

AN APPRAISAL OF THE USE OF COURTYARD FOR CONTROLLING THE SPREAD OF COVID-19 IN COMMERCIAL BUILDINGS

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Abstract. This study explores designing commercial spaces that practice many social and trading activities is a massive responsibility to the designer, especially in the post-COVID 19 pandemics. It should be a safe environmental place for such activities. There are several influences that health issues had on the transformation of architecture. There are some implications the pandemics may have on how architecture thinks and organizes the different spaces on different levels. Unfortunately, we have to live with COVID and its mutants, which appears in various versions from time to time. The world health organization (WHO) announced a solid recommendation to rethink practicing trading activities instead of doing it in a closed environment to be in the open air and reviewing designing the common spaces is crucial to control the spreading of viruses. The WHO reported that having fresh air in such areas is a successful issue for safe places during the pandemic. The research discusses the appraisal of the use of the Courtyard for controlling the spread of COVID-19 in commercial buildings as one of the types of open spaces in the commercial buildings to be a successful solution to accommodate such activities in safe open-air areas between such commercial buildings.

Keywords: COVID 19, Courtyard, Architectural Design, commercial building, Bahrain.

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1. Introduction

In many cities, the authorities had to lockdown as a step toward controlling; the spreading of COVID to avoid direct contact and the short distances between people. In some areas, it was entirely lockdown, and people were asked to stay at home for days. Consequently, people also suffered at a high level from staying in their homes for an extended time (Nia & Suleiman, 2018). Unfortunately, the lockdown caused economic problems at different levels in the cities. Therefore, the authority had to re-open the commercial building to give life to the town. But the reopening had to be according to WHO perception in general and the social distances in particular.

On the other hand, World Health Organization (WHO) asked nations to accelerate research on developing new models and standards to contain the spread of the coronavirus. The target was to care for those affected cities and share knowledge between cities in that matter. Due to COVID-19, Social Distancing, Modernism, Alleviation of Density, and Contact-less Design Features are the four methods that will change the architectural strategy for years to the future architecture of the commercial environment. Here it is necessary to have buildings that respect the WHO notes (WHO, 2022).

Woyo and Ukpabi (2022) wrote that the courtyard produced an enclosure trading environment, providing a space for relaxation and different activities for adults and kids within a safe environment. Therefore, the research proposes the courtyard plays a

breathing space between its significant components in commercial establishments like malls and others (Woyo & Ukpabi, 2022).

There is a recommendation of necessity to have breathing space between its significant components in huge commercial buildings like malls since the role of the courtyard is an enclosed environment that blends the indoor and outdoor spaces (Nia & Suleiman, 2018). A courtyard role comes in commercial buildings with various features that demand function parts that the courtyards can provide (Eldardiry & Konbor, 2022). Moreover, courtyards are not only about aesthetics, but it has other benefits, such as providing the necessary natural light and ventilation that people need to feel refreshed. Also, the natural element in the courtyard can provide a space for relaxation and different activities for adults and kids within a safe environment (Yusuf & Elghonaimy, 2020). In addition, it can heavily affect the users' social behavior in the building, such as creating a path for people to walk within it. Courtyards are a welcoming space that will break the claustrophobic atmosphere within the areas. The variation of the components in commercial buildings can be supported by the flexibility of the courtyard's elements (Shafik & El-Hussiny, 2019).

Moreover, the courtyard can heavily affect the users' social behavior in the building, such as creating a path for people to walk within it. Courtyards are a welcoming space that will break the claustrophobic atmosphere within the space. (Hussein, 2018). It also adds a dominant character to the area through the colors, textures, shapes can achieve, and furniture, all of that depend on the designers' creativity. Therefore, we can say that the variation of the components in commercial buildings can be supported by the flexibility of the courtyard's elements (Rahbarianyazd, 2017).

Before the COVID pandemic and accelerating the trading interaction and commercial activities, most commercial buildings prefer a fully indoor shopping experience. Some provide the interior with daylight through skylights, like Al-Aali Mall, or through the design of a partial glass wall, like Bahrain City Center. After the spread of using malls, when going shopping for a shopping trip, you rarely see a courtyard in the mall or shopping center that you go to, whether in Bahrain or outside. But, within the COVID 19 pandemic, these closed spaces become a hazard of virus transmission, threatening trading activities (Chayka, 2020). It should be noted that COVID-19 caused influenced almost all architecture in the world. The architectural segment was no further as the pandemic impacts; projects were withdrawn or behind to a note dated period. The Architectural bills Index applied to launch different buildings viewed its most horrible single-month drop since the indicator was invented many years ago. Every pandemic in the history has resulted in a large-scale architectural transformation (Borda-de-Água, 2020). In others, some projects have been canceled throughout the preceding period of the pandemic; they may be the legend to moderating COVID-19 in the long term. (4 Ways COVID-19 May Change Architectural Design for Years to Come).

The study problem comes from searching for an architectural solution for enhancing the trading and commercial spaces that follow the WHO's advice. So, to the route to a sustainable future, the research discusses the changing shapes of the retail space we are willing to live and work in now. Moreover, it will study the significance of courtyards in commercial buildings in resolving social, economic, and environmental issues. Therefore, the research aims to analyze cases of commercial buildings with a courtyard to examine the appraisal of the use of courtyard for controlling the spread of covid-19 in a commercial building. Moreover, it looks at the users' satisfaction inside such buildings and defines the courtyard's purpose according to the function. So, the research objective is to propose

the concept of using the courtyard with a resilient and sustainable architectural solution that can facilitate practicing commercial activities, avoiding the causes of spreading COVID within such buildings safely.

The study methodology was divided into two main stages. The theoretical studies will illustrate the term the courtyard and its significance for achieving sustainable building in harsh environments such as Bahrain. In addition to describing the commercial life, reviewing and analyzing Bahrain's trading activities and retail environment due to the COVID 19 pandemic. It will go through the safety regulation planned by local authorities to control the impacts of the pandemic. Then is followed by the analytical studies for examples of commercial complexes that successfully practiced commercial activities using the courtyards in a safe and secured environment during the full/partial lockdown in Bahrain.

