Vol. 4, Issue I, 2025 (January – March)
International Journal of Politics & Social Sciences Review (IJPSSR)
Website: https://ijpssr.org.pk/ OJS: https://ojs.ijpssr.org.pk/ Email: ijpssrjournal@gmail.com
ISSN 2959-6467 (Online) :: ISSN 2959-6459 (Print)
ISSN 2959-6459 (ISSN-L)
Recognized by Higher Education Commission (HEC), Government of Pakistan

Impact of Urban Development on the Climate Change! A study of the Awareness, Suggestions, and Concerns of Pakistan Architectural Community about the Impact of C.B.D Punjab on the Climate of Lahore

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Abstract

Due to the urbanization, our cities are expanding. According to a study, the projection of the urban area by 2030 is 1.2 million km2 which is almost double that of an urban area in 2000 (Hassan et al., 2014). These expansions make our cities the most vulnerable part of this planet in terms of climate change. Besides all these issues urban expansion is still on its way and our city is becoming larger and larger. New urban planning models are practicing in our cities and one of them is the concept of CBD Central Business Districts which was introduced by ERNEST BURGESS in 1229 (Shell, 2016). Pakistan also followed this model and introduced its first CBD in the centre of Lahore. Central Business District of Punjab or CBD Punjab is Pakistan's first business district launched in Gulberg Lahore by the Punjab Central Business District Development Authority (PCBDDA). With the permissible height of 750 ft, it's a mixed used high Rise development over an area of 118 acres.(Brier & lia dwi jayanti, 2020). This study aims to highlight the level of awareness, concerns, and suggestions of Pakistan's architectural community about the climatic impact of C.B.D Punjab on the Climate of Lahore. This research work was done by using a quantitative research method in which I conducted a physical questionnaire based survey in Pakistan's Architectural Community with closed questions. The number of questionnaires was 21 calculated by using MINI TAB software and data analysis was done on SPSS software by using a descriptive stat test. According to the results, 70 % of Architects from the sample size have an idea about the Project of C.B.D Punjab. 60% of them got information about C.B.D Punjab from Friends and Seminars and 30% from social media. 60% of architects are concerned that the construction of C.B.D Punjab will contribute to an increase in the winter smoke of Lahore. 55% of architects are concerned that C.B.D Punjab cannot achieve its Sustainable Development Goals and 55% of architects are concerned that C.B.D Punjab authority will not be able to provide the road map for sustainable construction. 60% of architects are dissatisfied with security measures taken by C.B.D Punjab authority in the construction of C.B.D Punjab and 60% of architects are dissatisfied with the project's current progress. 85% of architects suggest that the government take the following measures to minimize the environmental impact of C.B.D Punjab like Add open green spaces, Develop bylaws for the use of sustainable materials, And Make policies to encourage the use of solar energy.

Keywords Urbanization, Climate Change, Temperature, Sustainable Development, Central Business Districts

Introduction

Urbanization is one of the most complex phenomena of this modern world. According to the United Nations (2014), urbanization is a process of migration of people from small rural areas to large urban settlements with the dominance of industrial and services sectors. (Manzoor Hussain and Iram Imitiyaz, 2018) Due to the fast urbanization process urban areas are now facing the pressure of rapid urban development and increasing demand for built up land. According to a study, the projection of the urban area by 2030 is 1.2 million sq km which is almost double the urban area in 2000, and half of this projected urban area will be located in Asia. (Seto et al., 2012) According to UN 68% of the total world's population will be living in urban areas by 2050 and the major part of this population will be living in Asia and Africa. ("World Urban. Prospect. 2018 Revis.," 2019) This dramatic growth of urban lands is causing critical problems for people who are living in these cities in the form of public health, energy consumption, and climate change. According to the study, the total urban area of cities is less than 2% of the total land area of this world but still, these urban areas are consuming 78% of the world's total energy and produce 60 % of world Green House gases which is the primary cause of climate change. (*Annual Progress Report 2019; UN-Habitat*, n.d.)

