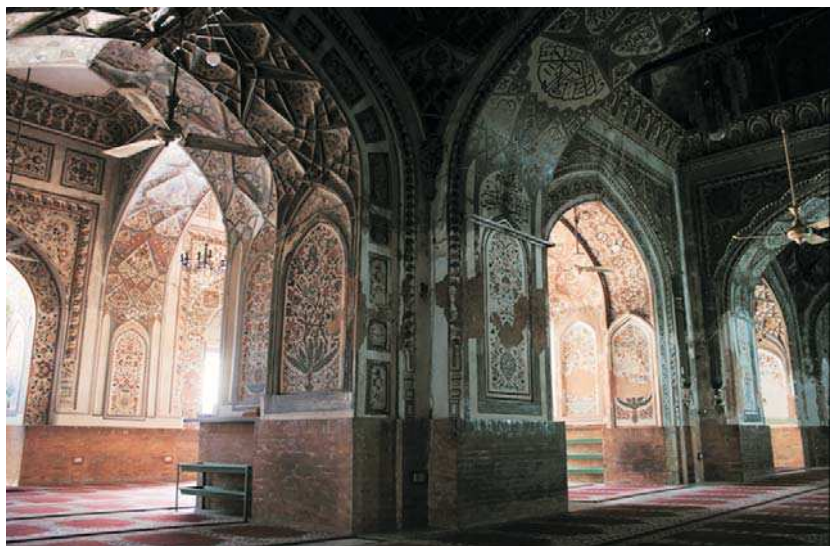


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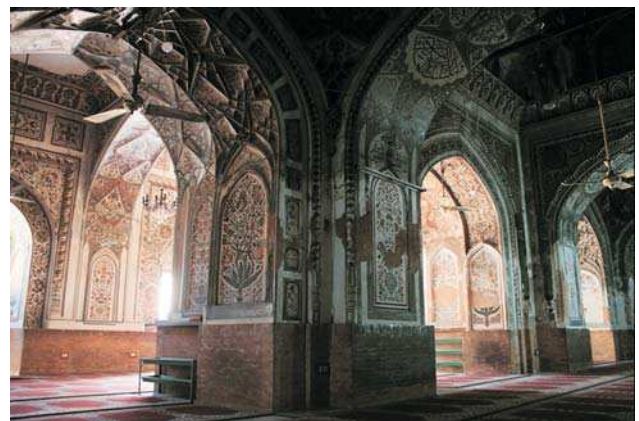
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Note: All the photographs included in this issue have been taken by the authors unless otherwise mentioned.

EDITORS' NOTE

The five research papers included in this volume cover themes related to coastal development, infrastructure development in terms of public parks and the practice of architecture around traditional and modern built forms.

The first paper included reviews a coastal development in Bangladesh, with respect to livelihood, culture and civilization. The traditional role of water network over the years is reviewed, along with the larger ecological impacts with respect to climate change. An approach towards integrated planning, promoting community participation is recommended in order to ensure successful implementation of strategies.

The second paper uses Geographical Information System (GIS) as a tool to document and analyse spatial equity of Public Parks in the city of Lahore. The premise behind this documentation and analysis is to draw a co-relation between accessibility, spatial distribution and larger equity of a metropolitan city, with the objective that the findings of the research can assist the planning authorities in identifying the spatial gaps and the need for improving the accessibility to public parks in the city.

The following three research papers explore various aspects of architecture in different cities of Pakistan. The theoretical frameworks of these three papers are varied. The first paper reviews an iconic piece of architecture in Peshawar, the Mahabat Khan Mosque, and offers recommendations for its conservation, addressing the delay in relocation of surrounding shops that is currently hindering its repair.

The fourth paper analyzes three postmodern projects in three different cities of Pakistan and discusses their contribution to the practice of architecture in terms of response to Regionalism as a theory, and concept development as a process.

The last research paper is categorized under Young Scholar's contribution. This research paper through analysis of two local residential case studies in the city of Lahore, explores the courtyard as a climatically responsive design element.

This volume also includes a book review on 'Complexity and Contradiction', authored by Robert Venturi. In this book the author explores the concept of how complexity and contradiction in architectural form can be incorporated. He questions the orthodox modernism and ventures into possibilities of how more sense can be created out from modern forms rather than the simplified form pursuit. He expresses the aspect that Modernism, as a movement, has failed to sustain the very nature of architecture by pushing itself away from traditional built forms.

Editorial Board

RIVER ECOSYSTEM SERVICE IN SETTLEMENT DEVELOPMENT AND HISTORY OF COASTAL BANGLADESH: A CASE STUDY ON KACHUA UPAZILLA

*Noor A. MD. Amanat Ullah**
*Shibu Prasad Bosu***

ABSTRACT

In Bangladesh every single settlement, whether it is urban or rural is situated alongside a form of inland water network. Livelihood, culture and civilization of these settlements maintain an intrinsic relationship with the Ganga-Brahmaputra-Meghna River Basin System. Inland water eco-system service plays a significant role in the establishment of a settlement and its socio-economic activities. The traditional role of the water network has however, deteriorated over the years due to the lack of ecological knowledge, dearth of proper strategies and policy guidelines and various anthropogenic activities in the face of accelerated climate change scenarios. This study attempts to find out the ecosystem services of Bhairab River in the context of the national river management strategies and policies in cooperation with river-dependent community and challenges thereof. The paper explains the background of this River's channel-based navigation, along with the discussion of issues and challenges faced by the settlements. The findings reveal various strategic policies that have been implemented over the years on piecemeal basis to manage water resources, which did not end up well due to the absence of a holistic approach. It is suggested in this paper that future management plans for this River should involve local communities to avail their willingness to conserve the River, while making them resilient against anthropogenic and natural impacts through enhancement of socio-economic outputs from it. The community willingness and its dependence, as unearthed in this research, provides compelling ground for the authors to state that integrated planning with proper respect for local ecology is a mandatory strategic element for successful implementation of the policies in this regard.

Keywords: Coastal Settlement, River Ecosystem, River Management, National Policies, Structural Development

INTRODUCTION

A river is often regarded as life-blood of human settlements. It provides necessary support to the basic functions of life, such as drinking, washing, agriculture and industrial production. The life and culture of people in Bangladesh is intertwined with Ganga- Brahmaputra-Meghna (GBM) River Basin System. This river network has however, changed its course from time to time (Rudra, 2018). As a general thumb rule, the average human settlement density within fifty kilometers of the coast is higher in large river basins than in smaller coastal basins (Fang et al., 2018). Coastal river-based settlements were usually established for reasons of accessibility, navigation control, trade and agriculture. Historically there tends to be a symbiotic relationship between these settlements and their associated river ecosystem. The South West region of Bangladesh is unique in nature with its brackish water ecosystem interspersed with sensitive tide-dominated rivers, water-filled depressions and streams. The system of the river of this region is altered due to national policies and strategies implemented from time to time and now this age old river system is taking its toll by damaging settlements, agriculture, transport and disaster management system (Dempster and Brummer, 1992).

This study has taken Bhairab River in Kachua Upazilla as a case study to review ongoing process of rationalization of national policies within the historical connotations related to river management in South West coast of Bangladesh. These policies are being implemented on the basis of national priorities, perception of the local and on the basis of environmental auditing. Various aspects of targeted and achieved objectives are given priority, following the functionalities of national policies.

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STUDY AREA

Bhairab River has played a dominant role in the development of settlements in Kachua Upazilla. Over time, people have grown and adapted to the natural characteristics of this water system and its fluid landscapes. Locals have used this physical environment in different ways to gain advantage in trade, communication and production. Climate, life style, and geomorphology of this region have produced different responses. The cultural practices have also impacted the settlements eventually creating distinctive settlement forms that may be described as the defining patterns or cultural products of historically- developed coastal river- based civilizations (Figure 1).

METHODS

The study includes interpretive historical research and case studies. The research relies on a range of research methods which range from qualitative questionnaire survey of local residents to semi structured interviews of various actors from the realms of policy, design and planning; an analysis of relevant mouza maps (both cadastral survey and revised survey are included), satellite imagery (Landsat-5 WRS-2 and Landsat 7 TM) and shapefiles by ArcGIS 10.4. and Erdas Imagine 2014.

History: An Overview of National River Management Policy

For millions of years GBM carried sediments from Himalayan mountain range, which forms the largest deltaic plan of the world- Bangladesh. From the beginning of time locals had to negotiate with this River network for settling in this region. In pre-colonial time, farmers used to collect levies from riverine crafts over the water course as per instruction from ‘*zamindars*’ or local landlords. During the colonial period the system continued and only the ‘*Lords*’ were changed. After the end of the colonial rule, the government authorities took control over river management. The main objective of these authorities was to ensure maximum agricultural production and minimum damage due to natural calamity. River management planning has changed over time according to socio-economic needs (GED, 2018). The different phases of water resources planning processes and its main features are described in the following sections.

Initial Phase: Krug Mission

Krug Mission Report (1959) is the first major study which addressed the problem of flood control and water resources

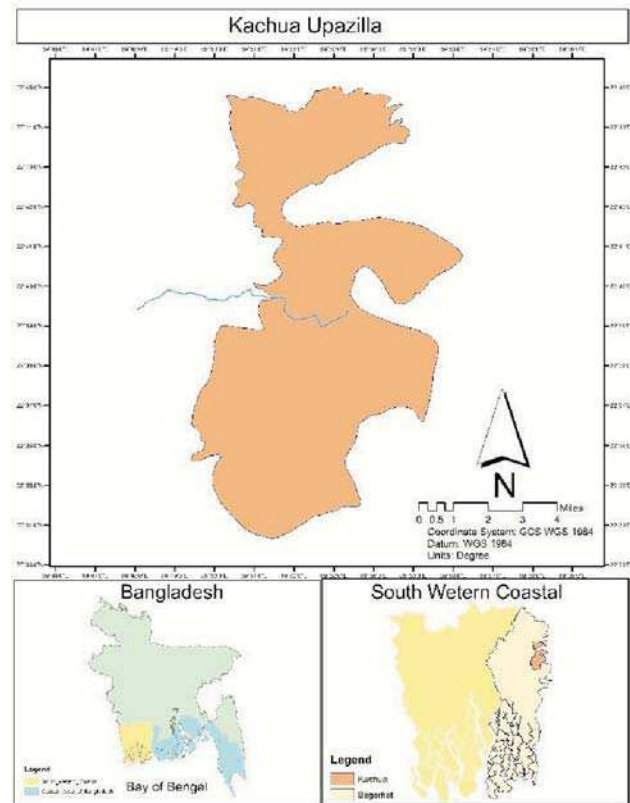


Figure-1: Study Area.

development of the country. Based on the recommendations of the Krug Mission, East Pakistan Water and Power Development Authority (EPWAPDA) installed a structural solution in the South West tidal areas called polder (circular embankment), for protecting land from flood inundation and saline intrusion. The report of the Krug Mission effectively discussed the principles governing delta development by large rivers and had various recommendations, suggestions and observations. It introduced the ‘polder’ enclosure system, a Dutch term (EPWAPDA, 1968).

IECO Master Plan

The main focus of IECO Master Plan (1964) was on development of the drainage system and on developing a proposal for flood control in the area. The plan also focused on developing the irrigation system in the area, albeit in a limited way. Following the Plan, the construction drainage and irrigation of large flood controlling projects, began in earnest. The objective of that plan was to protect the area from flooding and coastal storm surges, and eventually protect the agricultural produce (Ahmad, 2019; Ahmed, Choudhury, & Ahmed, 2017).

NWP Phase

The first National Water Plan (NWP-I) (1989) was based on various numerical models and many analytical tools were developed as part of this Phase. These were meant to define and suggest planning strategies. Both the NWP I and II Phases, emphasized on minor irrigation with low lift pump and shallow tube wells. It was recognized in these plans that fisheries are an important part of the income generation, and thus the plans recommended improvement in the design of water control structures. The objective behind this was to provide for fish migration. Several basic policies were proposed to strengthen the institution of fisheries. Improvement in the management of the FCDI projects was also proposed as part of this Plan, with the objective of enhancing fish production. Furthermore, the Plan also emphasized the requirement of setting aside some water bodies for fisheries development (Hossain, 2016).

FAP Phase

A number of projects were selected under Flood Action Plan (1989) which addressed the aforementioned problems and issues. Short-term projects addressed problems where there was clearly a need for early action, and medium to long-term projects included those which the regional studies showed generation of significant social and economic benefits, while causing least damage to the environment (Custers, 1993).

NWMP Phase

National Water Management Plan (2004) provided the policy directions for fisheries, industry, agriculture, navigation, environment, basin-wide planning, public and private investment, water rights and allocations, water supply and sanitation. The policy underscored the logistic utilization and larger principles of water resource development. It emphasized both private and public actions and highlighted the importance of conjunctive use of surface and ground water (WARPO, 2004a).

Coastal Zone Policy and Strategy

Coastal Zone Policy (2005) was developed, for implementing the policy, as to select strategic priorities and actions on the creation of the institutional environment that would enable the government to embark on a continuous and structured process of prioritization and the development and implementation of interventions for the development of the coastal zone (Ahmad, 2019).

Master Plan for Haor Area

The overall goal of the Master Plan for Haor area (2012) was to achieve sustainable development by integrated planning and implementation, through multi organizational involvement and community participation, for optimum utilization of resources and reduction of poverty. To be more precise, integrated development would comprise mainly flood management, environmental sustainability, production of crop, fisheries and livestock expansion of education, settlement and health facilities, road communication, navigation, water supply and sanitation, industry, afforestation and generation of power and energy (CEGIS, 2012).

National Water Act

National Water Act (2013) formulated policies and guidelines for integrated development, sustainable use, equitable distribution and conservation of water resources (GOB, 2013).

Participatory Water Management Act

Participatory Water Management Act (2014) gave direction for maintaining Participatory Water Management in the following sectors, (i) Participatory water management definition and process; (ii) Definition of stakeholder, beneficiaries and PAPs, (iii) Legal authority of WMO, (iv) Structure, function and responsibilities of different level of organogram of WMO, (v) Membership process and registration process and (vi) financial control and auditing process (Dewan, Buisson, & Mukherji, 2014).

BDP 2100

In the Bangladesh Delta Plan 2100 (2018) the main focus was given to the role of Bangladesh Water Development Board, the Water Resource Planning Organization, Local Government and Engineering Department and Bangladesh Agricultural Development Corporation in water resources development planning (GED, 2018).

IMPACTS OF RIVER MANAGEMENT POLICIES

River Management' refers to national and regional development intrinsically associated with river ecosystem. The term defines a concept of making, in which both natural and manmade water systems are integrated in the process of development. Impacts on settlement development of Kachua Upazilla, for the adopted national policies and projects, used to manage Bhairab River and are described in following sections:

Settlement Pattern and Cultural Tradition

Prior to post-colonial period River Bhairab was managed by local communities and they would build temporary earthen embankments to control the water. But there were three devastating floods in the 1950s, after which the installation of a large number of polder dykes was undertaken by the government authorities. Siltation in channel beds due to these projects resulted in shrinkage of River Bhairab, and after the installation of the switch under the Tidal River Management (TRM) Project, the flow of Bhairab was fortified to a great extent.

In the early stage, the settlers of this Region made canal network surrounding the River as the foci of nuclear pattern settlements (Figure 2a). These canals were used as a defense mechanism for the safety of households against flood. Even after the Krug Mission and IECO Master Plan projects, lands would get inundated in monsoon flood and people used canals as an adaptation process. Due to TRM projects, flood risks were reduced and people started settling beside rivers linearly (Figure 2b). Intrusion of road infrastructural development by LGED and RHD without respecting the canal-based settlement ecology also triggered road side ribbon development (Figure 2c). All these alterations in the water network of this region deteriorated the relationship of water and human settlements.