2. Material and Methods

There is a need to define the term "courtyard" to highlight the space under that title. A courtyard is an orbited area, regularly surrounded by a building open to the sky. These open spaces in the commercial projects and public buildings were regularly the direct gathering place for multi-activities objectives according to the type of buildings, leading to the other meanings of a court (Nia, 2021). The words court and yard derive from an identical basis, representing an enclosed space (Elghonaimy & Eldardiry, 2019). Therefore, Bahrain's courtyard has been well known as a climatic solution in the buildings for a long time. Due to Bahrain's harsh environment (high temperature and humidity), most of the year courtyard was used broadly. Nowadays, having a courtyard requires lots of effort to have the desired relaxed and comfortable environment. In that spot, Bahrain's weather is characterized by the followings:

- Summer hot months are April, May, June, July, August, September, and October.
- Bahrain has dry periods in January, February, March, April, May, June, July, and August.
- September is the wettest month with a high rate of glare condition. (Elghonaimy & Mohamed, 2019).

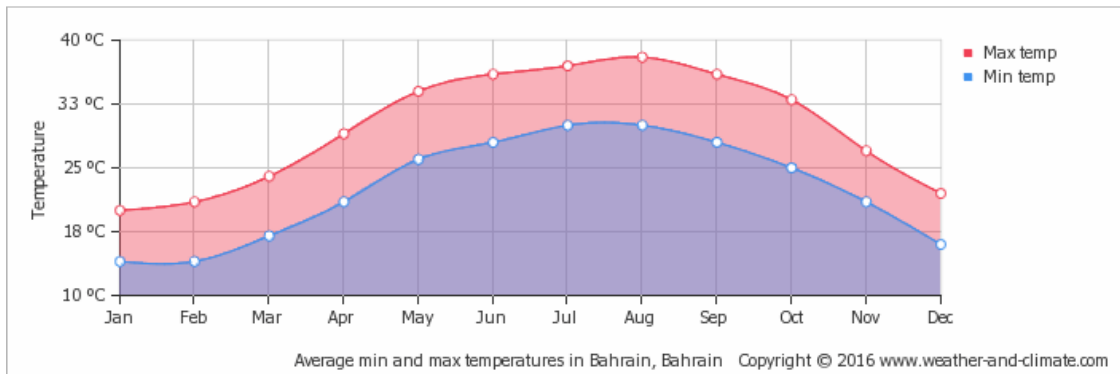
Therefore, using the courtyard inside the commercial spaces is a privilege. Explaining the significance of the courtyard according to the sustainability pillars, which is the target in designing the building, is as follows:

a. Environmentally aspects, the glare condition causes adverse visual impact problems. At the same time, the design of the displaying areas in the commercial buildings and the courtyard decreases this glare within the inner spaces (Muhy Al-Din, 2017). Moreover, it is essential to secure daylight level suitably, the compulsory level of airflow, and remove the threat of having the courtyard impassioned in summer. According to the existing 'Hygienic requirements for solar exposure and sunlight protection of public buildings and areas, the courtyard plays a significant factor in controlling solar exposure, which creates the direction of inner spaces of the commercial spaces to direct sunbeams radiation (Basha-Jakupi *et al.*, 2021). The courtyard helps maintain the solar exposure level of the upper floors in a straight line hit by sunbeams (Dechaicha *et al.*, 2021). Moreover, it is essential to protect the inner open spaces of the courtyard in the building. Daylight factor (DLF) is a percentage of daylight produced by skylight (direct or reflected) at a definite point of the area given to direct external horizontal light produced by the sunny of open sky fall; it is expressed as a ratio (Korkmazer *et al.*, 2019).

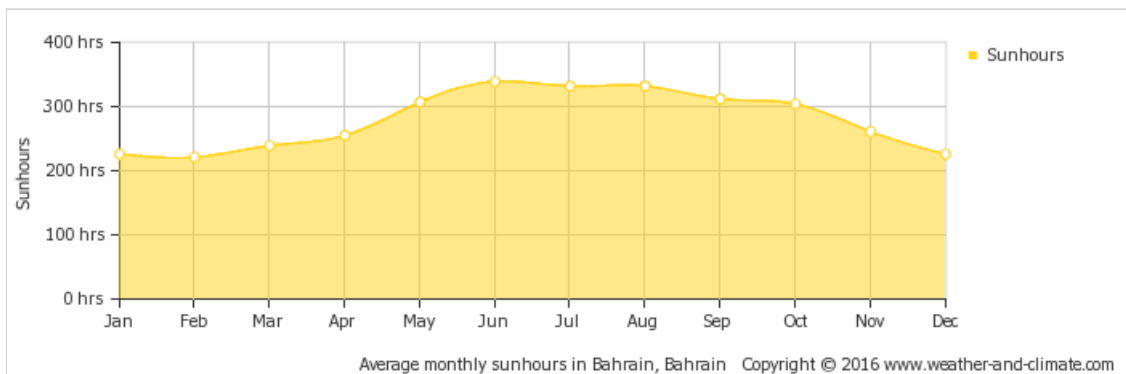
Moreover, natural ventilation and passive cooling are created through the night while using the courtyard, bringing the inclusive temperature down. In addition, the courtyard is overfilled with vegetation, and a garden area helps keep the building cool even in the arid climates, which is appropriate to the Bahrain environment (Rahbarianyazd & Raswol, 2018) (Figure 1).

b. Social-wise, it functions going for leisure; therefore, having the courtyards is very popular today. It gives an aesthetic ambiance of cost time in an open space during shopping. Courtyards should be considered to work with any building style – modern or traditional. It becomes easy to practice shopping or sitting in the middle courtyard enjoying the fresh air in the winter. The cold monopoly in this part of the building increases. And thus become busy during the winter.