There is a study that indicates the global temperature can rise about 3.7°C to 4.8°C in the next 100 years due to climate change. (IPCC, 2014) Rapid development in cities makes this situation worse and makes cities the most vulnerable to climate change in the world. Many cities especially from the developing world are not prepared yet and facing the challenge of sustainable development. Although Sustainable Development goal SDG set the agenda of 2030 in which they proposed sustainable development in cities by adding green public spaces and improving urban planning and management to make cities more sustainable. (FAO, 2020) These urban developments also increase the cities' daytime heat storage capacity by adding more impermeable areas in cities which causes the urban Heat island effect or UHI. (Chen et al., 2020) According to a study in European cities, the urban scale is the major factor of UHI, and city compactness is the second factor. (Zhou et al., 2017) There is a study in India that shows the rise of temperature by 4.72 C with an annual change of 0.157 C in the last 20 years in Kolkata due to the urban development in the city. (Zhou et al., 2017) In another study from Beijing China, they calculated the temperature difference from 21.72 °C to 18.5 °C, within a 60 km radius from Beijing city centre to its suburbs area and they found that city centre of Beijing faces a greater effect of UHI due to the dense urban development. (Chen et al., 2020) The high urban surface temperature also declines air quality by accumulating or concentrating the pollutants in the troposphere a lower atmospheric layer. This poor air quality has a bad impact on human health and causes different respiratory diseases like asthma, lung cancer, and skin-related issues. (Hassan et al., 2014)

Besides all these issues urban expansion is still on its way and our city becomes larger and larger. New urban planning models are practicing in our cities and one of them is the concept of CBD Central Business Districts. In 1929 the Sociologist ERNEST BURGESS first time introduced the concept of CBD. Burgess described CBD as a developed urban area that is located at the centre of the city with a focus on commercial, social, and civic life. (Shell, 2016) According to Burgess urban growth model, American cities can be divided into 5 concentric zones and the most central zone of the city is CBD. (Ferreira et al., 2019) The idea of this model was that urban growth takes place by expansion along the marginal space of successive zones like the outer marginal belt of CBD. But this Burgess urban growth model has been criticized based on the observation of urban growth which took place along the radial lines, following the rut ways that cut across the zones instead of the growth along the marginal space of successive zones. (Shell, 2016) There are also some other growth models like the concept of HOMER HOYT which was a critique of ERNEST BURGESS and introduced an urban growth model based on the star shape city growth under the influence of land prices, rent, and the major transport routes. (Green & Hoyt, 1941) We also have a third model of urban growth which is based on multiple nuclei growth of the city instead of growth around the central CBD.

Many countries around the world are practicing the urban growth model of ERNEST BURGESS for the growth of their cities especially in the developing world. Pakistan also followed this model and introduced its first CBD in the centre of Lahore. Central Business District of Punjab or CBD Punjab is Pakistan's first business district which was launched in Gulberg Lahore by the Punjab Central Business District Development Authority (PCBDDA). With a permissible height of 750 ft, it's a mixed used high Rise development over an area of 118 acres.(Brier & lia dwi jayanti, 2020)

Fig -01 Source (PCBDDA)

The CBD Punjab is divided into 5 main Zones Commercial Zone, Digital District, Residential District, Entertainment, and Government zone. Currently, PCBDDA has different projects under the banner of CBD Punjab like Lahore Prime, Lahore Downtown, Sirius, The Node, The Runway, and SANO. (Brier & lia dwi jayanti, 2020) Recently PCBDDA sold 5 commercial plots from Lahore Prime ranging an area of 10 to 15 kanal in 21.59 billion and 7 mixed use plots from Lahore downtown ranging an area of 12 to 14 Kanal in 34.89 Billion in 2021 and 2022. (Brier & lia dwi jayanti, 2020)

As discussed above Pakistan's neighbouring countries like China and India already had CBD in their all-major cities a long ago and now different studies from these countries documented the negative impact of these urban developments on their city's climate. In light of these examples, what will be the possible climatic impact of CBD Punjab on a city like Lahore which is already suffering from climate change, and more importantly what the Pakistan architectural community can do in this regard?

This study aims to find out the Awareness, Suggestions, and Concerns of the Pakistan Architectural Community about the possible climatic impact of CBD Punjab on the climate of Lahore.

