1) Did designers find remote work to be an effective substitute for the traditional workplace? and
2) What was seen as malfunctioning or lacking in design firm offices?

The interviews provided more in-depth insights into the experiences and perceptions of designers in the post-pandemic world as they were administered to individuals that were selected based on their expertise and relevance to the study. It was assured that the sample size was appropriate for a meaningful analysis. The research also included an analysis of similar projects to provide additional context. These case studies helped broaden the understanding of design guidelines and changes in response to the pandemic.
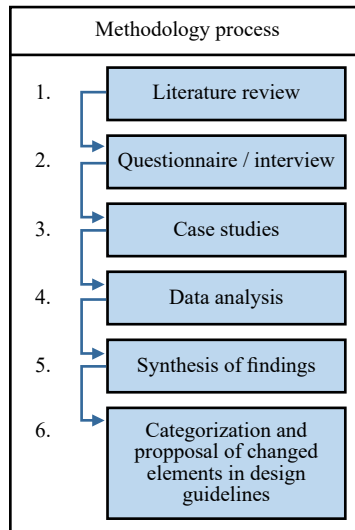
Figure 1. Methodology process

The collected data were analyzed using both statistical techniques and qualitative analysis. The questionnaire results were analyzed using descriptive statistics to identify trends and patterns, while the interviews and case studies were analyzed using thematic analysis to identify common themes and insights. The findings from the literature review, questionnaire, interviews, and case studies were then synthesized and integrated to provide a comprehensive understanding of the changes in design guidelines for design districts in the post-pandemic world. In this step, data from various sources was compared and contrasted to find broad trends and implications. Finally, the research offered a categorization of the modified components in the design guidelines based on the synthesized data. Examples were given to show how various design district areas might appear in the post-COVID-19 period.

3. Results

The results show the most important spaces that need redesign in a project type like a Design District, such as offices, galleries, multifunctional spaces, and services, as shown in Figures 2 and 3. McKinsey & Company [3] emphasizes that technology has played a significant role in creating innovative techniques to enhance people's lives and reduce the risk of infection. Specifically, in areas with high interaction rates, such as video conference halls, technology has been instrumental in facilitating safer environments (see Figure 4).
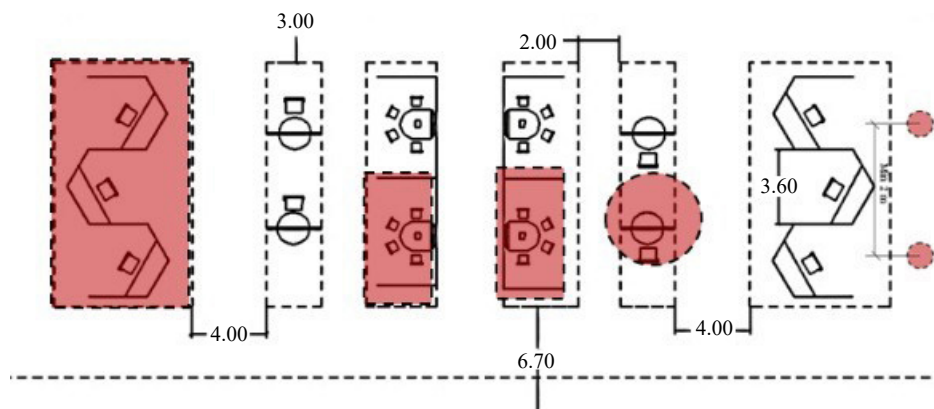