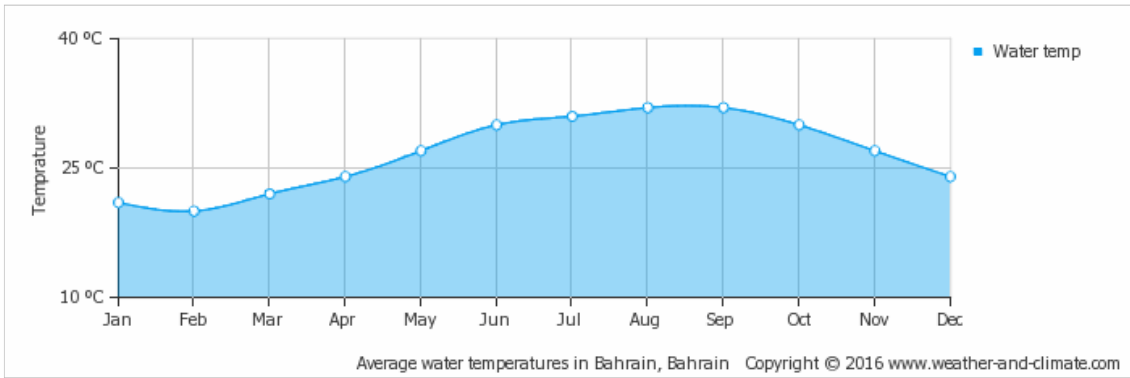
c. Economic-wise, A courtyard can decrease the buildings' temperature in Bahrain's climate and save electrical bills. Several courtyards also include natural cooling elements, like an artificial waterfall, a basin, thick external walls, a water fountain, and double-glazed windows. The presence of plantations in the courtyard of the building creates a beautiful and comfortable view. But at the same time, it is feasible to affect the place because of insects.



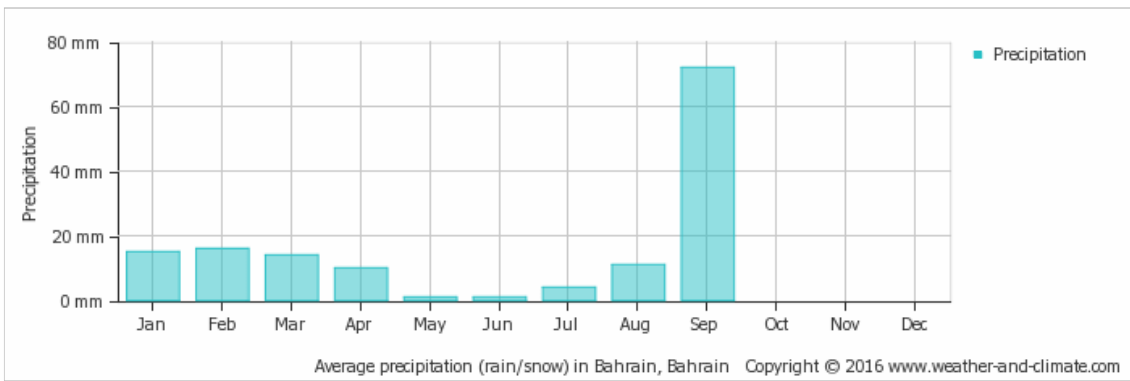
a. Average minimum and maximum temperature in Bahrain



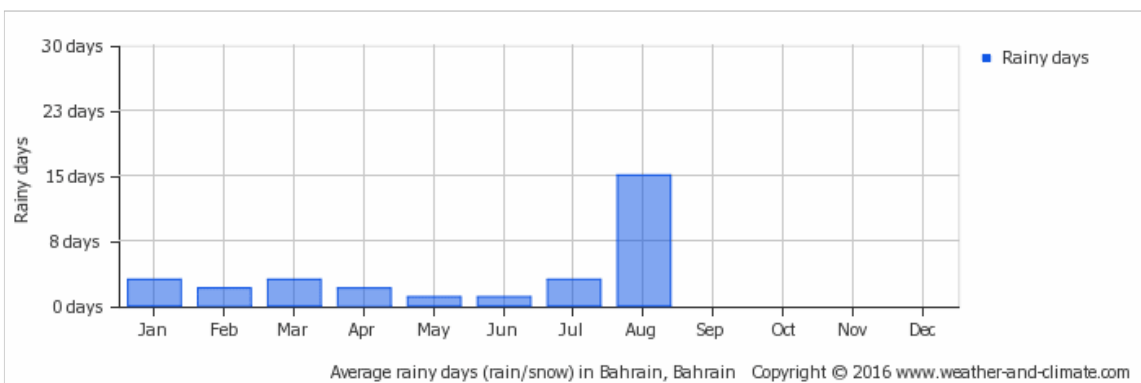
b. Average monthly hours of sunshine in Bahrain