Objective:

There are three basic objectives of this study.

- The first one is to find out the level of awareness in Pakistan's Architectural Community about the project of C.B.D Punjab.
- Highlight the concerns of the Pakistan architectural community about the climatic impact of C.B.D Punjab on the climate of Lahore.
- Get expert suggestions from the Pakistan Architectural community which can be incorporated in the construction of C.B.D Punjab to make this project more environments friendly.

Methodology:

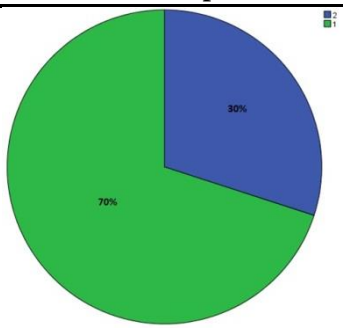
This research work was done by using a quantitative research method in which I conducted a physical questionnaire based survey in Pakistan's Architectural Community with closed questions. All questions were divided into 3 categories such as concerns, suggestions, and awareness. Each question has a code under its category like questions under awareness have a code A-01 to A-05 similarly questions under the Concerns category have code C-01 to C-08 and questions under the suggestion category have code S-01 to S-06. The number of questionnaires or sample size was 20 calculated by using MINI TAB software. The different values that were used to calculate the sample size are the Prevalence value: of 0.05, margin of error: 0.2, and confidence level is 95%. Data analysis was done on SPSS software by using a descriptive stat test.

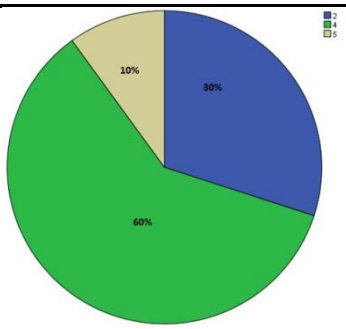
Results:

Results are divided into three categories.

Awareness:

According to the results, 70 % of Architects from the sample size have an idea about the Project of C.B.D Punjab. 60% of them got information about C.B.D Punjab from Friends and Seminars and 30% from social media.





70% architect who know about C.B.D Punjab
30% who don't know about C.B.D Punjab

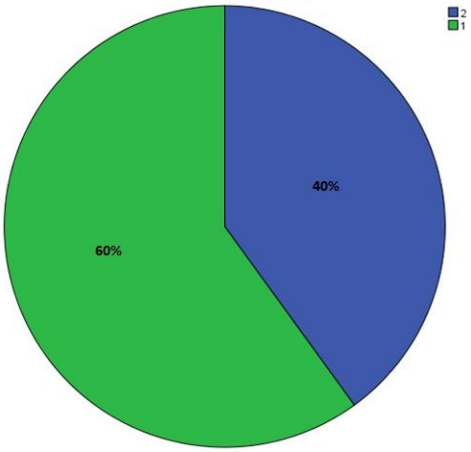
60% from friend's% seminar
30% Social Media, 10% do not reply

Concerns:

There are four major concerns of the Pakistan architectural community which are highlighted during this research.

Winter Smoke of Lahore

60% of architects are concerned that the construction of C.B.D Punjab will contribute to an increase in the winter smoke of Lahore.

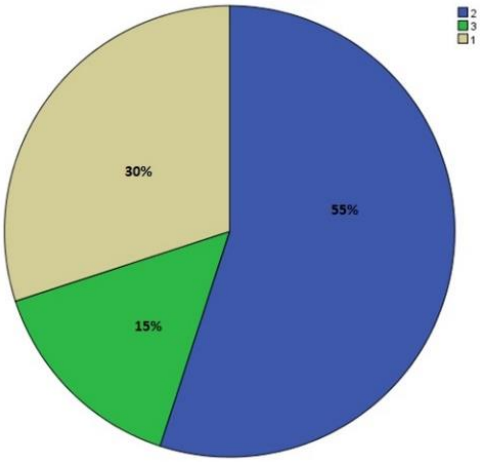


60% of architects think that the construction of C.B.D Punjab will contribute to an increase in the winter smoke of Lahore.