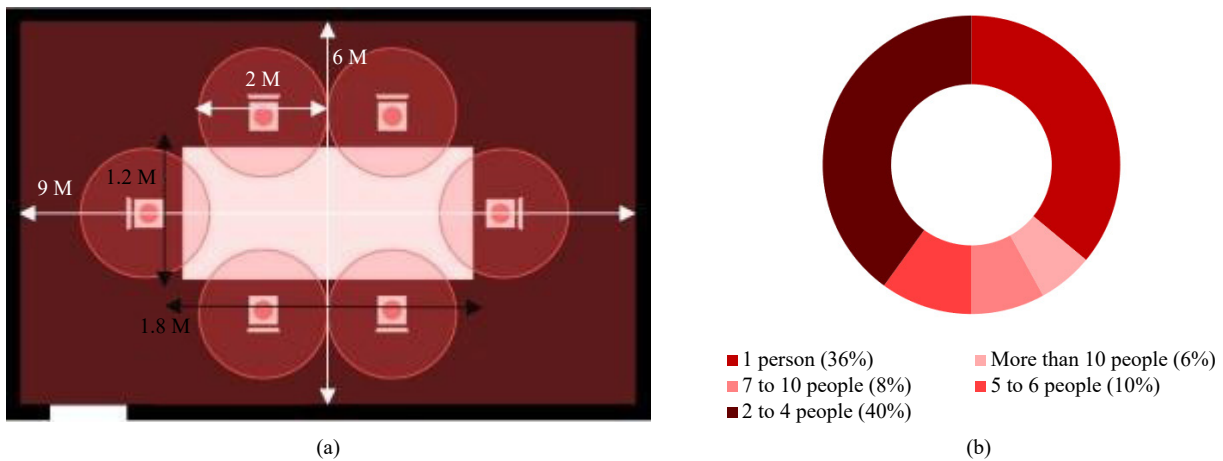**Figure 2.** Office layout post-COVID-19 [5]

Figure 3. (a) Conference room dimensions post-pandemic [6] and (b) usage percentages by meeting group size [6]
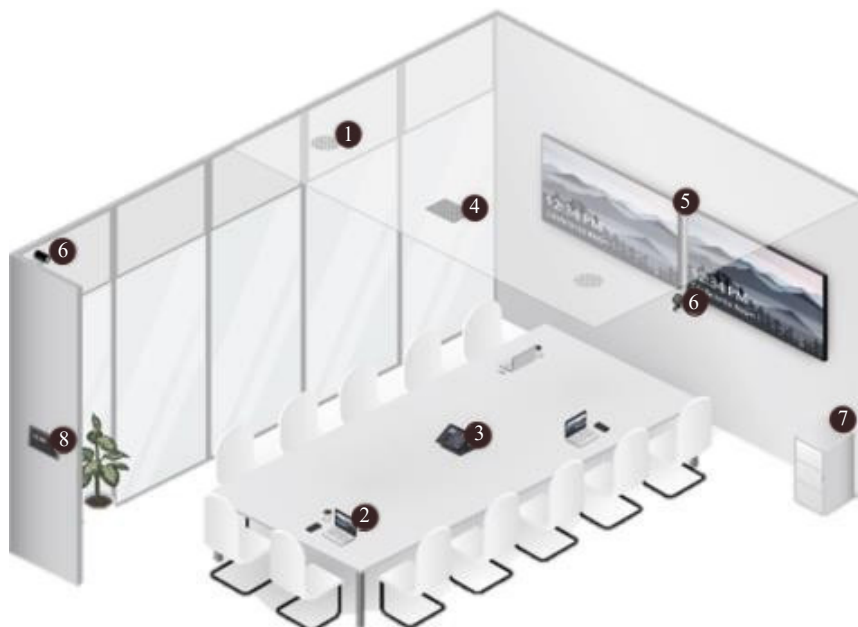

Figure 4. Factors that help remote attendees feel as though they are in the same room [7]

3.1 *Case studies*

3.1.1 *The Greenwich Design District*

According to Nidirect [8], the Greenwich Design District, located in Greenwich Peninsula, London, United Kingdom, was built before the COVID-19 pandemic to provide a permanent home for the creative industries. Spanning 14,000 m², the district comprises 16 free-standing buildings arranged around five courtyards, offering diverse arrangements of offices, flexible desk space, workshops, and ateliers.

The case study, as highlighted by Nidirect [8], emphasizes the significance of establishing a well-ventilated and isolated space with infection control techniques and clear circulation plans to prioritize safety and facilitate safe interactions. The design of the Greenwich Design District likely incorporated features that were conducive to a safe and healthy environment, even before the COVID-19 pandemic.

The concept highlights the idea of creating a closed interaction area with an outer layer of ethylene

tetrafluoroethylene (ETFE) membrane [9]. Greenwich Design District demonstrated this concept, as shown in Figure 5. This design enables the opening of panels, promoting air circulation within the main interaction area of the C4 building, which serves as the market space.

This feature provides increased fresh air intake, reducing the concentration of airborne particles and potentially minimizing the risk of transmission. The ability to open panels aligns with recommendations for creating safe indoor environments during the pandemic.

Additionally, the district's clear circulation plans likely aim to prevent overcrowding and facilitate physical distancing measures. These plans help regulate the flow of people and ensure that interactions occur in a controlled and safe manner.