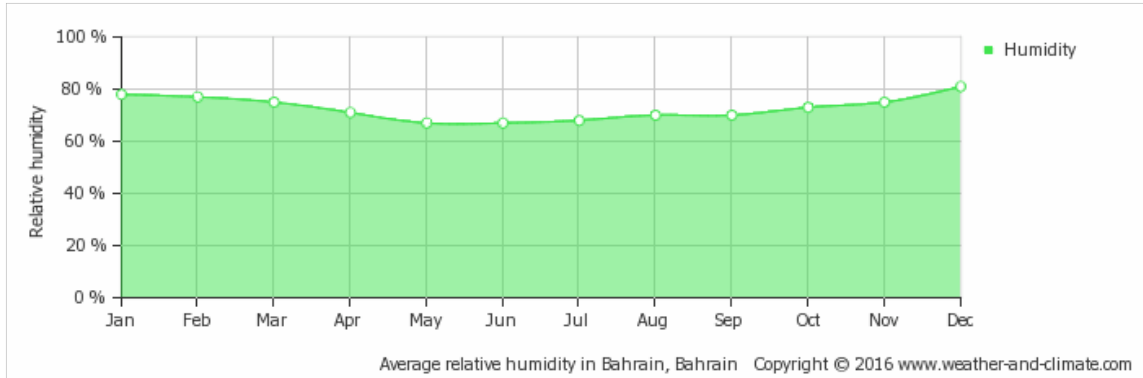
c. Average water temperature in Bahrain



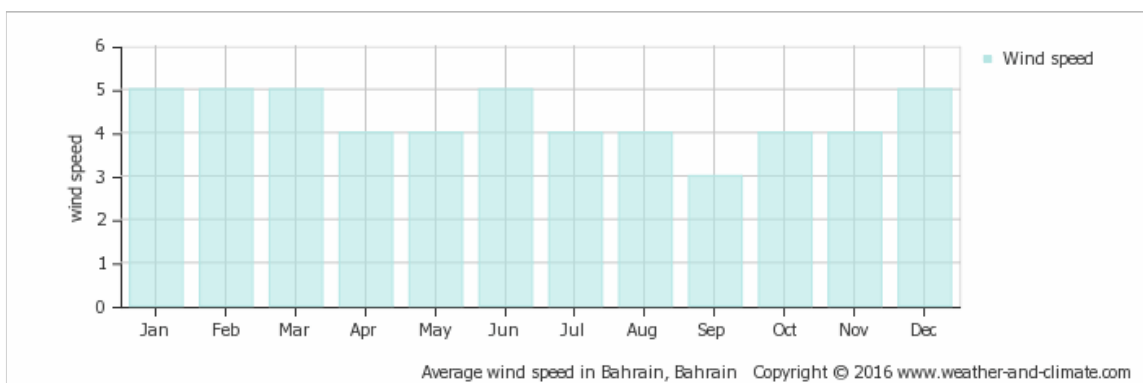
d. Average precipitation (rainfall) in Bahrain



e. Average rainy days (rain) in Bahrain



f. Average relative humidity in Bahrain



g. Average wind speed in Bahrain

Figure 1. Metrological measurement for Bahrain weather (Meteorological Services, 2022)

Architecturally, Courtyards make perfect sense for performing shopping and various commercial activities. It provides the users of a building with a comfortable outdoor space. This secure space is usable throughout the day. A courtyard helps the building to be appropriately warm or cool without artificial tools such as air conditioners with natural ventilation. Therefore, it attracts customers to visit the building or the commercial complex and encourages them to practice more than shopping (Zhang, 2017).

During the COVID 19 pandemic, the active commercial, and shopping areas varied according to their service. Moreover, it depends on the condition of the pandemic level (orange, yellow, red, or green status), and the type of trading (retails, shopping malls, shopping complexes, booths etc.) that reflects the number of shoppers and the level of services required.

The active area varies according to the type of commercial area and its shoppers' services. The functional indoor and outdoor shopping spaces generally insured the social distance while the yellow or orange state (Rosa-Jimenez & Jaime-Segura, 2022). The Ministry of Health in Bahrain recommended using the open space for shopping to be safe. They announced that it was preferable to use the outdoor spaces of the commercial areas rather than the indoor ones. In general, the recommended active site for shopping includes the arcades, the outdoor yards in front of the retail spaces, and the parking lots in the surrounding. These recommendations are targeted to control the infection spreading among shoppers within the closed areas (Figure 2). The principal guidance that the

authorities had taken to maintain the spreading of the virus in commercial and trading activities was the following

- a. Face coverings/masks are mandatory in all indoor activities cases.
- b. Be aware of Covid Pass from the up-to-date, accessible information; this applies to shared worship at places of worship like mosques.
- c. Ventilation, this virus is airborne, so frequently, ventilation for the indoor spaces across mosque rooms/halls is vital.
- d. If symptomatic, the patient was advised to stay at home and get PCR tested rather than lateral flow.
- e. The latest update will be announced at the “Be Aware Application”.

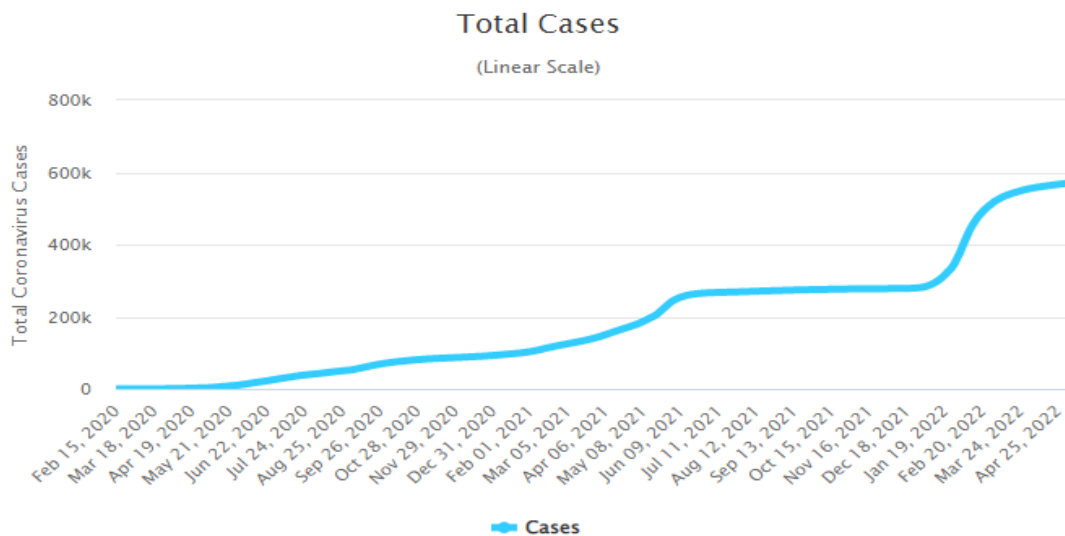


Figure 2. Total Coronavirus Cases in Bahrain (Coronavirus Cases in Bahrain, 2022)

To implement the safety precautions, the authorities closed a few commercial shops for some time (one week or two) after the Local Medical Team for Fighting the Coronavirus (COVID-19) exposed positive cases there. After the end of the week, these shops opened their gates for shoppers again with accurate monitoring to avoid repeating the same mistakes (BNA, 25 Jun 2021). The authorities tracked the shoppers' movement within the commercial spaces comprehensively within the "Be Aware" network program. So, the members of the Local Medical Team for Fighting the Coronavirus network are enabled to trace and contact infected people, then sanitize the buildings, and indorse that all safety steps are taken using a short period to carry out, as explained by the ministry.