The Bhairab River had significant impact on the cultural and traditional development of Kachua Upazilla. A sport called '*Nouka Baich*' was a part of the cultural tradition of this region, which is now extinct due to the fortification of the river water. Dwellers used to arrange local swimming competitions, which cannot be arranged any more. Reduction of these cultural events have great impacts on the psychology of new generation.

Furthermore, there are economic impacts also. For example, a group of people used to catch fish coming from the river through the canals and made their living in this region have now migrated to other regions for survival. People who earned their living by the blessings of the River are now unemployed and have been forced to migrate to urban areas in search of a livelihood. Many people have also opted for living on the roadside and on the embankments. A collective



Figure-2a: Change in Human Settlement Pattern.



Figure-2b: Change in Human Settlement Pattern.



Figure-2c: Change in Human Settlement Pattern.

impact is felt in terms of competition for the diminishing resources which is heightening conflicts and giving rise to tensions between different sectors of the society. This is resulting in the creation of an overall volatile social situation (Hoque, Quinn & Sallu, 2018).

Agriculture

Prior to post-colonial period the local practice of ‘Doshor Badh’ (Community embankment) and ‘Oshadoshi Badh’ (eight months embankment) was enrooted within the community. The embankments were made by temporary earthen materials, using low dykes and wooden sluice gates around the area. This was meant to protect the arable land from saline water intrusion and allow water to enter in the monsoon when salinity in the river was low. Thus, the farmers enjoyed good harvests in the dry period and a variety of fish in the monsoon. Due to flood mitigation, the government authorities started installing dykes and emphasized on increasing agricultural productivity in this region. The plan worked well till 1980’s and resulted in high amount of rice production.

But as the international price of shrimp rose, saline water was allowed to enter and convert croplands into shrimp farming land. In areas where previously embankments were installed to protect crop lands, they were turned into large shrimp *ghers* (farms) forcibly. Thus, extensive shrimp farming changed the crop pattern of this region drastically (Ahmed, 2011).

As crop production reduced drastically, cattle industry faced a significant threat. Grazing land for cattle was converted into *ghers* and due to shortage of fodder people lost interest

in cattle farming.

Traditionally this region was famous for betel-nut production in large scale. Almost all the homestead gardens were full of betel-nut trees. Biggest betel-nut market of the country resided in Bagerhat and Kachua. Due to increase in salinity the production of betel-nut is degrading and this industry is now on the verge of extinction. People are now opting for options of trees which can survive in the saline water.

Transport

Bhairab River-based canal network navigation played a big part in the development of settlements in Kachua Upazilla. This canal network not only served regionally but also extended its service nationally. Pirojpur district of Barisal division and Bagerhat district of Khulna division were connected through the Baleshwar-Bhairab-Doratan channel. It used to be the main route of communication between these two inter-divisional districts, prior to the installation of Bagerhat-Pirojpur highway road. Many drainage canals became inoperative due to siltation. Before the TRM sluice gates installation on River Bhairab, the River had an average width of eight hundred and eighty-five feet along the Kachua channel. Now the average width of the River is fifty feet, which turns it into a canal and unfit for large scale water navigation. The policy of connecting Bagerhat-Pirojpur via road network ignoring the water-based navigation has lessened the significance of Kachua as an intermediate region. Local businesses are facing serious trouble to establish a market place and this is in turn hindering the development of Kachua Upazila (Figure 3).

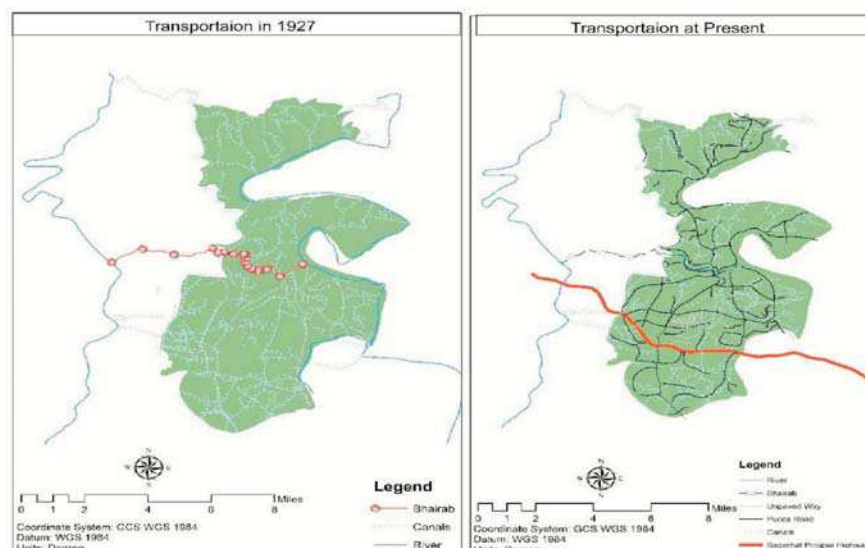


Figure-3: Transformation in Transportation System of Kachua Upazilla.

Drainage Management

Since 1980s, the polders have become a serious concern for the drainage system. Today, a large amount of land has gone under water because of the siltation caused by the polders in the channel bed of the River. As there is no adequate maintenance and system for dredging in place, therefore the situation is getting worsened with each day passing by. Many of the structures and the polders block huge amounts of monsoon flood flows. This results in the overflowing monsoon water going upstream because of the polder embankment, which results in widespread flooding. This in turn results in large amounts of silt being deposited in the river channels and the river bed. This results in a reduced bulk-carrying capacity of the water in the channels and the River. This further leads to flooding as the drains get congested.

CONCLUSION AND RECOMMENDATION

River management policies and projects should change their focus on higher rice production in coastal zones as it is hampering the existing sustainable structure of river ecology-based livelihoods. There has been a shift in water policy concepts. As a result of this shift, multiple objective planning was promoted as compared to single-objective planning. The South West Area Integrated Water Resources Management Project (WARPO, 2004b) outlined the effects of disturbing the natural river ecosystem. Research studies on a national level, such as those done by the Department of Fisheries (Department of Fisheries, 2017), the Bangladesh Water Development Board and the Water Resources Planning Organization, have identified that structural interventions disrupting the floodplains are depriving the River from its

resources. Multiple objective based national river plans have failed to understand the River's ecosystems (Uddin, 2005; Sanwar, 2010). Lack of proper vision and one dimensional planning and policies are making the region prone to disaster. Public sector institutional weakness and their inefficiency to impend according to proper planning is the reason behind dying rivers and the negative impact on the socio-economic activities related to the river system.

It is apparent from the above discussion that national river management policies, in a river ecosystem, for coastal settlements like Kachua Upazilla, have major negative consequences. However, the people want amalgamation of nature and human activities to utilize this natural blessing properly. Previously all the plans and policies implemented by the management heavily damaged economic and social aspects of local communities living on the banks of the River. This was partly because of the lack of appreciation and understanding of locals, and partly because of the lack of a holistic understanding of the water system and it's ecology on the part of the government. Therefore, it is recommended to develop the understanding of the aspirations, requirements and demands of both the local communities and the ecology of the area. The tangible and intangible aspects should be made an intrinsic part of the overall plan for the area. The policy making and management process should also integrate the tangible and intangible aspects. Conclusively, an integrated water resource planning is required to optimize the needs of the river-based settlement and it's ecosystem. Moreover, proper river management planning requires development of an institution that is responsible to deal with the task, which is multi-disciplinary and multi- dimensional.

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USING GIS MEASURES TO ANALYZE THE SPATIAL EQUITY TO PUBLIC PARKS IN LAHORE METROPOLITAN

*Muhammad Ahmad Al-Rashid**

*Muhammad Nadeem Rao***

*Zeshan Ahmad****

ABSTRACT

Public parks are considered as prime community assets that provide places for the citizens to enjoy and spend their leisure time. Parks can serve as the primary source not only incorporating physical activities, but also improving quality of life of residents. Equitable access to these services is one of the major concerns worldwide. However, a little attention is paid, in this regard, in the local context. This paper utilizes GIS tools and analyzes the equitable access to urban parks in the Lahore Metropolitan Area, with reference to its spatial distribution. The measures of access for the parks are computed for population, depending upon the type of facility at the administrative zone level. The accessibility to parks is measured using walking distance impedance and proximity analysis tool. The study further evaluates the spatial distribution of parks about population density and examines if differences are observed across different administrative zones in the Metropolitan. The least served areas and populations have been derived in spatial context across the study area. Moreover, maps prepared using hotspot analysis in GIS help to visually identify the spatial disparities and compare the differences among different administrative zones in the study area. It allows understanding of how different parks in the Metropolitan are distributed through space, and hence help in combating inequitable access. The results of this research can assist the planning authorities in identifying the spatial gaps in accessibility and addressing the needs for improving the accessibility to public parks across different zones in the Metropolitan.

Keywords: Administrative Zones, GIS, Lahore, Public Parks, Spatial Equity

INTRODUCTION

There has been an extraordinary development in urban populaces during the ongoing decades, and it is predicted that over seventy percent of the world's total population would be the part of urban areas by 2050 (UNFPA, 2011). This alarming urbanization statistic has raised worries about the growing detachment between urban occupants and habitat (Maller et al., 2009; Maruani and Amit-Cohen, 2007). Within many cities, especially in the developing world, spontaneous and casual settlements have brought about expanded spatial and social imbalance, asset misuse and ecological corruption (Wendel, Zarger and Mihelcic, 2012). The consistently diminishing green spaces have turned out to be inadequate to meet public demands regarding spatial dissemination, availability and the extent of the urban green land. Moreover, the modern urban communities aggravate the challenge of providing the growing need for green infrastructure within the wide range of contenting land uses (Wang et al., 2015). Thus, the issue of accessibility to urban green spaces is considered and discussed as a most growing concern in current sustainable urban planning agendas (Unal, Uslu and Cilek, 2016).

Planners perceived the significance of providing urban parks in the nineteenth-century (Nicholls, 2001 and 2004). Parks are vital in expanding chances to appreciate nature and to take part in recreational exercises. Parks can enhance the stylish and ecological character of urban situations, give open space to for entertainment and boost personal satisfaction for the inhabitants. These are seen as a method for particular sorts of refreshment of the psyche and nerves, which most city occupants extraordinarily require and are

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vital to the decency of urban communities and their neighborhoods. An in-depth review of positive aspects of green infrastructure in metropolitan regions has been studied by numerous researchers (Bedimo-Rung, Mowen and Cohen, 2005; Chiesura, 2004). Their research covers a broad scope of recreational, mental, emotional, educational, social, financial, ecological, scientific and wellbeing related advantages. In this manner, urban parks are viewed as alluring parts and basal green framework of the metropolitan regions (Wolf, 2004). However, to encounter the advantages associated with public parks, residents must have reasonable and equitable access to these assets (Reyes, Pérez and Morency, 2014).

Accessibility is one of the main variables affecting the regular utilization of urban green spaces and enhancing the general population's satisfaction (Bertram and Rehdanz, 2015; Cetin, 2015; La Rosa, 2014; Tu, Huang and Wu, 2018). Usually, accessibility can be defined as the ease with which an inhabitant can travel and reach the desired destination (Talen, 2003). As equality refers to treating every individual in the same manner. Equity also discusses the qualities of justice, fairness and considers the need of the inhabitants. Therefore, the term equity, rather than equality, is used in this paper to depict the fairness in the distribution of urban parks (Boone et al., 2009). Equity is profoundly associated with different dimensions of sustainability. Alongside economy and nature, equity shapes the three principal points on which a sustainable development, is based, these point are comprehended to be productive, green and reasonable (Campbell, 2003). Spatial equity is an essential proportion of sustainability, and along these lines, sustainable urban areas should try to have equal access to amenities and public facilities to all associates of their populace (Wilkinson and Pickett, 2011).

However, the equitable access to these utilities is challenging and requires in-depth analyses to distinguish the under-served zones, evaluate the impact of existing administrative policies, and encourage the most proficient method to assign rare public utilities (Tomic, Hewko and Hodgson, 2004). Without analyzing the spatial distribution, the usefulness of the public parks cannot be characterized accurately. Geographic Information Systems (GIS) has widely been applied for analyzing the spatial distribution and the extent to which the urban park's facility is equitable (Unal, Uslu, and Cilek, 2016; Tsou, Hung and Chang, 2005). The locational dimension in GIS is generally utilized to examine the accessibility to specific public infrastructure and utilities such as educational facilities, health care services, play areas and public parks (Macedo and Haddad, 2016). Since the late 1990s, innovations in GIS technology has tremendously

developed several tools, such as network analysis, buffer analysis and Euclidian distance, that can perform advanced studies related to the spatial distribution of different public utilities (Unal, Uslu and Cilek, 2016). Regardless of the importance of this concept, the fair distributional access to public parks in urban communities has not been surveyed in developing countries like Pakistan.

Therefore, this study aims to investigate the spatial distribution and walking time accessibility of urban parks in the Lahore Metropolitan at the administrative zone level. The equitable access to parks is measured using walking time impedance and proximity analysis tool. The study further evaluates the spatial distribution of public parks about population density and examines the differences observed across different administrative zones in the Metropolitan. The least served areas and populations have been derived in spatial context across the study area. Additionally, the aim is to distinguish spatial and planning standards to give an ideal dimension of the use of open parks and to comprehend which zones are progressively appropriate to be tended to for new green spaces as proposed in the current Integrated Master Plan for Lahore Metropolitan.

MATERIALS AND METHODS

Study Area

Lahore District is one of the districts in Punjab province of Pakistan that contains the city of Lahore. The official boundary of Lahore comprises the total area of 1,77,200 hectares and is characterized by a flat terrain. It is situated in the northeast of Punjab close to the Indian border and extends from 74° 10' and 74° 39' E longitude and 31° 15' and 31° 43' N latitude. Lahore is the second largest city of Pakistan in terms of population after Karachi and is the provincial capital of Punjab. In 1998, its population was recorded as 6.39 million which had increased to around eleven millions in 2017 (Pakistan Bureau of Statistics, 2017). Lahore was declared as the City District Government Lahore (CDGL) after promulgation of Local Government Ordinance in 2001. Initially, CDGL was divided into six administrative zones. Later in 2005, three more zones were added to CDGL. Now, Lahore City District comprises of one cantonment and nine administrative zones namely: Aziz Bhatti Zone, Data Ganj Bakhsh Zone, Iqbal Zone, Nishtar Zone, Ravi Zone, Shalimar Zone, Gulberg Zone, Samanabad Zone, and Wagha Zone. These Zones are further sub-isolated into 150 union councils (UCs) where the more significant part (122 UCs) are portrayed as urban, and the rest (28 UCs) are peri-urban/rural (Lahore Development Authority, 2004). Based on the administrative division system, union councils

are the smallest administrative units. The detailed description and location of City District Lahore is shown in Figure 1.

Lahore is known for its cultural diversity and historical significance due to several monuments, gardens, and parks from the Mughal era. However, the rapid development in urban infrastructure in the Metropolitan, especially the increase in transportation and its vehicular emission, has changed the landscape of the city and such attractive places have been negatively affected (Abubakar, 2016). The current spatial distribution of public parks and gardens is analyzed where the administrative zone-level subdivisions are taken as the unit of analysis. This study relies on administrative boundary data and national census data available at the zone level.

Data Processing

The comprehensive data for the whole metropolitan is used in this study, and it came from several sources. First, digitized layers of the road network, land use data, TMA boundaries, public parks were initially obtained from the Lahore Development Authority (LDA), Parks and Horticultural Authority (PHA) and the Urban Unit, Lahore. In total, one thousand seventy two public parks were distinguished within the study area. Second, demographic data at TMA level was extracted from the Punjab Development Statistics 2015.