The original design of the Greenwich Design District likely incorporated features that prioritized safety and addressed the need for infection control and safe interactions. The buildings within the district worked efficiently during the pandemic, indicating that they were well-suited to meet the challenges posed by the COVID-19 virus.

It's worth noting that buildings designed with features such as proper ventilation, clear circulation plans, and multifunctional spaces are generally beneficial in promoting occupant health and well-being, regardless of a specific pandemic. The Greenwich Design District serves as an example of a pre-pandemic design that successfully adapted to the challenges of the COVID-19 pandemic and provided a safe environment for its occupants.
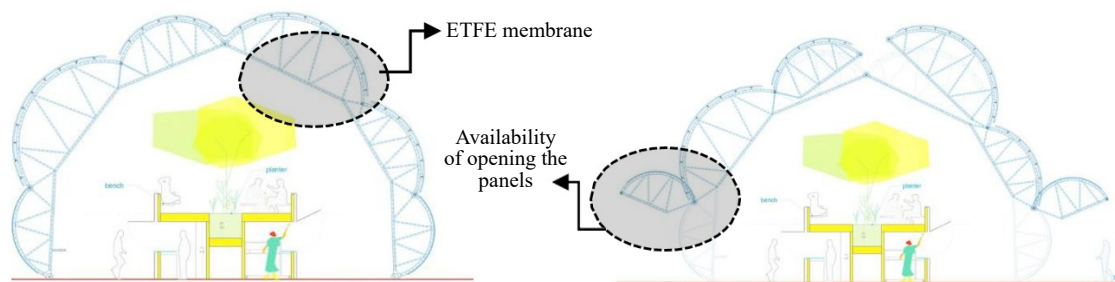

Figure 5. Design district canteen [10]

3.1.2 *Metaverse workpod*

Located in South Korea, this office project spans an area of 148 m² and encompasses several objectives [11]. Its key goals include safeguarding individual privacy, fostering a tranquil and focused atmosphere, and incorporating open meeting rooms and discreet rest areas to promote productivity. While the concept of infection control within the building is not yet fully developed, there is an illustrative example of workspace design that implements such measures: the metaverse workpod case study. Figure 6 showcases the integration of biophilic design within isolated workspaces, while Figure 7 highlights the diverse pod types for individual employees, ensuring privacy while maintaining connectivity to the larger workspace. Furthermore, Figure 8 depicts the desired flow of movement in post-pandemic designs, emphasizing the importance of clear circulation.

Given that this office project was conceived with post-pandemic regulations in mind, it can be inferred that the design incorporates elements that respond to the evolving atmosphere of workspaces in light of the COVID-19 pandemic. The design likely places a premium on safety, privacy, and productivity, considering the need for infection control and adherence to post-pandemic guidelines.

As mentioned by Allen [12], post-pandemic workspace designs should consider vital factors such as proper ventilation, physical distancing measures, and the integration of biophilic elements to establish a healthy and conducive environment for productivity. The cited metaverse workpod case study provides an inspiring example of incorporating infection control measures within isolated workspaces, serving as a potential model for other post-pandemic office designs.

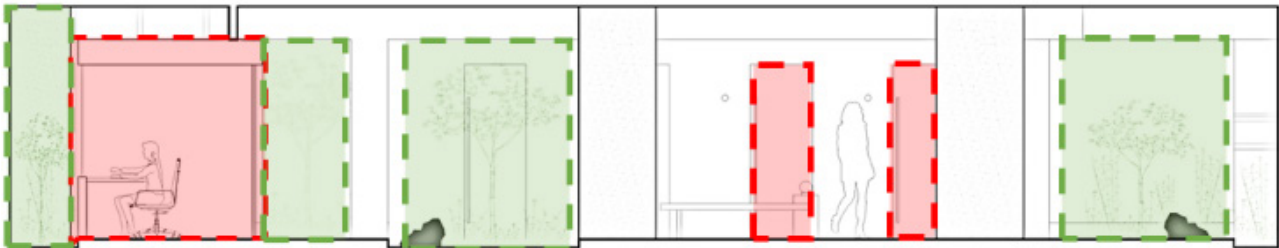**Figure 6.** The use of green elements and natural lighting [11]

Figure 7. Different pod types and their connection with nature [11]