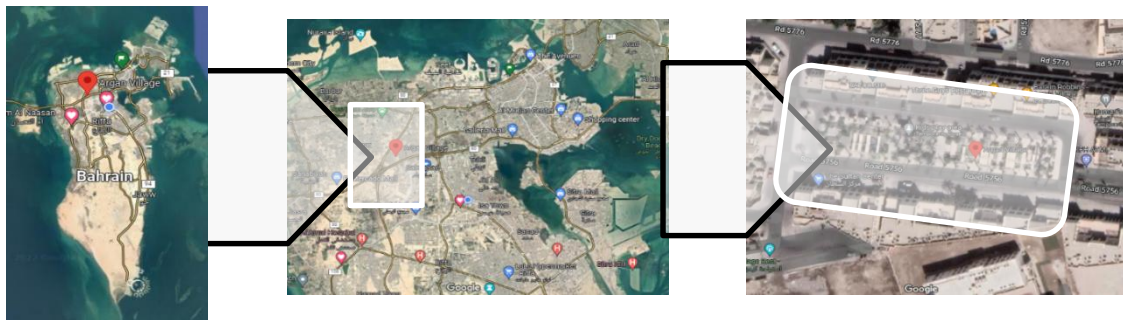
After highlighting the definition of a courtyard and its significance in a commercial building and giving background about COVID 19 circumstances in Bahrain, the study will present two cases of commercial projects with courtyards. These cases were performance the retailing activities during the COVUS 19 pandemic. The projects show the role of the courtyard in progressing the commercial activities during the COVID pandemic successfully.

2.1. Argan Village, Bu Qwah, Bahrain

Argan Village is a low-rise retail building gathered around a courtyard (park) in a complex of 3,146 sqm. It is located in the residential area of Bu Qwah (Figure 3.a). The

village's design depends on having a large courtyard in the middle of the project, which enables visitors to move between shops in a safe environment and allows them to hold entertainment events in a safe concept from spreading viruses (Figure 3.b).

The park was an obvious choice for this study because of its approach to sustainable architecture via the successful attempt to engage the people's trading activities outdoors. In the VOVID 19 pandemic period, people used to practice their trading activities in a safe environment by utilizing the open spaces free from the hazards of transmitting the viruses in their shipping. Architecturally, it was an award-winning property and a hot spot for the Jeyoun community development in Bu Qwah. It's simply an appropriate place to visit from time to time, especially during the semi-lookdown period (Figure 3.b). The complex is highly visited on Fridays and Saturdays by locals and visitors of different ages.



a. Location of Argan Village, Bu Qwarah, Bahrain



b. The courtyard in the intermediate of the project



c. visit hours for Argan Village (Google, 2020)

Figure 3. Argan Village commercial areas, Bu Qwarah, Bahrain

As shown in Figure 3.c, visitors usually spend 30 minutes to 1 hour and a half, and it's mostly visited from 9 am until 11.59 pm. The park is considered a source of entertainment for it holds many events throughout the year. It opens 24 hours, seven days

a week, automatically giving the visitors an open invitation. Multiple activities have taken place in the park, such as film screenings, national day celebrations, yoga classes, chess tournaments, arts and craft events, etc. Until today, Argan Village is open to all kinds of events regardless of the category (Figure 3.c).

The courtyard has several advantages in terms of performance for users. Retail facilities like Al Jazira supermarket surround the park, 3 Guys, Baskin Robins, and many other brands, creating a layering technique that is beneficial for creating a secure space. It can also block the noise from the park to the residential area. Bahrain is known for its rough weather. Some people try to avoid open spaces in the summer heat, but not everyone is bothered by that. So, the park is supplied with elements that provide shade to the visitors. It also has a water fountain for aesthetic purposes and cools the weather around it. Not only that but there are also some light fixtures on the ground that produce light and water as small water fountains (Figure 4).

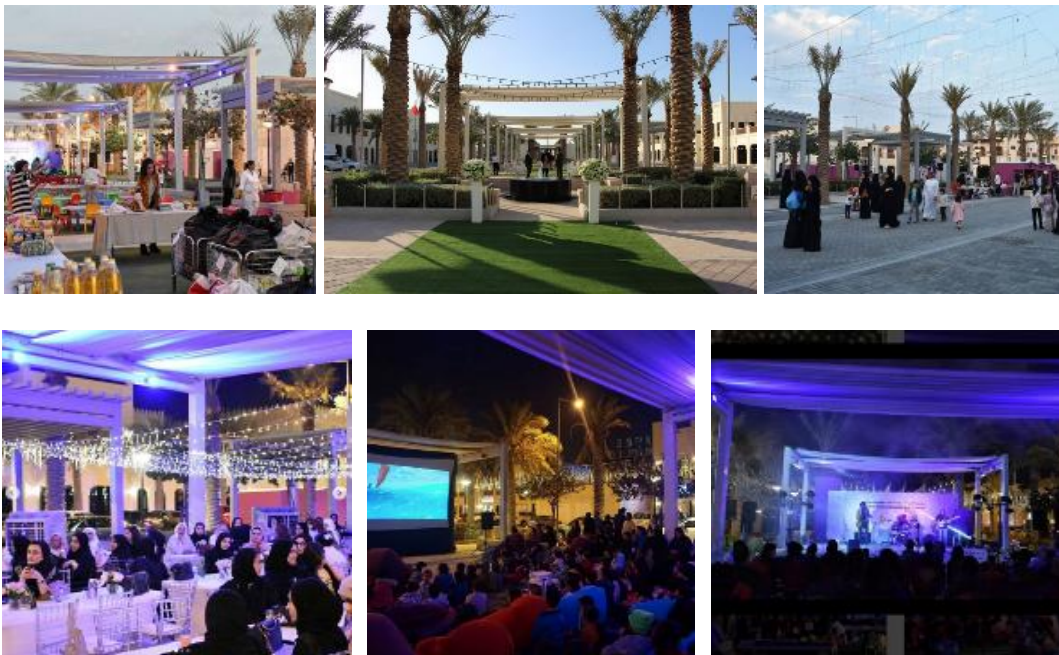


Figure 4. Using the courtyard for entertainment activities and spreading joyfulness for the users in the commercial areas in Argan Village project