The whole dataset collected from different sources was incorporated in ArcGIS to rectify the topological errors. Using the edge-node topology for the roads, the geometric errors were removed through topological rules that represent the network properties. In the meantime, the road classification was separated into the primary, secondary, tertiary and local streets. Local and tertiary streets are the

most straightforward class to experience for people on foot, while only vehicles can get on primary and secondary roads. The road network was prepared (Figure 2) in consideration of the Integrated Master Plan of Lahore (2008-2028) and Google Earth. Network Analyst tool in GIS was used to prepare the road network dataset. This dataset included the following attributes such as Fnode, Tnode, F and T minutes and one-way restriction to represent the real-time network linkage of the Lahore. The network dataset with edge nodes topology is shown in Figure 3.

Study Methods

The study utilizes and compares the accessibility of the public parks using walk time/distance impedance analysis. Using the walk time and distance impedance analysis, the

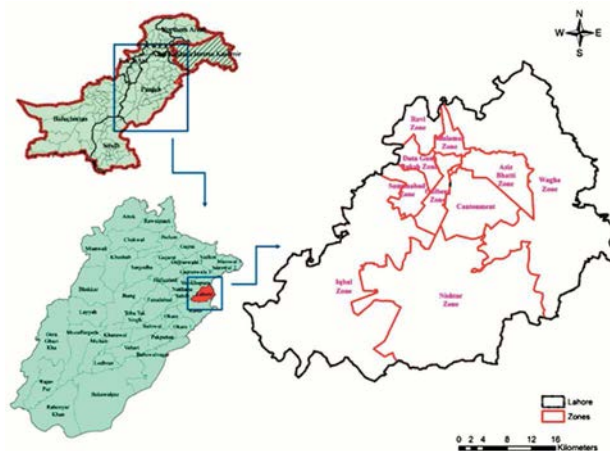


Figure-1: Indexed and Zone-level Map of City District Lahore.

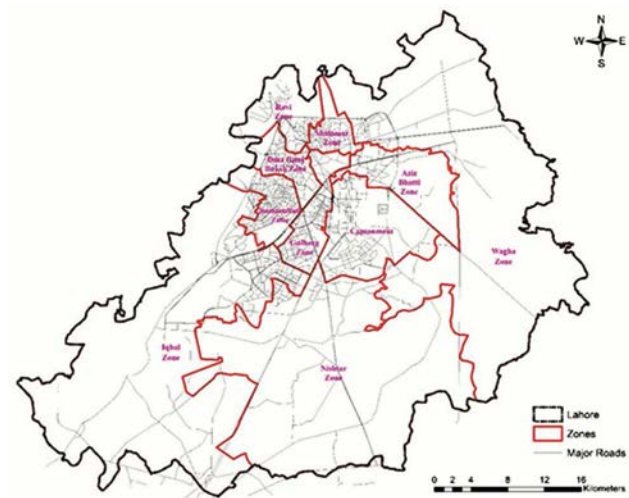


Figure-2: Major Road Network of Lahore.

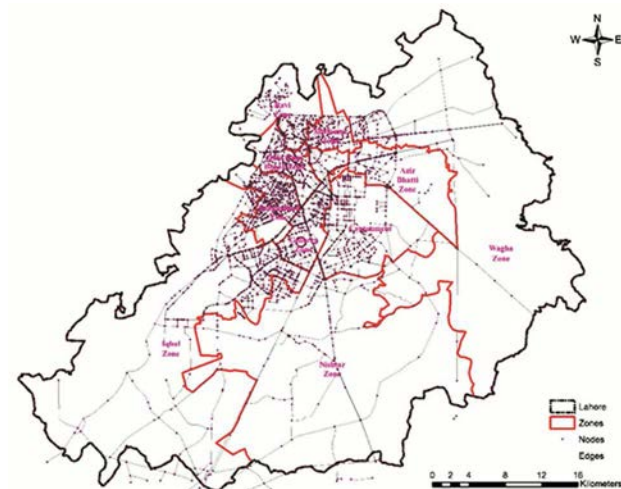


Figure-3: Network Dataset and Edge Note Topology Result.

service area of the public parks along the network were derived. It indicates all the feasible streets that lie within the access of specified time and distance impedance. Setting the average walking speed at four hundred meters in five minutes, the study calculates the time level along the road network by this speed. Park accessibility is calculated with respect to time and distance. Travel time is calculated by using the formula $\text{Length of Road (S)} = \text{Travel Speed (v)} \times \text{Walking Time (t)}$. After populating the attributes with time and distance impedance, network dataset representing real-time network connections were built using Network Analyst Extension in ArcGIS 9.3 software. Thus, zones were divided into four categories with respect to time and distance, as given in Table 1.

All public parks were taken as the centers and buffers were established by the distance of each service level that the park can be reached in, using different time frames. Hence, using the point data in network analysis, service areas and accessibility zones were derived at, based on the different time impedances. Finally, the accessibility areas were derived at, and mapped using GIS hotspot analysis. Besides, the service areas were calculated in GIS by overlaying different database layers. For this, the population density at the zone level was derived from Punjab Development of Statistics reports, according to the following equation:

$$\text{Population Density (Zone)} = \frac{(\text{Total Population of the Zone})}{(\text{Total Area of the Zone})}$$

It was assumed that the population is evenly distributed in the areas. Actually served population was calculated by multiplying the population density of the zone with the accessibility area of the park facilities. These served population and areas were further tabulated and compared across the City District among different zones, which helped to identify the gaps in the equitable provision of these facilities.

RESULTS AND DISCUSSIONS

Foremost, it was important to determine the land use of Lahore district. According to the Integrated Master Plan of Lahore, land use breakup is vibrant due to rapid change in

the uses. The total area of Lahore is about 177200 hectares. The ratio of parks and open spaces is reducing with respect to the area of other land uses. The total number of parks is 1072 in the whole city, which only contributes to 0.77% of the total area. Land use breakup of Lahore is given in Table 2 and the location of parks is given in Figure 4.

Spatial Distribution of Public Parks

Based on the methodology as discussed in the previous section, spatial accessibility of the urban parks in Lahore

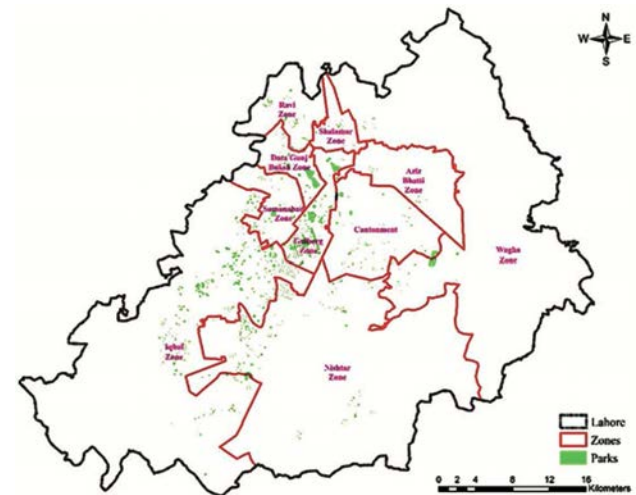


Figure-4: Location of Parks in Lahore.

Table-2: Land use breakup of Lahore.

Land Uses	Area (ha)	Percentage
Residential	27631.4	15.59
Commercial	1288.34	0.73
Parks	1370.23	0.77
Educational	1321.68	0.75
Institutional	561.55	0.32
Health	261.16	0.15
Industrial	2900.24	1.64
Graveyard	312.06	0.18
Vacant/Agricultural	125079.8	70.59
Water Bodies	1716.25	0.97
Roads	5490.29	3.10
Cantonment	9267	5.23
Total	177200	100

Table-1: Categories of Accessibility Zones.

Category	Time (Minutes)	Distance (Meter)
Category-1	0-5	400
Category-2	0-10	800
Category-3	0-15	1200
Category-4	0-20	1600

was derived. Spatial accessibility was derived based on the different categories of time impedances for every park present in Lahore. Figure 5 shows the served area of each park in the Metropolitan. The spatial distribution of the parks concerning the different walk time impedances, in each zone, can be seen.

Furthermore, the statistical analysis as shown in Table 3, reveals the comparison of the parks' service areas with the total served and unserved population in each administrative zone. The analysis provides a detailed description of service areas of parks according to selected walking time impedances. The total served population with different walking time impedance is also calculated. Table 3 also reveals the total unserved population in each administrative zone.

Aziz Bhatti Zone

Aziz Bhatti Zone is one of the municipalities of the Lahore metropolitan. It comprises of a total area of 9034 hectares, which is almost equivalent to 5.15% of the total area of the Metropolitan. The population density is seventy-five persons per square kilometer. According to the spatial distribution and statistical analysis, it contains only twelve public parks.

The served area under accessibility zones of zero to five minutes walking time is 57.02 hectares out of 9034 hectares.

Further, served area of accessibility Zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes is 131.85 hectares, 257.15 hectares, and 612.71 hectares respectively. It is observed that 4304 people can access the parks in zero to five minutes of walking time. Also, the three other accessibility zones (i.e. zero to ten minutes, zero to fifteen minutes, and zero to twenty minutes walking time) are serving the 9,952, 19,410 and 46,249 people respectively. The total unserved area by parks in the Aziz Bhatti Zone is 8,521 hectares, which contributes to 93.2% of the total area. The total unserved population is 634,207 out of 689,456. It reveals that 91.9% of the population in this zone is unserved by public parks (Figure 6).

Data Gunj Buksh Zone

Data Gunj Buksh Zone is the second densest administrative area of the Lahore metropolitan. The zone ranks third in the Metropolitan with a total population of 1,143,825 residents.

However, it is the second smallest zone with respect to the area in this region. According to the spatial distribution and statistical analysis, it contains of only seventy-seven public parks. The served area under accessibility zones of zero to five minutes is 451.15 hectares out of 3052 hectares. Further, served area of accessibility Zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes is 1,055.84

hectares, 1,512.38 hectares and 2,283.36 hectares respectively (Figure 7).

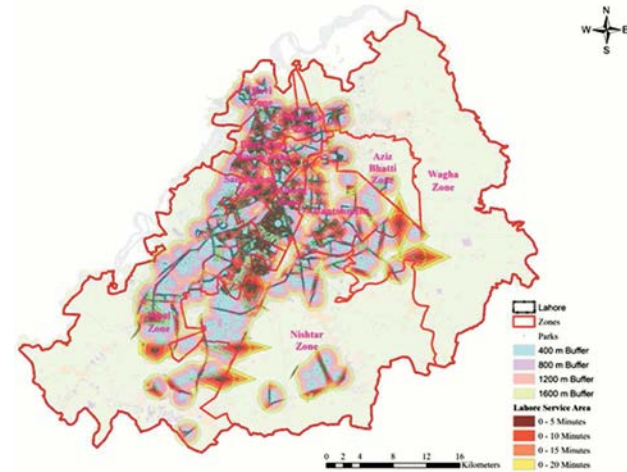


Figure-5: Spatial Distribution and Areas Served by Public Parks in Lahore Metropolitan.

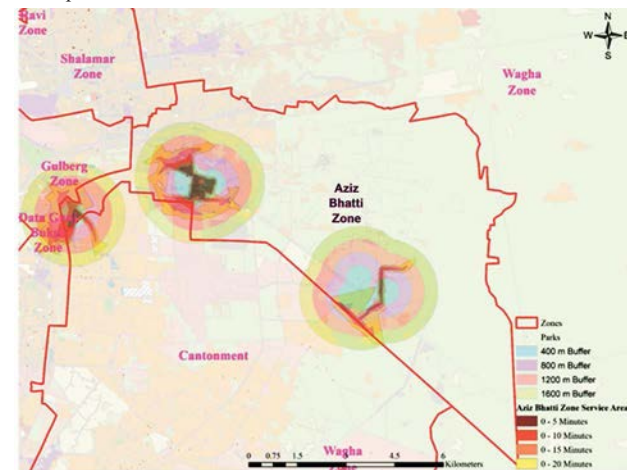


Figure-6: Spatial Distribution and Areas Served by Public Parks in Aziz Bhatti Zone.

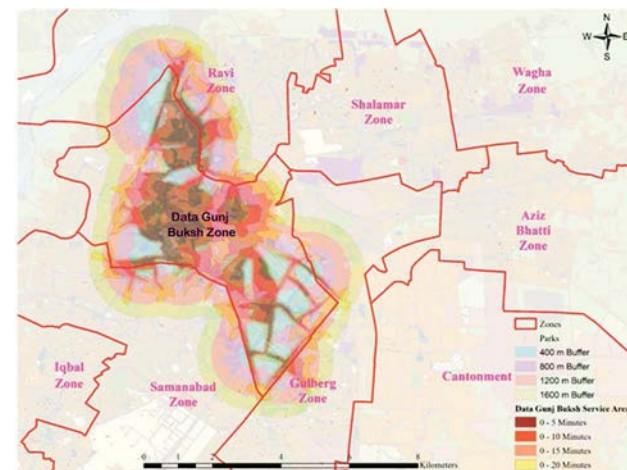


Figure-7: Spatial Distribution and Areas Served by Public Parks in Data Gunj Buksh Zone.

Table-3: Served Area and Population Per Administrative Zone.

Zone	Total Population	Area (Ha)	Density	No. of Parks	Parks Area (Ha)	Served Area (0-5 mins)	Served Area (0-10 mins)	Served Area (0-15 mins)	Served Area (0-20 mins)	Served Population (0-5 mins)	Served Population (0-10 mins)	Served Population (0-15 mins)	Served Population (0-20 mins)	Unserved Area	Unserved Population
Aziz Bhatti Zone	689,456	9,134	75	12	5.74	57.02	131.85	257.15	612.71	4,304	9,952	19,410	46,249	8,521	643,207
Data Ganj Bukshi Zone	1,143,825	3,052	375	77	157.34	451.15	1,055.84	1,512.38	2,283.36	169,081	395,706	566,808	855,755	769	288,070
Gulberg Zone	935,358	4,211	222	230	357	1,109.96	2,169.91	2,767.39	3,843.76	246,547	481,986	614,700	853,786	367	81,572
Iqbal Zone	861,271	46,979	18	342	398.59	1,076.66	2,733.82	4,314.51	7,202.67	19,739	50,119	79,098	132,047	39,776	729,224
Nishtar Zone	1,284,794	45,040	29	198	167.64	697.54	1,731.41	2,966.21	4,996.23	19,898	49,389	84,613	142,521	40,044	1,142,273
Ravi Zone	1,077,983	4,896	220	59	43.6	230.84	683.89	1,162.30	1,911.58	50,825	150,576	255,911	420,885	2,984	657,098
Samanabad Zone	1,216,117	4,036	301	62	65.76	509.01	1,299.77	1,797.75	2,706.73	153,374	391,643	541,693	815,585	1,329	400,532
Shalamar Zone	1,074,220	2,329	461	62	15.01	277.97	657.24	977.13	1,594.53	128,210	303,143	450,688	735,456	734	338,764
Wagha Zone	724,000	48,142	15	30	94.71	187.38	591.45	1,116.02	1,974.06	2,818	8,895	16,784	29,688	46,168	694,312
Cantonment	892,427	9,381	95	55	64.84	371.17	1,204.11	2,034.65	3,467.98	35,310	114,549	193,559	329,914	5,913	562,513
Lahore	9,899,451	177,200	56	1072	1370.25	4,968.70	12,259.28	18,905.49	30,593.61	277,581	684,877	1,056,174	1,709,142	146,606	8,190,309

The accessibility zone of zero to five minutes is serving a population of 169,081 out of 1,143,825, which is equivalent to 14.7% of the total population. Also, three other accessibility zones are serving the population. The analyses reveal that 74.8% of the population can access public parks within a walking distance of twenty minutes. The total area unserved by the parks in the Data Gunj Buksh zone is 769 hectares, which contributes only 25.19% of the total area. Moreover, the total unserved population is 288,070.