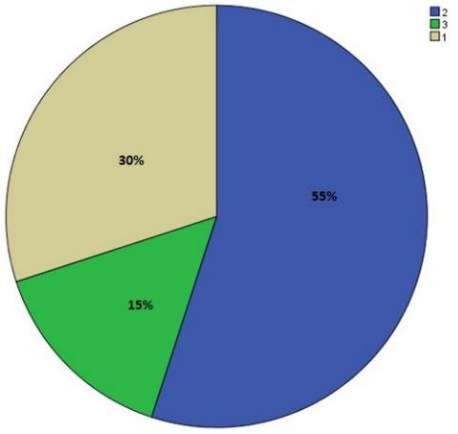
40% of architects think that the construction of C.B.D Punjab will not contribute to an increase in the winter smoke of Lahore.

Sustainable Development Goal

55% of architects have concerns that C.B.D Punjab cannot achieve its Sustainable Development Goals and 55% of architects have concerns that C.B.D Punjab authority will not be able to provide the road map for sustainable construction.



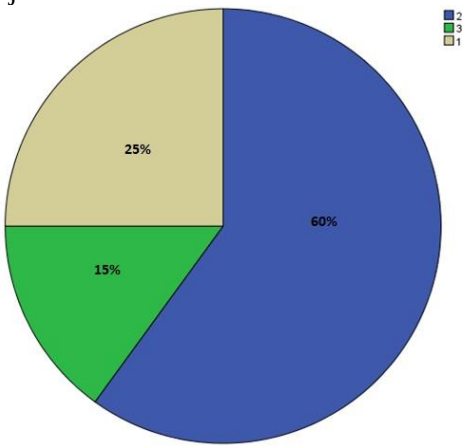
55% of architects think that C.B.D Punjab cannot achieve its Sustainable Development
30% of architects think that C.B.D Punjab can achieve its Sustainable Development
15% do not to reply



55% of architects have concerns that the C.B.D Punjab authority cannot be able to provide a road map for sustainable construction.
30% of architects think that the C.B.D Punjab authority can provide a road map for sustainable construction.
15% do no to reply.

Security Measure during Construction of CBD Punjab

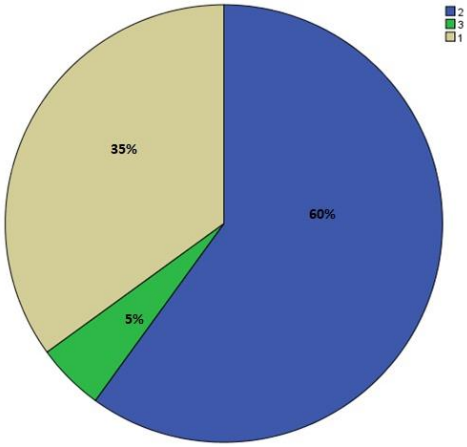
60% of architects are dissatisfied with security measures taken by C.B.D Punjab authority in the construction of C.B.D Punjab



60% of architects are dissatisfied with security measure
25% of architects are satisfied with security measure
15% do not to reply

Project progress.

60% of architects are dissatisfied with the project's current progress.



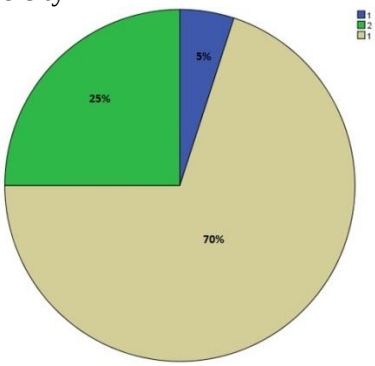
60% of architects are dissatisfied with the project's current progress
35% of architects are satisfied with the project's current progress
5% not to reply

Suggestions:

There are three major suggestions from the Pakistan architectural community which are highlighted during this research.