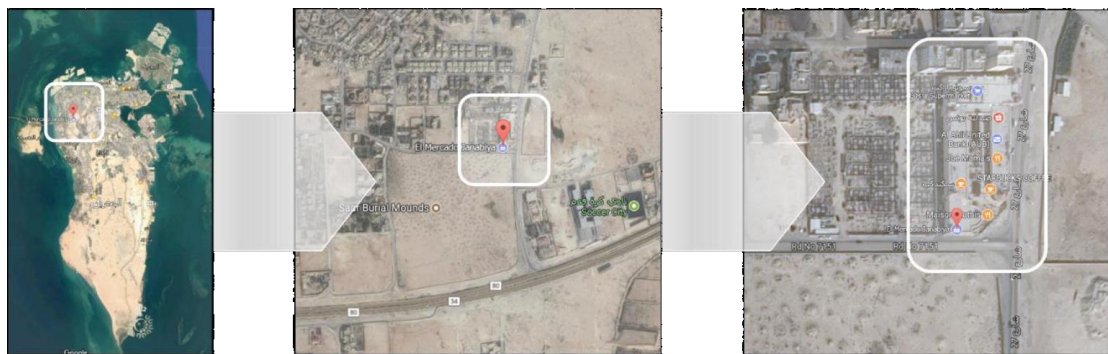
The park provides a sustainable ecosystem as it's known for plants removing various pollutants from the air. Palm trees are laid out in a specific pattern; trees, bushes, and other plants. All of that helps in building a healthy environment in the area. People usually go to such places looking for a different environment from their homes, work, and search for a mental health boost. The park operates by creating a healthy and welcoming atmosphere where people can socialize and re-boost their energy. And on the economic aspect, Argan Village is a perfect weekend plan for the family. It provides commercial shops for adults and events in the park for children. For example, parents can go out for a cup of coffee as they sit relaxing while having visual access to keep an eye on their kids (Figure 4). In our case, the advantages outweigh the disadvantages, but they still exist. For example, noise can be an issue for the nearby houses. Regardless of the

earlier layering technique, some events can create a loud noise reaching the residential area, which can be a problem.

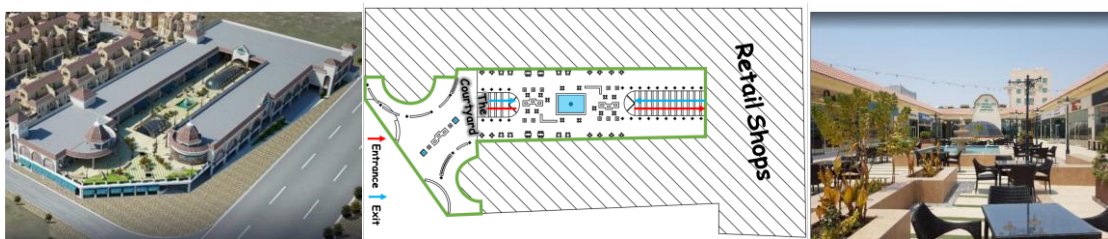
2.2 El Mercado Janabiya, Bahrain

El Mercado mall is one of the few examples of commercial buildings in Bahrain. El Mercado provided all the needed courtyard elements. Therefore, it is believed to satisfy the sustainability concept by giving an open-to-sky area, greenery, and a water element, reducing energy consumption and adding to the overall environmental quality (Figure 5). It has a courtyard within the commercial building that helps change users' experience, and moods since nature and water elements will change the air and create a better environment than the artificial HVAC system air.

The positive point in the case is the suitability of applying WHO advice in maximizing the outdoor shopping areas and the social distances by creating central open spaces to allow practicing shopping within a relaxed open-air environment. Moreover, the courtyard helped carry out smells from food, drinks, or anything that will be mixed easily with the air. Another feature of openness is that the air movement is high, and new fresh air replaces old air, making you feel more relaxed. The courtyard is an excellent place to relax after shopping, as there are several restaurants and cafes, but the temperature at certain hours might be a blocker.



[Left] Map of Bahrain [Center] Map of Janabiya [Right] El Mercado mall (Google, 2017)



[Left] 3D image of complex [Center] Master plan of Janabiya [Right] The courtyard of the El Mercado mall (Google, 2017)