Gulberg Zone

Gulberg is one of the most advanced areas in Lahore and is developed largely as a commercial area. It comprises a total area of 4211 hectares with a population density of two hundred and twenty two persons per square kilometer. Gulberg is recognized as the land of flowers as many beautiful parks exist in this zone. It contains the second most number of parks after Iqbal Zone. These parks cover an area of 357 hectares. The served area under accessibility zone of zero to five minutes walking distance is 1109.96 hectares out of total 935,358 hectares of Gulberg zone. Further, served area of accessibility zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes is 2,169.91 hectares, 2,767.39 hectares and 3,843.76 hectares respectively (Figure 8).

The total served population in accessibility zone of zero to five minutes walking distance is 246,547. Analyses further revealed that a total of 853,786 people in this zone can access the public parks in twenty minutes of walking distance. The total unserved area by parks is only 367 hectares which is equivalent to 8.71% of the total area. Moreover, 81,572 people must walk for more than twenty minutes to access the public park in Gulberg. It can be argued that the public parks in the Gulberg zone are spatially better distributed as compared to other administrative zones.

Iqbal Zone

Iqbal Zone is a commercial and a residential locality in the south-western part of Lahore. It's extent is marked by Wahadat Road to the south and Multan Road to the north-west. It is the second-largest zone with respect to the area comprising of 46,979 hectares and a population of 861,271. Iqbal Zone is recognized as the second least dense area in Lahore having a population density of only eighteen people per square kilometer (Figure 9).

Statistical analyses reveal that the total served area under accessibility zones of zero to five minutes of walking distance

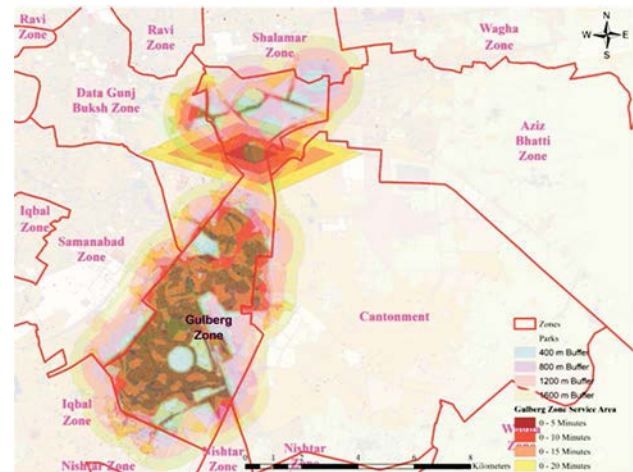


Figure-8: Spatial Distribution and Areas Served by Public Parks in Gulberg Zone.

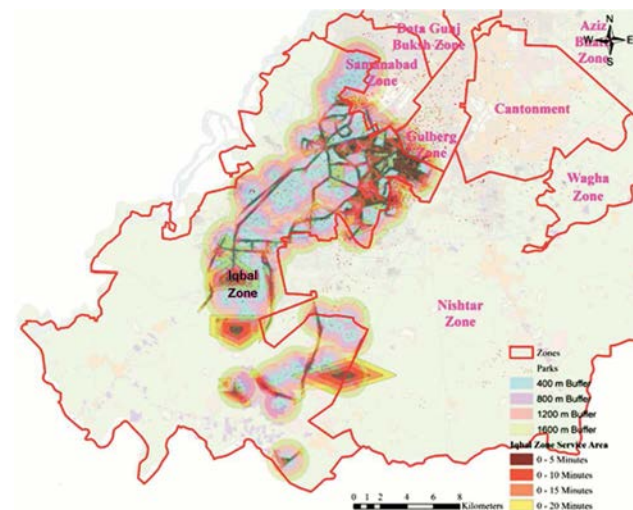


Figure-9: Spatial Distribution and Areas Served by Public Parks in Iqbal Zone.

is only 1,076.66 hectares out of 46,979 hectares. While the served area of accessibility Zones of zero to twenty minutes of walking distance is 7,202.67 hectares. The accessibility zone of zero to five minutes is serving a population of 19,739 out of 861,271, which means that only 2.29% of people in this zone can access the parks within five minutes of walking. While only 15.3% of people can reach the parks in twenty minutes of walking. The total unserved area by parks in the Iqbal zone is 39,776 hectares, which contributes 84.6% of the total area. Moreover, the total unserved population in this Zone is 729,224.

Nishtar Zone

Nishtar Zone is the third-largest administrative area in the Lahore metropolitan with a total population of 1,284,794. The Zone ranks first with respect to the population in the metropolitan area. According to the spatial distribution and statistical analysis, it contains one hundred and ninety eight public parks with a total covered area of 167.64 hectares (Figure 10).

The served area under accessibility zones of zero to ten minutes of walking distance is 1,731.40 hectares out of 45,040 hectares. Further, the served area in accessibility zones of zero to twenty minutes of walking distance is 4,996.23 hectares. Table 3 further reveals that 49,389 people can access the parks in ten minutes of walking distance, while 142,521 people can access it in twenty minutes. However, 87.5% of people have to walk for more than twenty minutes to access the public park in this zone. The unserved area by parks in the Nishtar zone is 40,044 hectares which are equivalent to 88.9% of the total area.

Ravi Zone

Ravi Zone is one administrative zone in Lahore Metropolitan. The major part of this zone comprises of Shahdara, which is a populated and crowded area. It comprises a total area of 4896 hectares with a population density of two hundred and twenty persons per square kilometer. The zone contains fifty nine public parks, which cover an area of 43.6 hectares (Figure 11).

The served area under accessibility zone of zero to five minutes walking distance is 230.84 hectares out of total 4896 hectares of Ravi Zone. Furthermore, the served area of accessibility zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes is 683.89 hectares, 1162.30 hectares, and 1911.58 hectares respectively. It was also analyzed that only 4.7% of the population can access the parks in five minutes of walking distance while 39% of people can access in twenty minute walk time. Moreover, 657,098 people must walk for more than twenty minutes to access the public park in this zone.

Samanabad Zone

Samanabad Zone is mixed land use locality in the north-western part of Lahore. It comprises an area of 4036 hectares and a population of 1,216,117. Samanabad is one of the densest areas of Lahore with a population density of three hundred and one people per square kilometer. The total

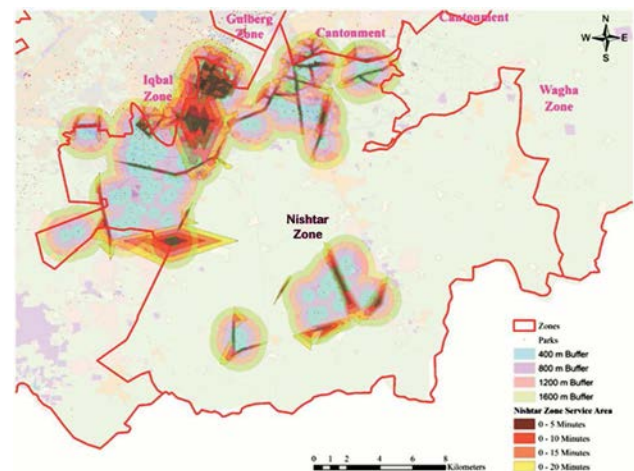


Figure-10: Spatial Distribution and Areas Served by Public Parks in Nishtar Zone.

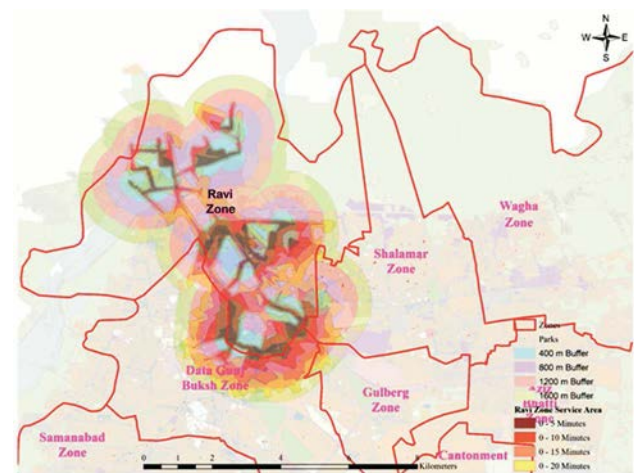


Figure-11: Spatial Distribution and Areas Served by Public Parks in Ravi Zone.

number of parks in this zone is sixty two which covers an area of 65.76 hectares (Figure 12).

Statistical analyses, as shown in Table 3, revealed that the total served area under accessibility zones of zero to five minutes of walking distance is only 509.01 hectares out of 4036 hectares. While the served area of accessibility zones of zero to twenty minutes of walking distance is 2706.73 hectares. The accessibility zone of zero to five minutes is serving a population of 153,374, which means that only 12.6% of people in this zone can access the parks in five minutes of walking distance. While a major chunk (67%) of the population can reach the parks in twenty minutes of walking distance. The total unserved area by parks in the Samanabad Zone is 1329 hectares which contributes 32.9% of the total area. Moreover, the total unserved population in this Zone is 400,532.

Shalimar Zone

Shalimar is one of the oldest administrative zones, located in the north of Lahore, along the historic Grand Trunk Road. Shalimar Zone is the smallest and the most congested zones in Lahore, with a population density of four hundred and sixty-one persons per square kilometer. There are only sixty-two public parks available for 1,074,220 people. These parks cover an area of 15.01 hectares (Figure 13).

The served area under accessibility zone of zero to five minutes walking distance is 277.97 hectares out of total 2329 hectares of Ravi Zone. Further, served areas under accessibility zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes are 657.24 hectares, 977.13 hectares, and 1594.53 hectares respectively. Further, it can be seen that only 11.9% of the population can access the parks in five minutes of walking distance while 68.2% of people can access in twenty minute walk time. Moreover, 338,764 people must walk for more than twenty minutes to access public parks in the Shalimar Zone.

Wagha Zone

Wagha Zone is situated in the northeastern part of Lahore along the India-Pakistan border. It is the largest administrative area in the Metropolitan but is the least dense zone. The population density is only fifteen persons per square kilometer. Moreover, the zone lacks the facility of public parks as compared to other zones. There are only fifteen public parks which cover an area of only 94.71 hectares (Figure 14).

The served area under accessibility zones of zero to twenty minutes of walking distance is only 1974.06 hectares which is only 4.10% of the total zone area. Table 3 further reveals that only 29,688 people can access the parks in twenty minutes of walking distance. However, 95.8% of people must walk for more than twenty minutes to access the public park in this zone. It is interesting to note that the total unserved area by parks in this zone is 46,168 hectares. Hence, the Wagha Zone possesses the least accessibility and poor spatial distribution of public parks.

Cantonment

Lahore Cantonment is regarded as an upscale neighborhood of the Metropolitan. It is an independent municipality, under the control of the Cantonments Department of the Ministry of Defense and Military Lands. Lahore Cantonment is located in the heart of the city neighboring Gulberg, Aziz Bhatti,

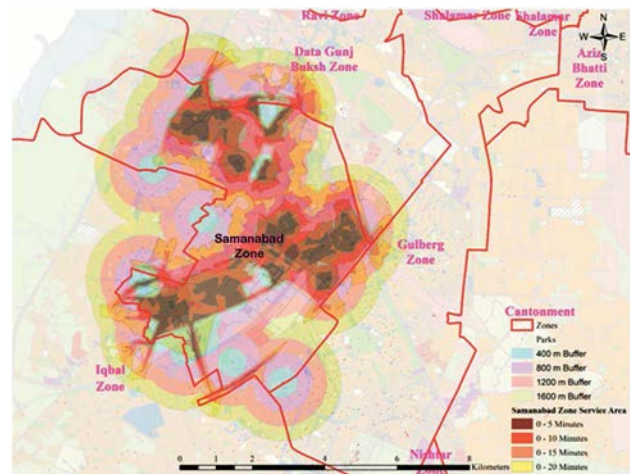


Figure-12: Spatial Distribution and Areas Served by Public Parks in Samanabad Zone.

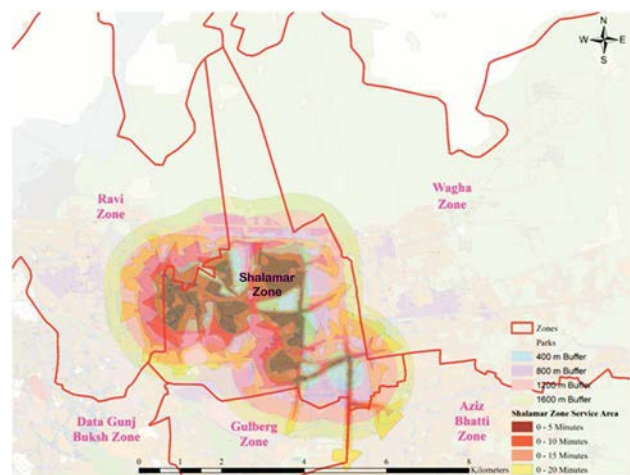


Figure-13: Spatial Distribution and Areas Served by Public Parks in Shalimar Zone.

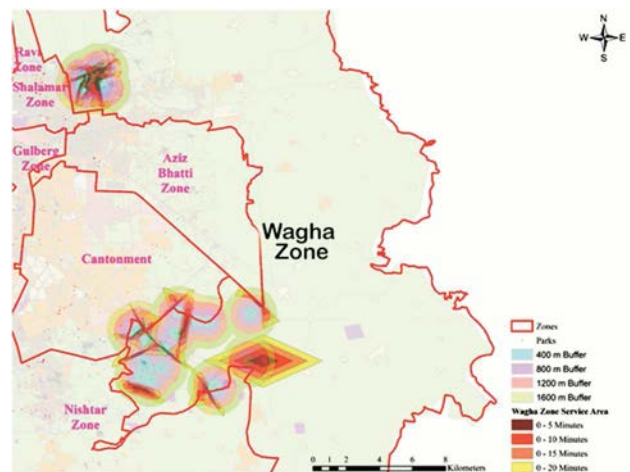


Figure-14: Spatial Distribution and Areas Served by Public Parks in Wagha Zone.

Wagha, and Nishtar Zones. It comprises of a total area of 9381 hectares with a population density of ninety five persons per square kilometer. The zone contains fifty five public parks which cover an area of 64.84 hectares (Figure 15).

The served area under accessibility zone of zero to five minutes and zero to twenty minutes of walking distance is 371.17 hectares and 3467.98 hectares respectively. It is pertinent to note that only 3.9% of the population can access the parks in five minutes of walking distance, while 36.9% of people can access in twenty minute walk time. It infers that 63.03% of people must walk for more than twenty minutes to access the public parks in the Cantonment Zone.

Overall Lahore Metropolitan

The result, as shown in Table 3, reveals that the total area of the parks is 1370.23 hectares. There are 1072 parks in Lahore that contribute 0.77% of the total area of the Metropolitan, which reveals that the ratio of available public parks is far less than the standards. Four categories are developed to analyze the spatial distribution and access. The served area under accessibility zones of zero to five minutes of walking distance is 4968.70 hectares out of 177200 hectares. Further, served area under accessibility zones of zero to ten minutes, zero to fifteen minutes and zero to twenty minutes is 12,259.28 hectares, 18,905.49 hectares and 30,593.61 hectares respectively (Figure 5).

Further statistical analyses infers that a total of 277,581 people can access the public parks within walking distance of zero to five minutes, i.e. 2.80% people can access the public parks within zero to five minutes of walking distance. While only 17.1% population must walk for zero to twenty minutes to access the public parks in Lahore. The total unserved area by parks in Lahore is 146,606 hectares which contribute 82.7% of the total area. In a nutshell, it can be concluded that the public parks in Lahore are not equally distributed spatially. Besides, the provision and quantity of public parks are far below the standards.