1. Corridor
2. Pod type 1
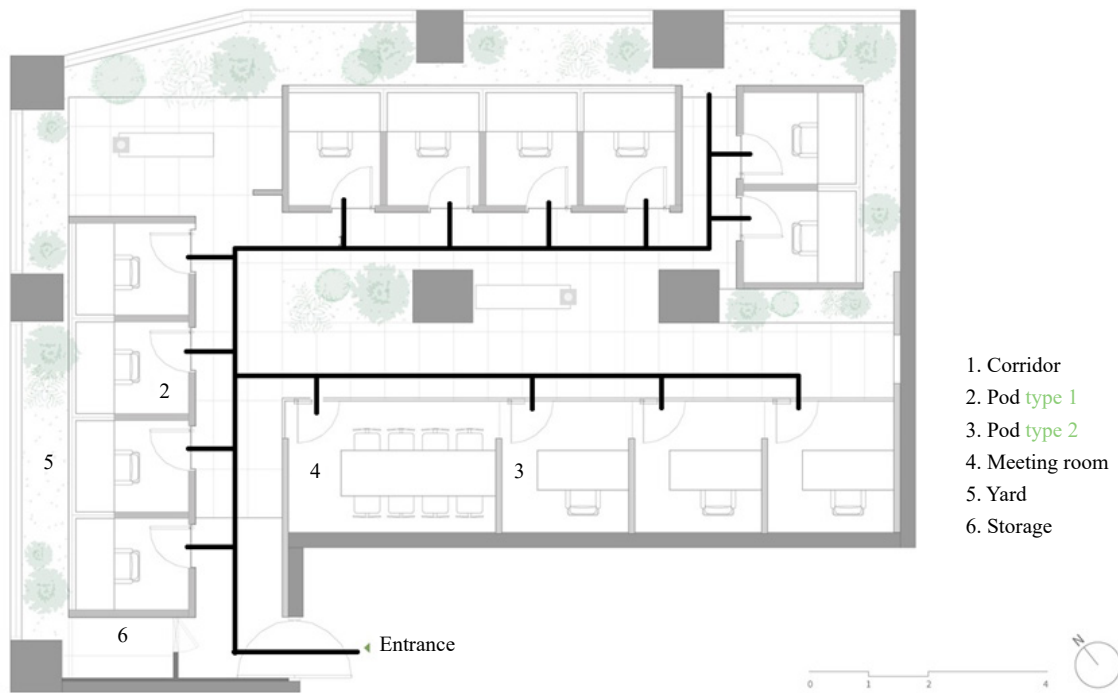3. Pod type 2
4. Meeting room
5. Yard
6. Storage

Figure 8. Clear circulation within the space [11]

3.1.3 *The Polygon Business Park*

The Polygon Business Park is a revolutionary technological business complex located in Beverly Hills, Al Sheikh Zayed, Giza, Egypt [13]. It seamlessly integrates indoor and outdoor spaces with a captivating mountain-inspired landscape, featuring irregular forms and platforms. The design highlights the harmonious connection between the built environment and nature.

In terms of indoor and outdoor connectivity, the office extensions within the business park are particularly noteworthy. Each office within the Polygon Business Park is equipped with its outdoor informal area [13]. This thoughtful feature not only provides a space for casual work but also strengthens the connection between occupants and the outdoor environment. This design approach fosters a dynamic work environment that encourages collaboration and allows individuals to engage with nature during their workday. Figures 9 and 10 showcase these indoor and outdoor connections, illustrating the integration of workspace extensions with inviting outdoor areas.

The Polygon Business Park was built before the COVID-19 pandemic. The design emphasizes the integration of indoor and outdoor spaces, creating an inspiring and visually appealing workspace. While the specific pandemic-related adaptations or advantages of the design are not explicitly mentioned, workplaces need to adapt to changing circumstances and implement necessary measures to prioritize the safety and well-being of occupants.

The Polygon Business Park serves as a testament to the seamless integration of indoor and outdoor spaces, fostering a connection with nature and providing a visually appealing work environment. Although the specific pandemic-related adaptations are not outlined, the design approach and emphasis on indoor-outdoor connectivity can contribute to a positive work environment conducive to well-being and productivity [12].