Figure 5. El Mercado Janabiya, Bahrain

Listed below are four methods COVID-19 may affect architectural strategy for the future of commercial activities with the following approaches:

a. Social Distancing: Many commercial and trading activities are gradually re-opening, with social distancing guidelines. People will walk into open trading these days and see the open space concept in the designed commercial buildings. Many traditional

commercial items will be replaced by quick trading (booth trucks) cubicles, no more shared shop spaces, and tape and signage present throughout with instructions on where to sit and how to traverse the shops. While numerous believe these to be superficial, short-term solutions before obtaining back to regular soon, others are training for the long haul. On the other hand, companies such as Google and many others have opted to execute their trading-from-home policy. Experts and business owners realize that the pandemic may not be “going away” soon. As a result, architects in many countries are tasked with re-designing commercial space to help its occupants adhere to social distancing. The “short-term” temporary features added to the commercial will likely become integral to buildings. The open-concept "courtyard" will probably be dominant for some time. Therefore, architects must design such commercial spaces by reaching up with proper, socially distanced areas

b. Modernism: Calling from the nation's memories, for example, within the 19th and early 20th centuries, infectious disease was destroying their way through the world, similar to what we see with Covid-19. As a result, architects began to design different types of buildings with general health in mind, and Architectural Modernism evolved as the dominant form of design from the 1920s to the 1970s. With its soft surfaces and geometric, simple architectural designs, the Modernism concept was placed primarily to mitigate dust and uncleanness and stimulate natural sunlight, air, and openness, notably clean properties. Therefore, as the pandemic begins to lose acceleration, the general principle in the community must move to prevent another pandemic consequently, modernist architecture and its clean belongings have to evolve famous again.

c. Alleviation of Density: Undoubtedly, COVID-19 has delivered its most significant impact on densely populated provinces. To this day, the city has had uncontrolled coronaviruses and its mutation causes, and there is little to no doubt that the incredibly high density of the city's population with the absence of sanitary protocols has been a significant factor in spreading the virus. There is a primary expectation that urban planning and urban city design will drive to relieve population density in numerous cities. This means more open spaces between buildings with more spread out, spacious environments.

d. Contact-less Design Features; Scientists discovered that viruses and diseases have evolved to live and thrive on many surfaces throughout an indoor environment and spread after physical contact. Therefore, many businesses are executing temporary “contact-less” features throughout their shops and services; it is believable to expect that many of these features may become familiar and permanent. The indoor ventilation system technology that removes potentially infected air, automatic doors, smartphone-linked elevator buttons, voice-activated lights, and different contact-less parts will evolve the national indoor space benchmark. Those who understand these changes and their impact on society push architecture forward. On the other hand, the pandemic seems to be reshaping the contemporary world in practical and unexpected ways. Those resistant to modifying and viewing these new trends as brief may be left behind and face hazards.

3. Discussions

Bahrain has been known for decades for its rich history in commercial activities and trading on different levels. It is within the deep and rooted history anchored in Bahrain. On the other hand, the collected data from the ministry of transportation and teleconnections shows the high degree of temperatures, sunshine, glare, humidity, and

wind speed. It clarifies the local environment's low precipitation and rainy days (rainfall) rate. So, due to the harsh environment in Bahrain, the old commercial activities were located in the indoor environment in the form of shaded shopping streets. Consequently, it is clear that these meteorological data substantially impact the need for courtyards in commercial buildings.

The retail and shopping for a long time in old Bahrain areas significantly impacted bonding the social and economic vitality of Bahrainis and non-Bahraini. Moreover, We can see that the evolution of commercial buildings' architecture form and function over time depends on the population's commercial, political, and cultural lives. The reports of the Bahrain Chamber of Commerce and Industry showed that due to the COVID 19 pandemic partial lockdown, most of the urban context of Manama suffered from the decay of the trading process and social interaction.

The study reviewed and analyzed the reports from the Bahrain Chamber of Commerce & Industry about the circumstance of the life of the trading activities in the commercial areas in Bahrain during the COVID 19 pandemic. The analysis indicated the advantage of using open spaces such as courtyard; it helped overcome many declines in trading, shopping activities, and social life for residents during the lockdown. The analysis shows that the authorities tried to propose alternatives to crack the problem of closing the indoor shopping malls. This type of commercial environment is the source of life for commercial activities in Bahrain due to its harsh climate. During the period of the full/partial lockdown in Bahrain, the commercial buildings with courtyards had been hosting some outdoor activities that practiced commercial activities, which helped Bahrain's trading environment (Al-Khattaf, 2021).

Moreover, it enhanced the residents' social life by cracking the social segregation and separation. The study shows that thought has to be given to the courtyard in the commercial buildings for being a vital hub that can re-bond the social life. It cracked the social segregation and separation for the residents and shows that it plays a crucial role in improving the social life in the communities similar to before, which is shown in the case studies in the study. So the study shows that the courtyard will act in the following:

a. Socially; It enhances the social interaction of current residents in a well-ventilated environment. It again attracts society to the culturally rich districts and educates them about these areas' values.

b. Economically, It will help improve the commercial and trading life and the current residents' economy and take advantage of the “opportunity cost” as an alternative cost.

Physical

d. Environmental; It will work on reviving traditional cultural principles, decreasing aesthetic pollution, and bridging the neighbourhood's physical environment gap.

From the previous justifications, the courtyard and its plaza within the commercial spaces is a multi-function hub community (Node) inspired by old commercial activities concepts that follow Bahraini heritage. The reference point is meeting and accumulating a suitable open space inside the district. Therefore, the basic idea of having a courtyard with enough available safe space in the heart of the retail spaces within the urban context is to gather people for different events and commercial and cultural activities to keep bonding the sociality of the residents within the urban context. This concept will be applied following the traditional idea of the Bahraini heritage strong. It will be a place for the community to practice religious activities. In addition to having a Gather, talk, and share knowledge and skills. But within the COVID 19 pandemic, the paper ensures that

designing the commercial spaces should be examined again. Referring to the case studies in Bahrain, practicing commercial activities during the pandemic showed the significance of reutilizing the spaces around such commercial and trading areas within the neighborhood's urban context.

4. Conclusions

After more than two years of facing the COVID-19 pandemic, how we will live will never be identical like before. Philosophers say that crises solve differences and relatively encourage inventions, too (Ermilova *et al.*, 2022). In their practical life, architects used to design their projects considering better sustainable projects, but now they have to think about resilience while developing their projects. Moreover, they must be ready for more modifications in their works due to the expecting pandemic, and now they must keep preparing and updating concepts for different projects.