CONCLUSIONS AND RECOMMENDATIONS

This study establishes the ability of GIS in assessing the existing facility of parks in Lahore. In GIS, Network service

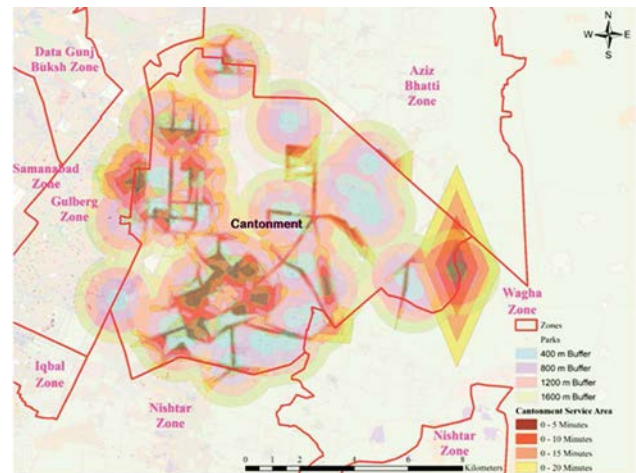


Figure-15: Spatial Distribution and Areas Served by Public Parks in Cantonment Zone.

area analysis gives the best result to examine the accessibility of parks. This study concluded that more than 82% of the area and population remained unserved which shows the improper spatial distribution of existing parks in Lahore. The least served administrative area is the Wagha Zone, while the most served administrative area in Lahore is Gulberg Zone. The evaluation approach used in this study can be useful in understanding urban park spatial distribution and in developing successful urban park management policies. Realizing the results of this study, it is proposed that advanced techniques of GIS suitability combined with the Analytical Hierarchical Process (AHP) should be used to define new locations for public parks, keeping in view the existing spatial distribution pattern. Hence, results would be helpful to develop a more comprehensive strategy that can provide greater equitable distribution of public parks across different administrative zones in the Lahore Metropolitan.

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MAHABAT KHAN MOSQUE - AN ISLAMIC SYMBOL OF PEACE

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ABSTRACT

It is ironical that the Mughals are remembered as warriors yet their breathtaking architecture offers an inspiration for regional peace. Separatist narratives may attempt to emphasise the ideological differences in the Indian subcontinent, but the centuries-old resonance of architectural magnificence of the Taj Mahal in India and the Shalimar Gardens in Pakistan simply mocks any divisions. It is within this perspective that the preservation and restoration of the Mahabat Khan Mosque in Peshawar deserves more attention than it has been accorded. Papers published so far have served well by detailing its history and features, but its significance as the western-most unifier for the sub-continent has been left unexplored. This article aims to highlight the link that its architectural features create with the Mughal buildings of the whole subcontinent. Photographs from unique angles are shared to highlight this commonality and thus serve as a counter narrative of regional unity based on a common Islamic architectural heritage. Also included is a fresh inventory of its state of disrepair, based on a survey conducted by students of City University in 2019, to revoke attention towards its restoration. Finally, recommendations are offered to address the delay in relocation of surrounding shops that is currently hindering its repair.

Keywords: Mahabat Khan Mosque, Peshawar, Conservation, Mughal Architecture.

INTRODUCTION

Whereas ideological extremist narratives may be against peace between Pakistan and India, these two rivalling countries actually happen to share a common Islamic architectural heritage. These countries form a major portion

of the region that functioned as a single subcontinent since the Mughal period of the earlier to mid part of the second millennium, and continued during the British Raj of the later part of the millennium. Hence, there are many shared commonalities in the two societies before they became two separate countries, such as similarities in currencies, administrative infrastructure, railway networks, irrigation canal systems, and many others. None of these are perhaps so viscerally powerful though as the Mughal architectural legacy that has survived over time and adorns both cultures till today. Just as the Taj Mahal sways hearts of visitors in India, so does Shalimar Gardens leaves viewers with a deep sense of awe in Pakistan. There are many such masterpieces in both countries that are undeniably linked together in terms of a distinct architectural style and resulting intensity of aesthetic splendour. This article attempts to advance the documentation of one of these grand buildings, namely the Mahabat Khan Mosque in Peshawar, as the western most marker of the tradition.

A number of documentation works on the Mahabat Khan Mosque have already recorded its history in detail, including drawing comparisons with other examples of Mughal Architecture, but its significance as a symbol of peace has as yet remained unexplored. This paper aims to highlight the architectural features that link it with the heritage buildings of that period in the whole subcontinent. These features are discussed after a brief review of relevant literature, accompanied by photographs that focus on their visceral quality in particular. It is in this backdrop of its significance that the importance of its current state of disrepair can be comprehended. Recently students of the Architecture Department of City University, Peshawar compiled a cursory inventory of the types, locations and extent of repair required

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urgently. Results are presented in a tabulated form, followed by a set of recommendations for addressing the present hindrance in execution of repairs due to delay in relocation of shops surrounding the building. It is imperative to adopt a participatory approach for arriving at a consensus of all stakeholders, in order to restore this significant building.

LITERATURE REVIEW

Mughal Architecture, its history and significance is already the subject of numerous books (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013; Dani, 1995; Foster, 2004; Frishman, Khan, and Al-Asad, 2002; Hussain, 1998), therefore it is sufficient to focus on those works that are relevant specifically to the Mahabat Khan Mosque. Foremost among these are the series of papers by Shah (1996, 1997, 1999), while earlier works on this topic include a mid-twentieth century documentation by Jaffar (1940). These papers have documented the history of this building, include a comparison study, and details of its calligraphic ornamentation (Jaffar, 1940; Shah, 1996, 1997, 1999). In the present paper the aim is to add to the subject by highlighting the aesthetic quality links between the Mahabat Khan Mosque and the whole oeuvre of Mughal masterpieces spread across both Pakistan as well as India. To this end it can be useful to begin with a brief recollection of specifically the roots of aesthetic decisions embedded in Mughal era buildings, in order to set the context for the discussion.

A number of authors' accounts suggest that Mughal Architecture is marked by Babur's conquest of Delhi in 1526, and especially his son Humayun's decision to bring craftsmen from Persia to instigate a fusion of Persian and Indian architecture styles, as best illustrated in the Emperor's tomb that was built after his death in 1556 (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013). This fusion matured during the syncretism-oriented rule of their descendent Akbar, whose period of rule extended till the beginning of the 17th century, as embodied in the palaces and related buildings of the new capital he built at Fatehpur Sikri (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013). Buildings of this era were mostly constructed with red stone using trabeated techniques, often including marble inlays, heavy domes and multifaceted columns with bracings (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013). *Chhatris* (kiosks) were also common and the interior walls and ceilings were at times painted with coloured patterns (e.g. Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013). It should be noted that Fatehpur Sikri's Friday Mosque (1568-78) is considered by scholars as the first of the great

courtyard mosques of Mughal cities (Frishman Khan, and Al-Asad, 2002; Lewcock, 1995).

Shah Jahan's reign (1628-58), marks the classic period within Mughal Architecture, due to its immaculate use of symmetry and uniformity of shapes (Frishman, Khan and Al-Asad, 2002; Lewcock, 1995). White marble and highly polished white stucco from Gujarat replaced red sandstone, and the architectural vocabulary was streamlined to a set number of elements (Frishman Khan, and Al-Asad, 2002). 'Shahjahani' columns were multifaceted and tapering, with cusped arches, foliated bases, and *muqarnas* or vegetal capitals (Frishman Khan, and Al-Asad, 2002; Lewcock, 1995). Arches were multi-cusped, and a full bulbous form was used for domes, with constricted necks (Frishman Khan, and Al-Asad, 2002; Lewcock, 1995). Decorative motifs consisted of naturalistic flowering plants, and pietra-dura inlays replaced the earlier stone intarsia patterns (Frishman, Khan and Al-Asad, 2002; Lewcock, 1995). Mosques would have multiple minarets, of cylindrical or octagonal plan, with one or more balconies and topped by *chhatris* (Frishman Khan, and Al-Asad, 2002; Lewcock, 1995).

While general characteristics of the mosques of this period have already been described in detail in published literature (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013; Frishman, Khan and Al-Asad, 2002; Lewcock, 1995), the aim here is to recall the key aesthetic characteristics relevant to the Mahabat Khan Mosque. Overall the mosques would comprise a rectangular courtyard or *sahn*, enclosed on the four sides by pillared cloisters or *iwans*, with a fountain or tank in the centre for ablution. There would be a rectangular hall on the *qibla* or Mecca-facing side, with the front wall containing a recess or alcove called a *mihrab*, where the prayer would be lead from. On the right side of the *mihrab* would be the pulpit or *mimber*, and there would be high towers or minarets on the sides and at times at all four corners of the mosque. Due to the prohibition of faces of living beings in Islam, decorative lettering and geometric patterns became increasingly sophisticated, using different coloured marble, painted plaster, fresco and glazed tiles (Foster, 2004).

In terms of structural advancements, arches and domes gradually replaced the post and beam systems (Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Brown, 2013; Frishman, Khan and Al-Asad, 2002; Lewcock, 1995). Techniques were used to counter the effect of oblique or lateral thrust and to resist the forces of stress and strain, by means of which greater strength and stability was achieved. Eventually there was an effect on the skyline, flat or low-

pitched roofs were replaced by domed roofs, creating a shift from pyramidal to ovoid forms (Shah, 1999).

Along with the significance of Mughal Architecture it is also important to understand the strategic position of Peshawar in the region (Hussain, 1998). This is the city where Alexander's army passed through in 327 B.C. In the past, it has been mentioned by different names, until the Mughal Emperor Akbar gave it the present name (Hussain, 1998; Shah, 1999). Many scholars, traders, merchants, historians and conquerors have passed through it while navigating the nearby Khyber Pass to cross the Karakoram Mountains to and from neighbouring Afghanistan. Hospitality is a conspicuous attribute of this region's culture (Hussain, 1998). Peshawar is among the few ancient cities in the sub-continent that have retained their character. Mughal Emperors' heritage has survived in the form of buildings such as Mahabat Khan Mosque, Tomb of Nawab Saeed Khan, Gor-Khatri, Bala Hisar Fort, Tomb of Qutb-ud-Din and Tomb of Shaikh Imam-ad-Din. Materials used in these buildings include burnt brick, lime mortar and plaster as the main materials, while the architectural features include different type of arches (pointed arch, multi-foil arch, cusped arch and shoulder arch) and domes (Hussain, 1998). Among the decorative motifs the most important techniques are *tempra* and fresco painting, stucco tracery, stalactite, arabesque, mosaic, relief work and calligraphy (Dani, 1995; Foster, 2004; Hussain, 1998; TCKP, 2018).

Mahabat Khan Mosque is thus significant as a point of convergence between the Mughal heritage on one hand and the strategic location of Peshawar as the western-most demarcation of the region. Unfortunately, there is no architectural record of the Mosque. Documentation of the early British occupation of Peshawar mentions only the desecration of the mosque in 1834 under the Sikh rule (Shah, 1996, 1997, 1999). No record of repairs or additions was kept by its *mutawwalis*, or caretakers, while numerous renovations and improvements were undertaken after the 1947 independence of Pakistan (Shah, 1996, 1997, 1999). Therefore, the description that follows is an observational discussion of its features that connect it with Mughal Architecture as a whole.

As mentioned at the outset the contribution of this paper is to propose an additional context for placing the documentation works already completed on the Mahabat Khan Mosque, namely as a harbinger of a narrative of commonality and peace between India and Pakistan, on the basis of a celebration of the awe-inspiring features of the building. This approach of highlighting the role of architecture as a conscious means

for peace-building and socio-cultural harmony within situations of diversity and conflict is a relatively fresh topic. However, a number of authors' works having already established it as a distinct subject of published discourse, including foremost, the specific reference to peace as a purpose of architecture by Gray and Hancock (2007). These authors have also used photographs to convey the experiential aspect, as is the case in the present article as well (Gray and Hancock, 2007). Whereas such works have focused on the effects of architecture on creating a feeling of peace, the present article reaches beyond to suggest commonalities of similar experiences as a means for bonding and resolving conflict (Day, 2007; Sternberg, 2009).

ARCHITECTURAL FEATURES – EXPERIENTIAL QUALITY OF THE MAHABAT KHAN MOSQUE

In the architectural design analysis that follows the focus is on the experiential value that makes Mahabat Khan Mosque belong to the shared Mughal architectural heritage of the whole region, occupied by Pakistan and India together. As such this endeavour functions as a reinterpretation of previous documentations for the specific purpose of highlighting the feelings of awe that the visitors experience to date (Buttimer and Seamon, 2015). These feelings are a common trait across all monuments of Mughal Architecture found in India as well as Pakistan, and hence are a potential source for creating a connection across these two otherwise politically divided nations (Brown, 2013; Frishman, Khan and Al-Asad, 2002). This connection has the potential to serve as a counter-narrative of unity and peace, in the face of prevailing separatist narratives of difference and violence. To fulfil this objective major design decisions have been discussed, beginning first with the selection of the Mosque's site, followed by descriptions of other key elements. Care has been taken to include images that present views and angles of vision befitting an architectural gaze, and are radically different from the multitude of tourism-oriented images already available for public viewing on the world wide web.

Spectacular Selection of Site

Proximity to the ancient site of Gor Khatri (Shah, 2016), suggests that the Mosque was planned to function as an unequivocal landmark, not just as a statement of power but also as a cultural symbol of exemplary hospitality for travellers. It is situated on the boundary of the centuries-old walled city, possibly to serve caravans passing through the Grand Trunk Road and nearby traveller accommodations, or *caravan serais*. Towering minarets must have indeed made it visible from far distances, imaginably providing a

sight of relief and expectations of a tranquil place to take rest for traders from Central Asia on one side and India on the other, travelling long distances on animal-drawn modes of transport of that time, as evident even to this day (Figure1).

It was conveniently near the old *Qissa Khawani bazaar* (literal meaning: story-telling market). There was the Mahabat Khan serai just beside, on the eastern side of the Mosque right next to the *Qissa Khawani bazaar*. Indeed the careful selection of sites with the architectural consideration of providing an iconic approach to strategic buildings is a common characteristic found in almost all monuments of the Mughal era, including those present in present day India, namely among many examples, the Grand Mosques at Fatehpur Skri and at Delhi (Alfieri and Borromeo, 2000; Brown, 2013; Shah, 1999).

Composition of Strength and Stability – Pervading Feeling of Amity

Along with the use of classic symmetry, the overall aesthetic character of the building is of massiveness and stability. Its towers are slightly tapered towards the top, while the width to height ratios of the arches and domes all portray a feeling of horizontality, as illustrated in the views generated at various points in the courtyard and interior hall of the building (Figures 2-5). Also, the size of the courtyard and the overall size versus height ratio of the building as a whole returns back a sense of a large vastness to the beholder, again a well-known feature of all mosques built in the Mughal period (Brown, 2013; Jaffar, 1940; Lewcock, 1995).

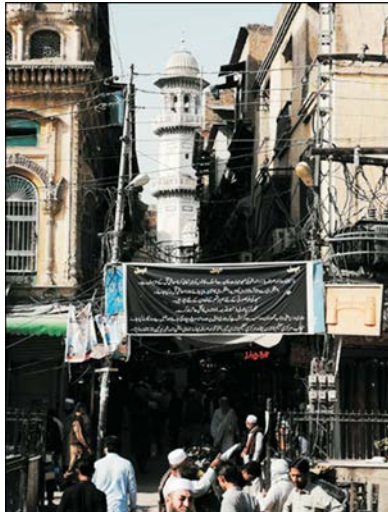


Figure-1: Strategic location of the mosque allows it to be visible from far distance.