Figure 9. Office outdoor extensions [13]

Figure 10. Outdoor terrace accessibility [13]

3.2 Questionnaire

A questionnaire was utilized to determine the most needed elements in the work environment and what guidelines should be changed. The respondents were from different professions in the creative industries and were users of this sort of building; an examination of similar projects was also conducted. Employers were also asked about changes caused by the pandemic.
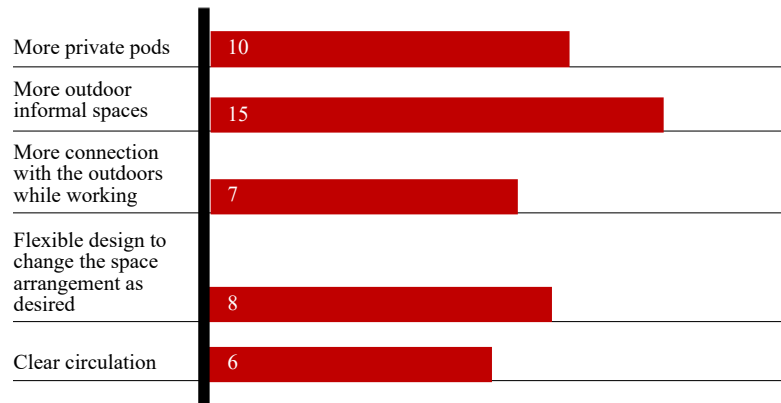

Figure 11. A bar chart that shows the final results of the questionnaire

3.3 Interviews

Interviews with several firm owners and employees in the creative industry were conducted. The interviewers included architects, interior designers, and graphic designers. The interview aimed to determine what the majority believed about the raised questions, which are: did designer firm owners find remote work effective and a substitute for the workplace? What was seen malfunctioning or lacking in the design firm offices?

The main findings of the interview were that 80% believed that remote work in the creative field was inefficient and lacked interaction, which is an important element in creative work. Furthermore, the main modifications that were needed in workspaces were private workpods, outdoor extensions for informal work and meetings, one-way circulation, biophilia, flexible design to accommodate changes, and the use of technology.

4. Discussion

The results of this research provided valuable insight into how the COVID-19 pandemic had impacted architectural design guidelines, particularly in the context of design districts. Specifically, the study (Polygon and Post-Pandemic Metaverse) found that biophilic design, which integrates indoor and outdoor spaces, can create a safer environment for the users of the building. The post-pandemic metaverse case study also demonstrated the effectiveness of private work spaces in controlling the spread of the virus.

In addition, the Greenwich Design District in London exemplified the importance of closed, interactive spaces with infection control systems and clear circulation in post-pandemic design, as well as the impact of well-ventilated spaces on reducing the risk of infection.

The results shown in the standards also highlighted the need to consider increased spacing dimensions in different types of spaces to facilitate social distancing.

The questionnaire and interview results indicated that outdoor, informal spaces are desired in such workspaces, which supports the idea of creating flexible and adaptable designs. Overall, the study found that a combination of biophilic design, private work spaces, infection control systems, clear circulation, and increased spacing dimensions can effectively mitigate the risk of virus transmission in design districts.

In conclusion, the survey findings and interview outcomes enrich the research by offering real-world viewpoints and reinforcing the key points. The interconnectedness of the survey responses, interviews, and other case studies strengthens the overall argument that integrating biophilic design, private workspaces, infection control systems, clear circulation paths, and expanded spacing dimensions is imperative for the creation of design districts that prioritize user health and adaptability. These valuable insights contribute to the formulation of comprehensive design guidelines tailored to the post-pandemic landscape, ensuring the safety and resilience of design districts.

This project reflects and foresees the metaverse era, not just as a business and architectural potential but also as an exciting, forward-thinking evolution for society as a whole in terms of culture, economy, and politics [1]. Encouraging the libertarian principle of contributing to society as a whole while giving democracy and meritocracy the highest priority translates into the Liberland Metaverse as part of the concept's philosophy. As for the Liberland Metaverse, Vít Jedlička emphasizes how the metaverse could undoubtedly raise Liberland's economy, stating that the number of citizenship applications continues to accelerate after introducing the metaverse project as Liberland's new future.

5. Conclusion

In conclusion, this paper significantly contributes to the academic understanding of architectural design guidelines in design districts amidst the COVID-19 pandemic. Through comprehensive research methods including case studies, surveys, and interviews, valuable insights are obtained on the necessary adaptations and new design guidelines required in the post-pandemic era. The findings underscore the importance of incorporating essential elements such as ventilation, isolation, circulation, infection control systems, social distancing, indoor-outdoor integration, biophilic design, and technological advancements. This paper significantly contributes to post-pandemic design research by providing valuable insights for creating safe and adaptable design district spaces.