Vertical Development

70% of architects have suggested that the government should have to go with vertical development to stop horizontal expansion of the city

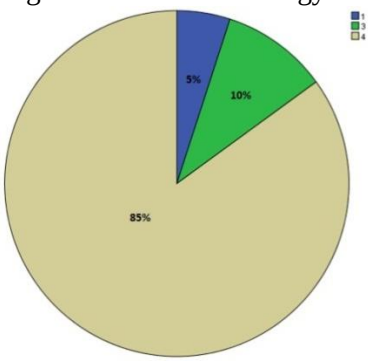


70% of architects agree with vertical development
25 % of architects disagree with vertical development,
5% do not reply

Security measures to minimize the environmental impact of C.B.D Punjab

85% of architects have suggested that the government take the following measures to minimize the environmental impact of C.B.D Punjab.

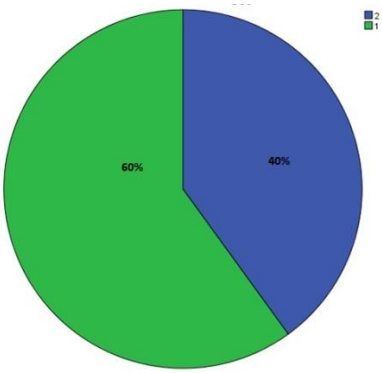
- Add open green spaces.
- Develop bylaws for the use of sustainable materials.
- Make policies to encourage the use of solar energy.



85% of architects suggest the above three options
10% suggest that open green spaces.
5% of architects Suggest Add open green spaces.

Development of C.B.D in all other major cities of Pakistan

60% of architects have a suggestion that Government should have to develop C.B.D in all other major cities of Pakistan to promote economic activities.



60% of architects agree that C.B.D have to develop in all major cities of Pakistan
40% of architects disagree that C.B.D have to develop in all major cities of Pakistan

Discussion:

According to the results, the Pakistan architectural community has a high level of awareness about the project of C.B.D Punjab almost 70 % of architects have an idea about this project and they got information from different sources like social media, etc. but we know that government bodies did not incorporate the local architectural community into the planning phase of this project it's an alien project design by foreign architectural firms. This is a huge setback for this project because these foreign design firms did not have any idea about the local climate of Lahore. This scenario becomes more verse because Lahore is already suffering from climate change and a construction project of this scale cannot end up with a good climate impact on the climate of Lahore. As I mentioned earlier our neighbouring countries already have these kinds of C.B.D and different studies from these countries show the negative climatic impact of these developments on the local climate. In the case of CBD Punjab, there is not even a single study on this mega project to highlight its positive and negative effects.

So in this study, I was trying to highlight the concerns and suggestions of the local architectural community which can be incorporated into this project. According to the results, there are four major concerns raised by the local architectural community. The first one is the issue of winter smoke 60% of local architects think that the construction of this project will contribute to an increase in the winter smoke of Lahore as mentioned earlier that Lahore already suffered from climate change and winter smoke is one of its element which overshadows Lahore from November to January in these days Lahore become the world most polluted city. Second concern is the sustainable development goal set by the C.B.D Punjab Authority. 55% of architects have concerns that C.B.D Punjab cannot achieve its Sustainable Development Goals and 55% of architects have concerns that C.B.D Punjab authority will not be able to provide the road map for sustainable construction. The reason behind it is that there is a general belief in the local architectural community that C.B.D Punjab authority did not have the professional skill to achieve these goals. There are also three suggestions from the Pakistan architectural community that can be incorporated into the construction of C.B.D Punjab to minimize its environmental effect of this project if the government wants to continue this project the first is the 85% of architects want to take the following measures to minimize its environmental effects. Add open green spaces, Develop bylaws for the use of sustainable materials, and Make policies to encourage the use of solar energy.

Conclusion:

After analysing the results, it is concluded that first the local architectural community has a high level of awareness and second, they also have some concerns and suggestions about this mega project. If C.B.D Punjab authority accommodates this local community of architects and designers in the planning of C.B.D Punjab and incorporates their suggestions in the project and removes their concerns then definitely the outcome will be much more beneficial for the climate of Lahore. It is clear that due to fast growing population, these kinds of mega projects have to build in our cities. So if we make a proper road map for these projects and incorporate the local community in the planning phase then definitely these projects can be environment and community friendly projects.

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