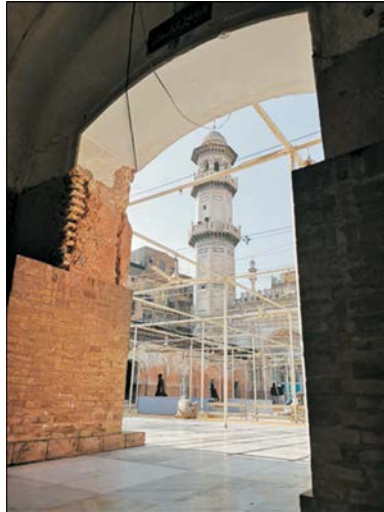


Figure-2: Proportions of elements portray a feeling of stability and amity- broad and massive looking towers.

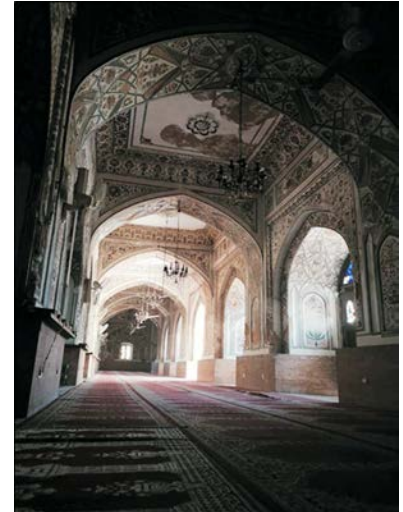


Figure-3: Proportions of elements portray a feeling of stability and amity - thick walls and broad arches.

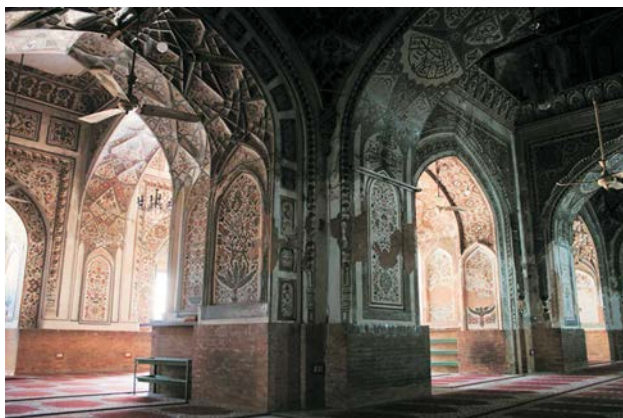


Figure-4: Proportions of elements portray a feeling of stability and amity - massive central columns.

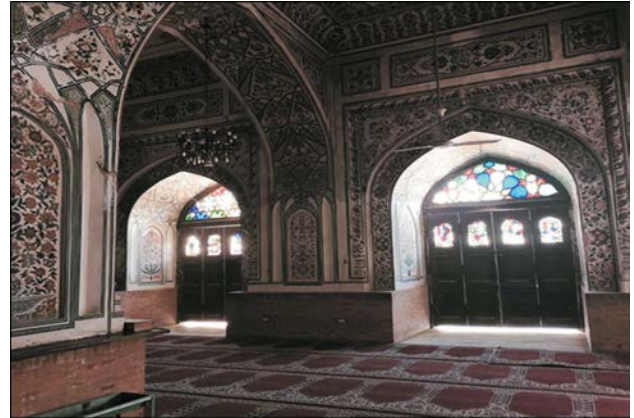


Figure-5: Proportions of elements portray a feeling of stability and amity - deeply recessed openings.

Exquisite Relief Work

Columns and arches have been presented throughout the building as an exquisite composition of relief gradations (Figure 6). Every edge and plane surface has been treated to create a pervading effect that traverses the whole building, in the exterior as well as the interior (Figures 7-10). Depths and widths of each level in the vertical gradations have been carefully chosen to deliver a sense of aesthetic ambience par excellence (Jaffar, 1940; Shah, 1999). It is reminiscent of the similar effect that can be experienced at the Grand Mosques found in India at Fatehpur Sikri and Delhi, as well as the Taj Mahal complex in Agra (Ardalan and Bakhtiar, 1999; Brown, 2013).



Figure-6: Multiple gradations in vertical relief work creates a feeling of rich yet sublime embellishment.



Figure-7: Fine gradations in relief work in arched openings combined with geometric designs create a feeling of rich yet sublime embellishment.



Figure-8: Deep recessed windows with multiple arches within arches.

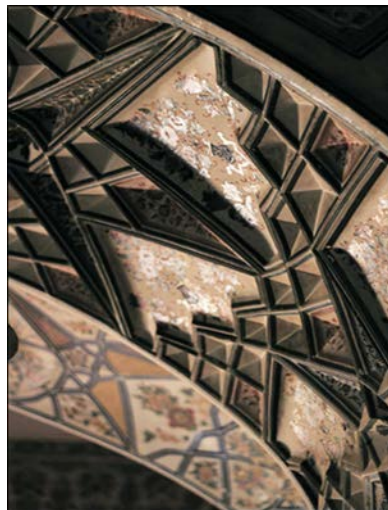


Figure-9: Relief work on ceilings and arches in the interior of the mosque,



Figure-10: Detail-relief work on ceilings and arches in the interior of the mosque.

Ornamented Towers and Fluted Domes – Delicate Mass

Almost all of the monumental mosques of the Mughal period have domed roofs (Ardalan and Bakhtiar, 1999; Brown, 2013). However, fluted or ribbed domes are not so common, and therefore the Mahabat Khan Mosque's closest similarity is with the ribbed dome roof of the Grand Mosque of Delhi, India (Shah, 1999). Although the flutes of the domes of the Mahabat Khan Mosque were added in the British colonial period, it can be assumed that this addition was inspired by the original design, considering the scale and expanse of the restorative work undertaken at that time (Shah, 1999). As such it suggests an unmistakable heritage connection with the grooved dome of the Grand Mosque of Delhi

(Alfieri and Borromeo, 2000; Ardalan and Bakhtiar, 1999; Frishman, Khan and Al-Asad, 2002). A point of interest here is that the Persian style of that time had plane domes, therefore it is probable that the idea of fluting was inspired by the tradition prevalent for this type of dome construction in Central Asia (Foster, 2004; Jaffar, 1940; Shah, 1997, 1999). Similarly, the detailed decoration work on the towers portrays a feeling of delicate mass (Figures 11-12).

Climatic Ambience

All Mughal buildings bear witness to a strong tradition of climate control understandings and their implementation. Use of brick in the Mahabat Khan Mosque, combined with thick walls, generous openings for ventilation, light niches at the sides of domes, and a central courtyard with a water body, are all environmentally responsive features found in all Mughal buildings (Jaffar, 1940; Lewcock, 1995; Shah, 1997). Similar decisions are visible in the Grand mosques

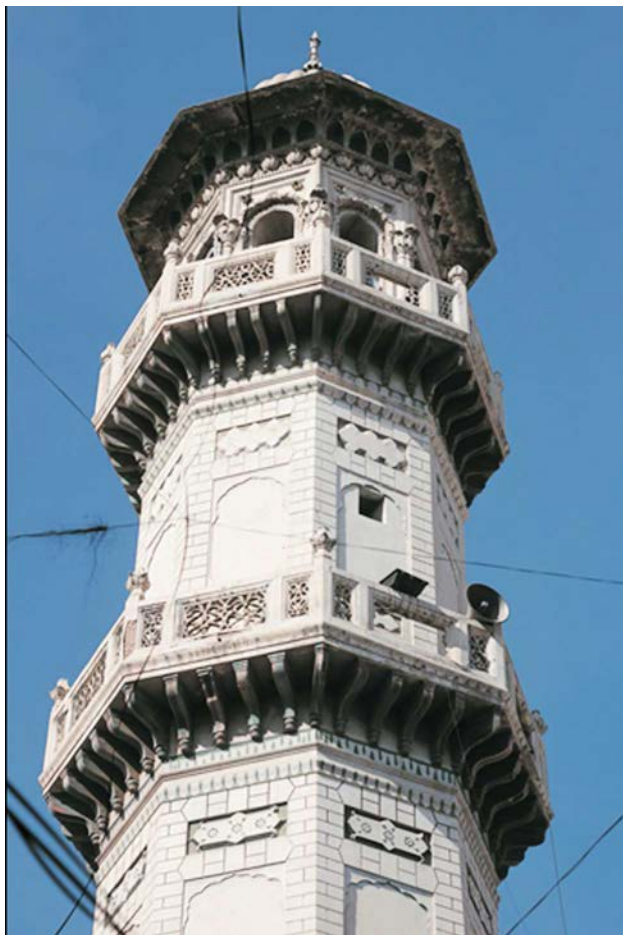


Figure-11: Intricate decorative work on huge towers portrays a feeling of delicate mass.

at Delhi, Fatehpur Sikri as well as Agra (Brown, 2013). Photographs show the small niches given at the base of the domes to allow natural sunlight to illuminate the west side walls of the Mosque (Figures 13-14).



Figure-12: Close-up view-intricate decorative work on huge towers portrays a feeling of delicate mass.

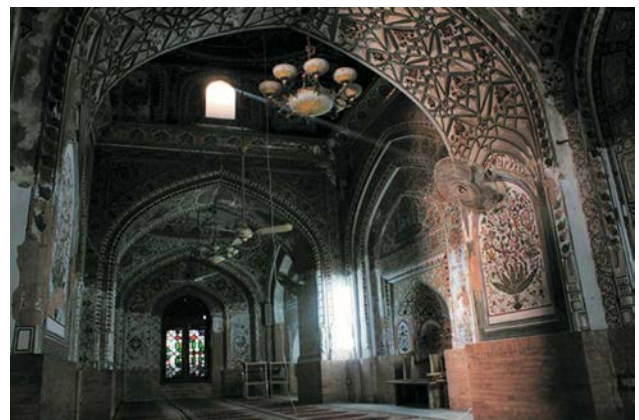


Figure-13: Small niches given at the base of the domes to allow natural sunlight to illuminate the west side walls of the mosque.

Sophisticated Interior Theme – Balance of Colours and Motifs

Mughal Architecture has a distinct quality of interior treatments all over the subcontinent (Lewcock, 1995; Shah, 1996). This is observable in the use of colours and carefully designed motifs of the Mahabat Khan Mosque (Shah, 1996). These decorations are closely similar in aesthetic sophistication to those found in buildings in India, and in turn with the splendour of Persian architecture that is the inspiration of the Mughal craftsmen (Ardalan and Bakhtiar, 1999; Brown, 2013). For example, the finely proportioned fenestrations in the Agra Mosque and the Delhi Mosque create a transcendent aesthetic feeling of balance and vivid yet ambient use of complimentary colours (Brown, 2013; Foster, 2004; Frishman, Khan and Al-Asad, 2002). This same feeling is observed in the Mahabat Khan Mosque, as visible in the photographs taken in an attempt to capture the experience (Figures 15-18). Figure-15 is a panoramic view of the interior, showing the overall tone of the scheme, while the rest of the views portray the translation of the quality into each detail of each and every part of the interior.

Restoration and Preservation

Above discussion demonstrates the significance of this building on one hand, while the pictures also reveal its current state of disrepair and disintegration. A brief listing of previous works undertaken for its restoration and preservation is shared to highlight the urgency of a fresh investment. Since a number of publications by other authors have already discussed these works in detail it is sufficient to only recall the key aspects here.

Original documentation of the Mosque is absent in historical records, and only a few sources provide clues about its origins and repair works (Shah, 1999). In one of the sources



Figure-14: Detail-small niches given at the base of the domes to allow natural sunlight to illuminate the west side walls of the mosque.



Figure-15: Panoramic view of the interior, showing the overall tone of the scheme.



Figure-16: Close-up view of windows in the main hall.



Figure-17: Tasteful decoration of each and every portion of the interior.

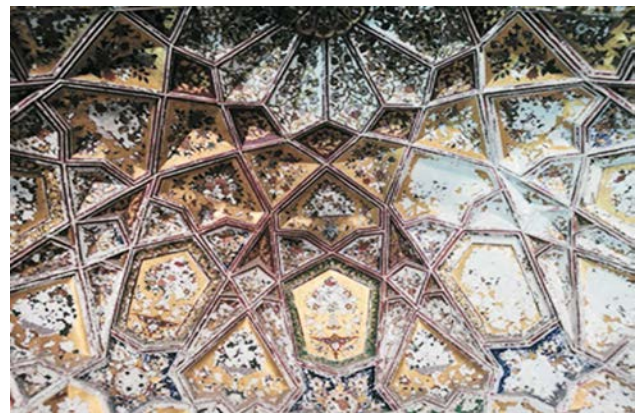


Figure-18: Fine fenestration of the interior of the main hall.

it has been recorded as having been originally built in 1756 (Raverty, 1852). According to Hunter though, Mahabat Khan was a General in the army of Emperor Jehangir and the construction of the Mosque is attributed to him, and therefore estimated to have taken place in the latter half of the 17th century (Hunter, 1887). This Mosque has been referred to as 'the finest public building in the city' in the Gazetteer of the Peshawar District, 1897-98 (Punjab Gazetter, 1899).

This building is recorded to have suffered governance-ordered destruction or rather desecration, under the rule of Hari Singh Nalwa in 1834-38 (Caroe, 1958). It is reported by Caroe to have been repaired in the late nineteenth century by the British rulers at that time (Caroe, 1958). After independence of Pakistan in 1947 it was handed over to the

Auqaf Department, and a number of maintenance works have been conducted since 1949.

An Inventory of Urgently Required Repairs

At present the Mosque is in need of urgent repairs due to a long delay in work that was approved in 2016 but has not been carried out to date (Hidayat, 2017). This delay has been due to a dispute between two government departments on the decision to relocate the shops surrounding the Mosque (Akbar, 2019). Meanwhile the condition of the Mosque is worsening, and requires immediate work, as identified through an inventory survey of the main hall carried out by students of the Architecture Department of City University, Peshawar (Figure 19). Three groups were formed to note down observations in the south, centre and north portions of the hall. Symbols of different colours and shapes were used to note the number of locations of four types of needed repairs, namely, plasterwork (ornamental), glasswork and woodwork, as listed in Table 1.

RECOMMENDATIONS FOR A PARTICIPATORY APPROACH

Survey results listed here denote the magnitude of degradation that has already occurred and is progressing due to delay in attention. Any damage in plaster weakens the bonding of all plasterwork at the edges and therefore the damage spreads at an increasing rate if not repaired immediately. This situation in turn underscores the importance of resolving the dispute over relocation of surrounding shops that is causing the delay in repairs (Akbar, 2019). It is imperative for architectural conservation projects to adopt a participatory approach to avoid disputes of interest, as is the standard practice internationally (Ashley, et.al, 2015; Heras, et.al., 2019; Stubbs and Thomson, 2016; Van der Hoeven, 2018; Zang and Van Gorp, 2018). On the basis of the participatory approach practiced globally for architectural conservation projects, the following recommendations can be made for expediting the execution of repair work at Mahabat Khan Mosque:

- An internationally recognised expert on the implementation of participatory methods in architectural conservation work should be engaged.
- All stakeholders should be invited for a public event, such as a seminar, for voicing their viewpoints and then the expert facilitator, as recommended above, can assist in developing a consensus.
- If there is a need to financially support the relocation of the surrounding shops then that support should be arranged by the government.



Figure-19: Inventory Observations by Students.

- If one of the concerned government departments has a regular income generation attached with the shops, as indicated in the public statement made via news coverage on this subject, then the same amount of regular income should be arranged from an alternative source for that department (Akbar, 2019).

Table-1: Categories of Accessibility Zones.

Types of Work	No. of Locations	Notes / Observations
Plasterwork	60	Most of these locations are actively deteriorating, and further delay may escalate the scope and cost of work.
Paintwork	58	Any further deterioration may lead to large patches of missing paint and colour matching will be difficult.
Glasswork	11	This may require replacement of all panes of the same stain shade, because any slight difference in shade will damage the whole effect of the stained glass décor.
Woodwork	11	Whole panels may require replacement to avoid any aesthetically unacceptable joints in the carving.
Total	140	This is modest observation for the purpose of highlighting the extensive scope and urgency of the required work, and actual number of locations may be higher.