The academic significance of this work lies in its comprehensive and integrated approach, which combines theoretical knowledge with practical insights. Through an examination of real-world examples and the solicitation of expert input, this paper provides invaluable recommendations and guidelines that can be effectively applied to the design and planning of design districts. Consequently, this research contributes to the expanding knowledge of post-pandemic design, serving as a solid foundation for future advancements in architectural design practices.

However, a limitation of the study is the lack of specific case studies for post-pandemic design districts in Egypt. The absence of local case studies makes it challenging to assess the feasibility, effectiveness, and potential challenges associated with implementing such a district in the Egyptian context. This limitation restricts the availability of relevant data and insights that could inform decision-making, design considerations, and the overall success of the project.

Overall, the academic contribution of this paper lies in its ability to inform and guide architects, designers, and policymakers in developing innovative and resilient design solutions that prioritize user health and well-being in the context of design districts and beyond.

6. Recommendations

The implementation of updated and enforced regulations as a legal requirement in Egypt ensures their effective implementation and adherence. This will provide the necessary authority and enforceability to safeguard public health, safety, and sustainability. Alongside this, conducting thorough weather and environmental studies will provide valuable insights for designing climate-responsive and resilient spaces. Fostering collaboration and knowledge sharing among architects, urban planners, and stakeholders will promote innovation and best practices. Leveraging technology will optimize energy efficiency and enhance the user experience. Engaging the local community throughout the process will ensure inclusivity and a sense of ownership. Continuous evaluation and adaptation of the project will ensure its long-term success and positive impact. It is crucial to conduct further research and analysis to gather empirical evidence and local experiences that can guide the development and implementation of the design district.

Conflict of interest

There is no conflict of interest in this study.

References

[1] World Health Organization. *WHO Coronavirus (COVID-19) Dashboard*. https://covid19.who.int/ [Accessed 2nd February 2022].

[2] Cook D. Five workplace trends will shape life after lockdown. *The Conversation*. May 7 2020. https://theconversation.com/five-workplace-trends-will-shape-life-after-lockdown-138077 [Accessed 21st November 2022].

[3] McKinsey & Company. *How COVID-19 has pushed companies over the technology tipping point—and transformed business forever*. https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever [Accessed 2nd February 2022].

[4] Dişli G, Arslan HD. Pandemic resiliency and flexibility assessment of dormitory buildings in the post-Covid-19 era. *Asian Journal of Civil Engineering*. 2023; 24: 1215-1231. https://doi.org/10.1007/s42107-022-00563-4

[5] Office Snapshots. *26 return-to-workplace solutions for the post-covid office*. https://officesnapshots.com/articles/26-return-to-workplace-solutions-for-the-post-covid-office/ [Accessed 6th November 2022].

[6] Density. *How to plan conference room usage in the age of social distancing*. https://library.density.io/insights/how-to-plan-conference-room-usage-in-the-age-of-social-distancing/ [Accessed 10th September 2022].

[7] Continuant. *CUSTOM AUDIO VIDEO Create optimal AV experiences for each user and every space*. https://www.continuant.com/solution/audio-video-solutions [Accessed 6th November 2022].

[8] Nidirect. *Coronavirus (COVID-19): ventilation*. https://www.nidirect.gov.uk/news/good-ventilation-helps-stop-covid-19-spreading [Accessed 2nd February 2022].

[9] Designboom. *Design district canteen by Selgascano opens in London*. https://www.designboom.com/architecture/selgascano-design-district-canteen-london-10-25-2022/ [Accessed 10th September 2022].

[10] ArchDaily. *Design District Canteen / Selgascano*. https://www.archdaily.com/992202/design-district-canteen-selgascano [Accessed 10th September 2022].

[11] ArchDaily. *Metaverse Workpod / Design Studio BYO*. https://www.archdaily.com/992666/metaverse-workpod-design-studio-byo?ad_source=search&ad_medium=projects_tab [Accessed 10th September 2022].

[12] Allen JG. Designing buildings that are both well-ventilated and green. *Harvard Business Review*. January 9 2023. https://hbr.org/2023/01/designing-buildings-that-are-both-well-ventilated-and-green [Accessed 21st June 2023].

[13] Edarfirst. *The Polygon. Westown Business Park*. https://www.slideshare.net/Edarfirst/the-polygon-brochure [Accessed 10th September 2022].