The study concluded that the Coronavirus would reshape the architecture of the city. The study tried to answer the question: What are the changing shapes of the commercial space we are willing to live and work in now? The answer is that the commercial buildings post-COVID have a different vision because many aspects will not be the same in the post-COVID-19 world. Architects must modify the spaces where we live, work, socialize, shop, study, and seek shopping. It is well observed that many visible additions and modifications are already taking place. The pandemic has taught us that while famous commercial buildings with courtyards have always been the most engaging and crowded, sharing can be possible under strict social distancing measures. As these norms of personal space evolve, public spaces must become more flexible regarding physical engagement. Future architecture projects are already looking into giving people more expansive areas and are generating different and parallel journeys.

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References

- Al-Khattaf, I. (2021). *Bahrain reopens commercial activities to contain Corona*. T.S. Company, Producer, & Asharq Al-Awsat.
- Basha-Jakupi, A., Osmani K., & Hoxha E. (2021). Public art the catalyst for the creation and regeneration of public spaces – case study Prishtina, Kosovo. *New Design Ideas*, 5(2), 124-134.
- Borda-de-Água, L. (2020). How scientific attitudes can help get architecture out of its present mess: three simple rules to follow. *New Design Ideas*, 4(1), 65-67 .
- Chayka, K. (2020). *How the Coronavirus Will Reshape Architecture* (Vol. 1). New York, Emma Roulette.
- Coronavirus Cases in Bahrain. (2022). Retrieved 1 May 2022 from World Ometers: <https://www.worldometers.info/coronavirus/country/bahrain/>
- Dechaicha, A., Daikh, A., & Alkama, D. (2021). Monitoring and Landscape Quantification of Uncontrolled Urbanisation in Oasis Regions: The Case of Adrar City in Algeria. *Journal of Contemporary Urban Affairs*, 5(2), 209-219.
- Eldardiry, D.H., Konbor, U. (2022). Using phenomenological theory for sustainable renovation of historical open spaces in Bahrain. *Int. J. Sustain. Dev. Plan*, 17, 559-568.

- Elghonaimy, I. H., Eldardiry, D.H. (2021). Digitalization and reviving the water frontage following the concept of smart cities after COVID 19 pandemic. In 4th Smart Cities Symposium (SCS 2021) (Vol. 2021, pp. 398-404). IET.
- Elghonaimy, I., Eldardiry, D. (2019). The Revival of Courtyard Consolidation in Mosque Architecture. *The 2nd International Conference on Mosque Architecture. 1*. Kuala Lumpur, Malaysia: Abdullatif Al Fozan Award for Mosque Architecture.
- Elghonaimy, I., Mohamed, W. (2019). Urban Heat Island in Bahrain: Urban Perspective. *Buildings journal*, 9(4), 96.
- Ermilova D.Yu., Alibekova M.I., Eryomkin D.I., Lyakhova N.B., Sorokotyagina E.N. (2022). Analysis of the impact of second World War on fashion and consumer practices. *New Design Ideas*, 6(1), 71-85.
- Hussein, N. (2018). The Pedestrianisation and Its Relation with Enhancing Walkability in Urban Spaces. *Journal of Contemporary Urban Affairs*, 2(1), 102–112.
- Korkmazer, E., Bektas, Y., Aykanat, M., Jevedzade, S., & Y. Caymaz, G.F. (2019). Study of light pollution in urban lighting in Nisantasi example. *Journal of Contemporary Urban Affairs*, 3(2), 8–15.
- Meteorological Services. (2022, May 9). Retrieved May 9, 2022, from Ministry of Transportation and Telecommunications Kingdom of Bahrain: <https://www.mtt.gov.bh/content/meteorological-services>
- Muhy Al-Din, S.S. (2017). The influence of Mediterranean modernist movement of architecture in Lefkosa: The first and early second half of 20th century. (D. H. Nia, Ed.) *Journal of Contemporary Urban Affairs*, 1(1), 10–23.
- Nia, H.A. (2021). The role of urban aesthetics on enhancing vitality of urban spaces. *Khulna University Studies*, 18(2), 59-77.
- Nia, H.A., Suleiman, Y.H. (2018). Aesthetics of Space Organization: Lessons from Traditional European Cities. *Journal of Contemporary Urban Affairs*, 2(1), 66–75.
- Rahbarianyazd, R. (2017). Sustainability in Historic Urban Environments: Effect of gentrification in the process of sustainable urban revitalization. *Journal of Contemporary Urban Affairs*, 1(1), 1-9.
- Rahbarianyazd, R., Raswol, L. (2018). Evaluating energy consumption in terms of climatic factors: A case study of Karakol residential apartments, Famagusta, North Cyprus. *Journal of Contemporary Urban Affairs*, 2(1), 45–54.
- Rosa-Jimenez, C., Jaime-Segura, C. (2022). Living space needs of small housing in the post-pandemic era: Malaga as a case study. *Journal of Contemporary Urban Affairs*, 6(1), 51–58.
- Shafik, Z., El-Hussiny, M. (2019). Re-visiting the Park: Reviving the “Cultural Park for Children” in Sayyeda Zeinab in the shadows of Social Sustainability. *Journal of Contemporary Urban Affairs*, 3(2), 84–94.
- WHO. (2022). *World Health Organization*. Retrieved May 5, 2022, from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>
- Woyo, E., Ukpabi, D. (2022). Building Resilient Smart Cities for Sustainable Urban Tourism in Africa Post-COVID-19 Pandemic. *Building Resilient Smart Cities for Sustainable Urban Tourism, 1*, Springer.
- Yusuf, M., Elghonaimy, I. (2020). Housing Dilemma and Vertical Dimensions. *Journal of Civil Engineering and Architecture*, 8(5), 1107 – 1118.
- Zhang, D. (2017). Courtyard Housing in China: Chinese Quest for Harmony. *Journal of Contemporary Urban Affairs*, 1(2), 38–56.
- 4 Ways COVID-19 May Change Architectural Design for Years to Come. VIP Architectural Associates, PLLC, Retrieved May 2, 2022, from <https://www.vipstructures.com/covid-architecture/>