Above recommendations should be implemented immediately to prevent further escalation of repair cost, because the delay is worsening the condition of the building.

CONCLUSION

Mughal architectural heritage is unique to the subcontinent. It has a distinct quality of inspiring an overpowering awe in a viewer. This feeling is deeply visceral and transcends any conscious ideas or thoughts. It is a heritage to be cherished and passed on to future generations. Its strength makes attempts to divide this region's people on the basis of political or ideological rationalisations appear superficial and fleeting in comparison. This paper has presented the Mahabat Khan Mosque as the western most demarcation of Mughal

architectural heritage. Photographs from special angles have been shared to highlight the potential of this magnificent heritage to serve as a narrative that unifies the people of the region. This narrative can serve to counter the separatist narratives being propagated by various politicians to divide the people and promote violence. Mughal architecture can unite the people by its sheer beauty and grandeur. This paper has attempted to foreground this potential as a case for a fresh investment into the preservation and restoration of the Mahabat Khan Mosque. Results from a fresh survey of the state of disrepair have been shared to demonstrate the urgency of the situation. In the backdrop of this whole discussion the recommendations for a participatory approach to resolve delays acquires an undeniable significance.

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ARCHITECTURAL ANALYSIS: DISTINCTIVE BUILDING FEATURES IN PAKISTANI ARCHITECTURE

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ABSTRACT

This research attempts to analyze the recent trends in Pakistani architecture. It aims to explore three recent paradigms: regionalism and theme-based form generation. The purpose of the inquiry was to select and analyze projects from three different cities of Pakistan and draw comparisons and conclusions. The factors that can make any structure a trendsetter in relation to the architectural context of Pakistan have been analyzed. The study also attempts to analyze the latest trends in the architecture of the country. This methodology helped in comprehending the influential approaches of different architectural projects and assess these for persisting trends. The research also emphasizes on finding contemporary processes in expressing architectural design methodologies. The research analysis three case studies with the help of elaborated sketches and diagrams. The research is concluded by identifying building features that make each of them distinct in the context of sustainable and regionalism techniques. This study also highlights the unique design techniques that fall under the paradigms of Regionalism.

Keywords: Regionalism, form generation, trendsetting, contemporary architecture, Pakistan.

INTRODUCTION

The question which is being explored through this research is: what architectural components lead towards a building becoming a trendsetter? The current architecture in Pakistan can be expressed with the word “multiplicity”, as it involves

the response to traditional and non-traditional components, with the design being influenced by multiple historical backgrounds. Furthermore, the design is also impacted by the synchronicity and collocation of settings, like regulated and non-regulated developments. As a result, public and private projects explore new spaces and forms (Baldwin, 2019).

With the country having varied and diverse architectural history, evolving from Indo-Saracenic and Mughal style, there are many examples of Islamic architecture as well as modern projects. Architects today are also inclined towards mimicking international concepts and ideologies. The cities need an efficient building design that augments and repair the depleted urban milieu. One witness so many design examples that are anesthetized from inappropriate decisions that completely overlook the context, the climate, the user, and even the existing fabric and material directed to develop a new upmarket architecture.

The architecture of Pakistan has been re-inventing itself on the commercialization requirements. In this scenario, the kind of design that sets the precedent for the future in architecture is rare and difficult to find. Yet there are also some considerate examples produced from time to time. Some projects have run through the test of time and are timeless in true sense.

This research aims to draw attention towards a local innovative architecture based on regional needs and requirements, which can be identified as good examples.

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These projects have succeeded in producing a conscious and “out of the box” design. This study identifies three different, creative, and contemporary plans from three different cities of Pakistan. All three projects are completely varied in purpose, brief, scale, and even time of completion, but all three designs are innovative in their unique way.

LITERATURE REVIEW

This research emphasizes and delves upon the idea that if a building responds to the concept of Regionalism, it can play its part towards the regeneration and restoration of the environment through improved design and planning techniques and can connect better with the context.

Regionalism is an underlying idea that promotes the use of local architectural vocabulary and local building materials. Regionalism is an attitude that strives for close interaction with the perception of the ‘genius loci’, the ‘spirit of the place’. The term ‘Regionalism’ is interpreted in some diverse ways in the architecture of the interwar period. It is an approach that can accommodate highly contradictory interests and viewpoints (Meganck, Santvoort and Maeyer, 2012). Any architect’s approach to “Regionalism” should be very natural; he should try and design an amalgamation of a built environment that should root itself on the traditional as a well modern element in a balanced and unified way (Meganck, Santvoort and Maeyer, 2012). By using contextual forces, Regionalism imparts a sense of place and meaning to architecture. Regionalist designs are sensitive to the local climate as well as the technological constraints of the local building industry. The practitioners of Regionalism seek to integrate global architectural and technological developments with regional sensibilities derived from spatial, cultural, and historical contexts (Agrawal, n.d.).

On the other hand, one important theory on sustainability states that achieving sustainability should not be expensive. Stephen Mouzon in his recent book offers crucial remarks on the importance of doing less with more for a sustainable environment. He explains that sustainable design could be achieved without relying on costly technologies (Mouzon, 2010). The main lesson one may draw from Mouzon’s research is how well one can do with less, by sharing resources and becoming less consumptive of finite resources and more efficient in everything one does.

The third component which needs to be adopted for design to be responsive is conceptual form generation. Concepts play a key role in the development of innovative design solutions for many architects and engineers. Even though

there is no sharp distinction between the process of production and the process of interpretation of designs, an “intended” interpretation usually guides the actions of the designers. Conceptual descriptions set at the early stages of the design process are used to frame some general design approach. Design concepts are introduced contextually and in parallel to a course of productive design action that is described and explained in terms of them. Interpreting the output of the design action confers meaning on the concepts. This allows concepts and design artifacts to evolve in parallel (Kotsopoulos, 2008).

RESEARCH METHODOLOGY

The method of research for this paper relies on the data collected from the concerned architectural offices and telephonic interviews with the architects (whose design projects are incorporated in this paper). The research was carried out using photographic statistics gathered by the visit to the case studies and the information provided by the concerned architectural offices.

Through a technical examination of the planning and design details, the architectural elements have been identified, which contribute towards making the building responsive designs. The authors have looked at three buildings from three different cities of Pakistan for their innovative qualities based on the selection criteria which is (Figure 1):

- i) Sustainability (only limited to the design concepts and techniques)
- ii) Regionalism
- iii) Conceptual form generation

FINDINGS

Case study 01: Faran Mosque, Karachi: Responsive Design

The project selected for this category is of Faran Mosque located in Karachi, designed by Architect Misbah Najmi and completed in 1984. It is located to the southeast of an intersection of two major Roads, Sharah-e-Faisal and Korangi

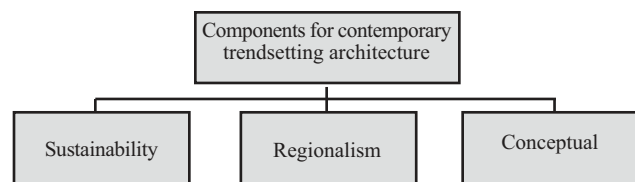


Figure-1: Components for trendsetting architecture.

Road. Contextually it is placed next to an architecturally significant building Finance and Trade Center (FTC). The Mosque gratifies as a massive landmark, successfully avoiding competition with FTC in its background. The design of the Mosque evolved around the artificial hill, that provided a sound barrier and helped in achieving a conducive environment inside the mosque. The hill not only serves a meaningful purpose but helps promote a new ideology of design with the landscape becoming a part of the architectural vocabulary (Figures 2-5). The presence of courtyard and mechanical vents on the roof of the Mosque also assist in ventilation and air circulation. The Mosque has a central courtyard. Structurally, the Mosque comprises of RCC columns. Doors made up of wood and glass are embedded in them, opening into the central courtyard from three sides, except the *qibla* side. The ablution area is designed in such a manner that it doesn't affect the circulation of the Mosque, especially during the congregation.

This particular design incorporates the use of simple techniques by creating light wells, as vents in the basements, capturing natural ventilation through a sunken courtyard

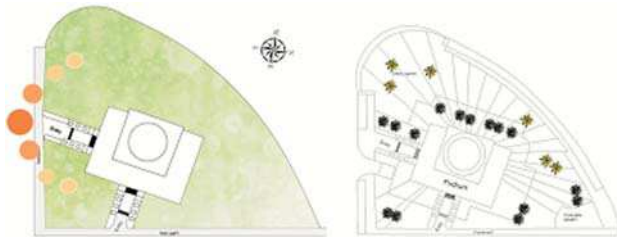


Figure-2: Master plan of the site and the Mosque.



Figure-3: Monumentality in architecture.
Source: Info 360, 2017

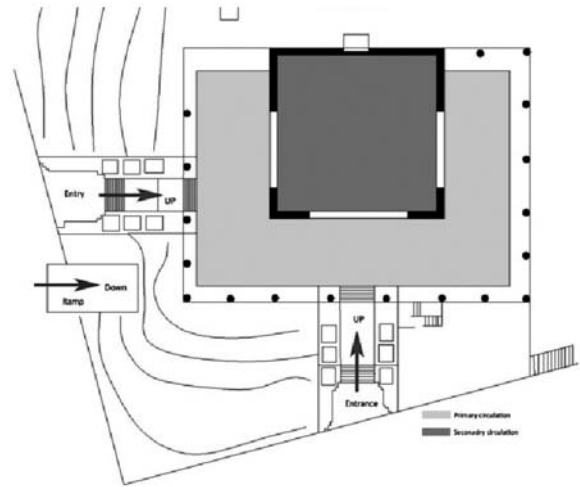


Figure-4: Ground floor plans.
Source: Info 360, 2017

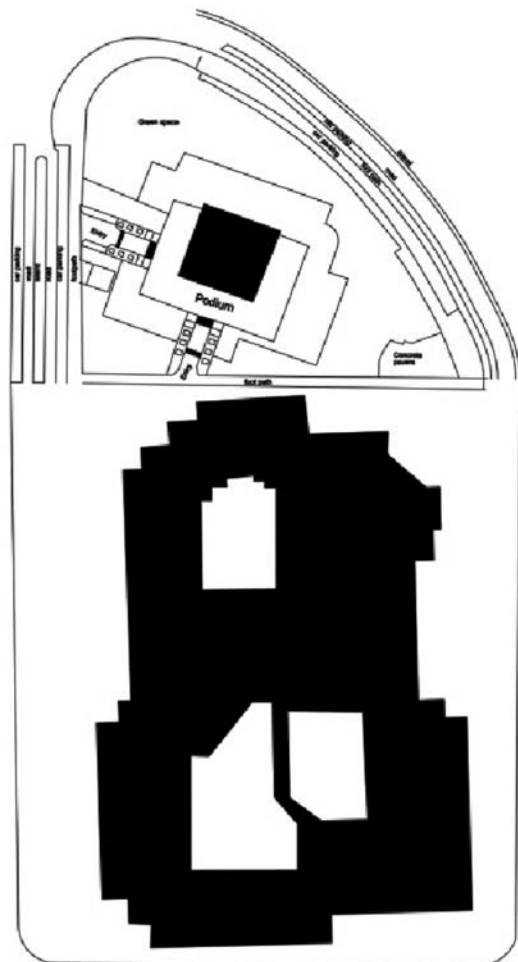


Figure-5: Figure ground diagram.

and incorporation of cooling technique and usage of slopes as noise barrier (Figures 6-7). These slopes allow the building to harness energy. Variation in levels is created to control noise pollution and ventilation. Another technique known as cooling through evaporation is used throughout the design. Water sprinklers are provided on the west and southern sides and are scheduled to be used in the afternoon. The wind hits the wet slopes, gets cool, and keeps the temperature down, the local stone absorbs the water and thus proves to be a sustainable solution. Sunlight is carefully brought into the building to pawn humidity through the drying effect. Traditional architectural techniques popularly known as “wind catchers” are also used, to supply fresh air to the basement and replace the warm air. These wind catchers help in cross ventilation, as the overall climate of Karachi is windy.

The sprinklers placed in the windward direction help in getting the overall temperature of the mosque down, especially in the open court. The sunken courtyards also create a micro-climate within the prayer space. A fiberglass dome for capturing maximum natural light is used, and the incorporation of *jalis* (screens) serves as an aesthetically pleasing element as well as produces a cooler environment. These traditional methods are cost-effective and natural.

There is also the use of active techniques that are facilitated mechanically. The relationship of the building geometry with ecology is often described by commonplaces such as compact shapes that are most favorable for the use of energy and building materials. The geometric analysis of this Mosque reveals the sensitive approach of merging shapes that complement each other (Figure 8).

The overall design analysis reveals that the designer has indulged in the attribute of sustainability in multiple ways. From air circulation to material selection, this Mosque is fully aligned with nature and sets a trend for future architects to produce such projects that work on less input and maximum output (Figure 9).

Case study 02: Telenor office (345), Islamabad

The Telenor office (345) in Islamabad is designed by the Architectural firm, Arcop (PVT) Ltd, and the project got completed in 2017. The building has a strong conceptual base and is inspired by traditional contextual features of the region, incorporating the element of *Baaoli* (originating fin the sub-continent, these are sub-level wells or ponds, which are reached by steps) (Figure 10). In incorporating this concept, the building has developed a Regional connection both in physicality and in theory.

that the natural topography of the site remains unchanged and the building planning and contours accept and embrace the natural contours of the site. The development of courtyards reflects the traditional and regional influence on the design at a larger scale, and are linked up with the detailed analysis of the shapes and modules that are morphed to create the

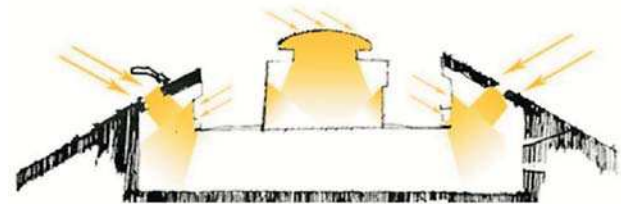


Figure-6: Section showing natural light paths inside the Mosque.

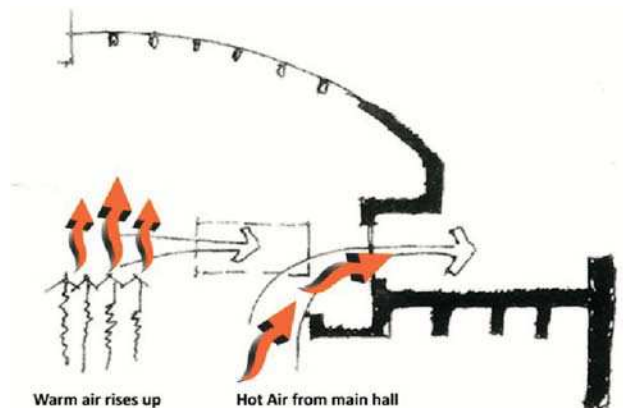


Figure-7: Section explaining the passive and wind catching techniques in design.

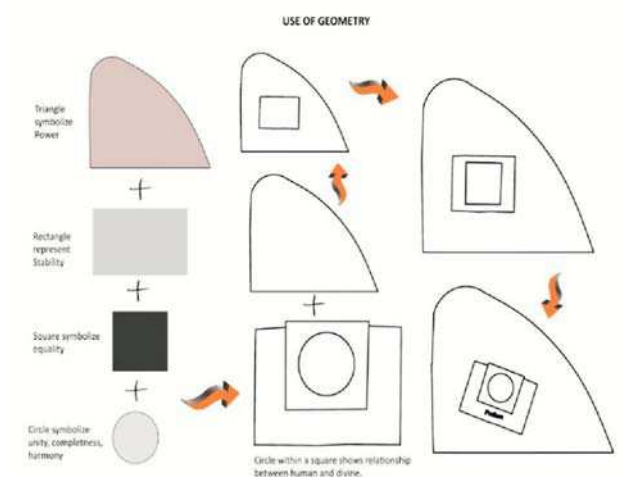


Figure-8: Use of geometry in design.

Source: Info 3 60, 2017.



Figure-9: Analytical points of incorporation of sustainability into Faran Mosque Design.



Figure-10: Use of central courtyard for collection of water concept of Chand Baori in India.
Source: Arch Daily, 2019.

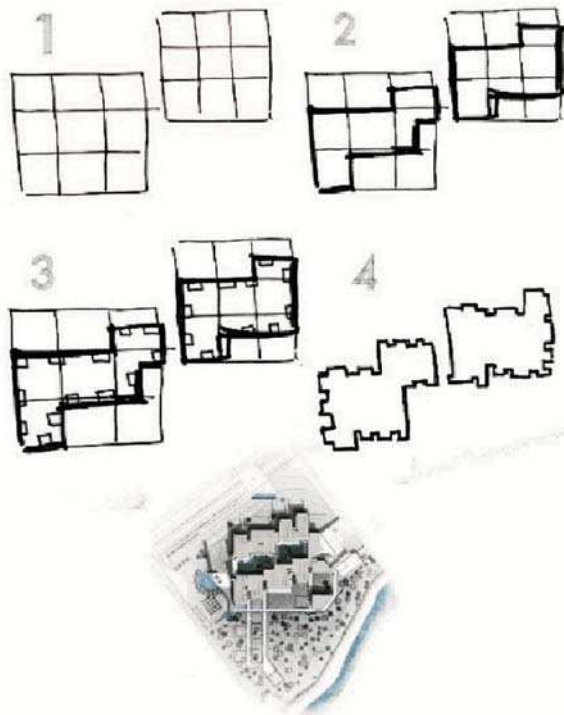


Figure-11: Use of schematic repetition for future extension in a site plan.

courtyards (Figures 11-12). The use of geometrical intricate details within the *jaalis* on a smaller scale, as compared to the whole building, reflects the geometrical exploration and modular design in the plans. The use of modules within the plan resembles the historic plans of Punjab's villages with a large number of small houses surrounding central courtyards.

with the surrounding landscape makes the building aesthetically pleasing (Figure 13). Minimum openings are provided on the east-west side of the building, which has been protected by rammed earth flanked walls. Regionalism as a concept is incorporated in this building's design. Incorporation of traditional and cultural design elements,

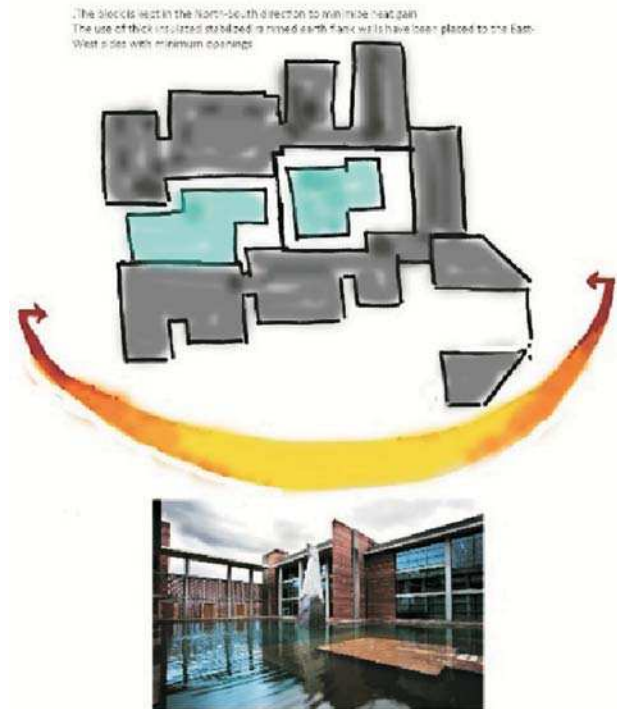


Figure-12: Strategic placement of courtyards.

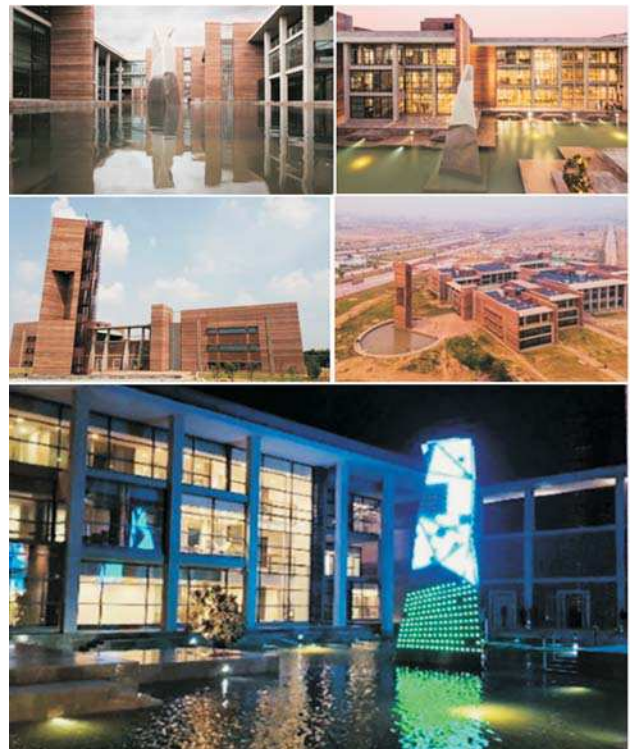


Figure-13: 3D view of 345 Telenor building Islamabad.
Source: Arch Daily, 2019

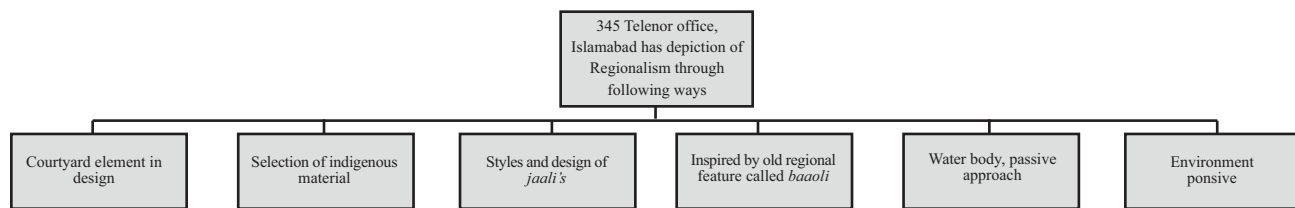


Figure-14: Analytical points of incorporation of regionalism into 345 Telenor office, Islamabad.

like the use of flanked earth walls, courtyards, blending subtly with the use of wood in exteriors shows regional connections. The design focusses on developing spaces that are not rigid, and follow a hierarchy and allows users to communicate freely. The central courtyards originate from the concept of central gathering spaces that were common in the traditional regional architecture. Large window openings are provided on either side of the building which connects to the central courtyard, for better light and ventilation. The water body in the center of the master plan naturally cools down the air within the courtyards and allows cool air to enter the building. Figure 14 summarizes the implementation of the component of regionalism into this design.

Case study 03: Garrison Shooting Gallery, Lahore: Form Generation

The Lahore Garrison Shooting Gallery is designed by Raees Faheem Associates, a Lahore based architectural design firm. The project was completed in 2018. The design of this project serves as an opportunity to study the extensive modern design principles incorporated in this structure cum monument (Figure 15). The building is inspired by the design of a bunker and the architecture of a fort. It is enveloped by artificial contours and stands as a symbol of modern architecture. It is an interesting amalgamation of dominating circular vocabulary punctuated with functional zones. The defined spaces capture the ideal views of the surroundings.

The distinctive building feature is its circular language. The concept of a concealed bunker fits the functional requirement of the building too since it's an army owned shooting gallery. Bunkers are spaces where shooting is the focal activity. The Building is depressed within the depths of contours. On each side of the built form, natural and artificial contours embed the building. This was achieved by dumping large amounts of earth excavated and dumped on the site and shaped into layers with mechanical means.

The ratio of open areas is considerably more as compared to the built structure, because of the nature of the activity, which requires larger distances of unobstructed views. As



Figure-15: Bird's eye view of shooting range.

Source: Raees Faheem Associates, 2019.

the project is located in a scarcely populated area, hence the less negative impact of the sound from the range on its surroundings.

The interior of the building receives sufficient natural light, which is important for the semi-covered ranges because they don't need artificial lighting during the day. The open spaces have perforated roofs where lights need to penetrate and the areas which have heavy visitor circulation are shaded. The height of the structure does not go above two floors, hence it does not obstruct any wind or create unlikely shadows. The plan is introverted in nature (Figure 16). The proportions of the building are well worked out, creating an overall balance in the composition. The repetition of the circular pattern throughout the design is very calculative, for instance, the circular arch can easily be added where needed. This additive property is inherent in the entire composition, where the whole can be divided into different parts wherever required (Figure 17).

A relationship is developed with adjacent circles with converging tangential lines, and those lines and circles further connect with circles of varying sizes. Eventually, a plan has been extruded from the circumference of the circles. If the circles and lines had been of equal size and direction, its design would turn out to be a monotonous repetition with neither multiplicity nor unity within the geometry. Artificially



Figure-16: Design Vocabulary.

added contours are the major design elements of this building, as they enhance both the concept and function of the shooting gallery. The contours visually obstruct the view from the front of the building to the back, which helps to create privacy, supporting the nature of the activity. The contours also add visual contrast and interest from the surroundings. These contours also recreate natural hunting and shooting grounds, giving similar vibes (Figure 18).

Overall, this design has responded to the component of form generation as documented in Figure 19.

DISCUSSION:

The design of any building should evolve out of contextual, regional, and conceptual constraints. It is pertinent to pay consideration to the practicality of design but at the same time, the study of its impact on the regional and contextual platform is also very pertinent. This research throws light on the regional and conceptual local design features that are helpful for architects to understand the necessity and use of these components. The analysis has addressed design elements that give the building's individuality. Table 1 summarizes the key findings and links them with the three case studies.

LIMITATIONS

The major limitation of this research was that there was very little literature available on the subject of architecture in Pakistan, due to which there is a shortage of pertinent

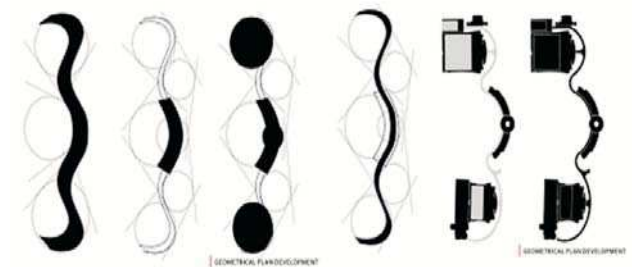


Figure-17: Geometrical Plan Development Analysis.

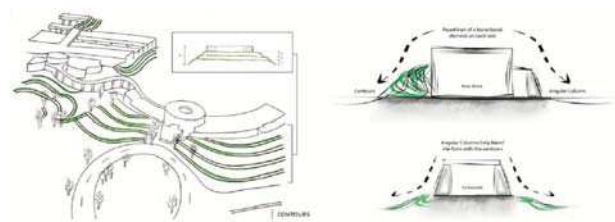


Figure-18: Contours analysis and form influence.

references and authors have relied majorly on technical examination of the buildings. Hence, the idea is to enhance the limited material available on the existing architectural literature in Pakistan. This paper aims to analyze these existing architectural structures which have helped in bringing innovation through their design techniques. These criteria are completely independent of each other. The intention was to dig out important components that should become an integral part of the design of a building and how the incorporating of these strategies can lead to an innovative structure.

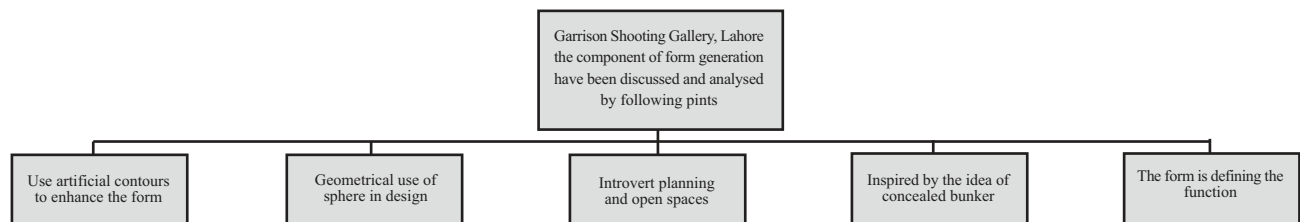


Figure-19: Analytical points of incorporation of form development into garrison shooting range.

Table-1: Summary of the Key Findings of the Three Case Studies.

CLIMATICALLY RESPONSIVE DESIGN	STATEMENT 1	Faran Mosque, Karachi
	Sustainability is a comprehensive concept, as defined by United Nations' Brunt land Commission in 1987 "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Al-Kodmany, 2018)	Cultural understanding, contextual study, and enhanced design features have been seen in this project to sustain for a longer time. Design is aligned with nature having a passive effect on the environment.
	STATEMENT 2	The natural environment has been taken into consideration while designing the building. From air circulation to the selection of material, everything has been chosen which is environmentally friendly.
REGIONALISM	STATEMENT 1	345, Telenor Office, Islamabad
	Any architect's approach to "regionalism" should be very natural; he should try and design an amalgamation of a built environment that should root itself on the traditional as a well modern element in a balanced and unified way (Meganck, Santvoort, & Maeyer, 2012).	Regionalism defines many aspects and general methods of expressing the natural environment including climate and context. Geometrically the use of modules within the plan resembles the historic planes of Punjab's villages with the large number of small houses surrounding central courtyards.
	STATEMENT 2	Traditional and cultural methods and elements of design are incorporated in a modern way with modern techniques.
CONCEPTUAL FORM GENERATION	STATEMENT 1	Garrison Shooting Gallery, Lahore
	Geometrical elements are used as an important factor that implies the appeal of an arrangement of architectural form and space (Meganck, Santvoort, and Maeyer, 2012). The generation of form and space by utilizing basic geometrical elements makes them imperative inputs in architectural design. Generating the architectural form and space based on the geometrical rules and abstracting them within basic geometrical elements make the result more understandable and recognizable (Yilmaz, 1999)	In the architectural profile of the project, an interesting amalgamation of dominating circular vocabulary punctuated with functional zones and defined spaces combined with ideal views, this building captivates all. The greenery flows seamlessly into the building as a perfect example of introverted planning. The plan has been extruded from the circumference of the circles. There is a strong link between geometry, nature and design in this project.

CONCLUSIONS

The local examples analyzed here have embraced sustainable design features and contextual relationships in unique ways and at the same time, these are boldly and subtly ironic. The buildings discussed here can be termed as hybrid designs, which embrace an eclectic approach incorporating consciously selected features without adhering to one inspired

theme. This option is striking and communal, so long as architects use the freedom to plan their design by steering and mixing various design solutions. This technique may allow clients and architects to work together to augment their design choices. Therefore, architects need not adapt, morph, or twist their design spaces several times to fit a particular design theme. They can employ a wide-spectrum of arrangements that simultaneously integrate a plethora of

Table-2: Summary of Design Approaches Concerning the Case Studies.

Design Approach			CASE STUDY		
	TECHNIQUES	USAGE	1	2	3
1	Traditional techniques	The project's architectural style collaborates with traditional techniques.			
2	Passive techniques	Design techniques, like windcatchers have been used to replace dry/warm air effects with the cool air. The architect made this building a climatic responsive building by incorporating certain elements which include the sunken courtyard, light wells, wind catchers align along the wind direction and aided with mechanical vents. The incorporation of the water body naturally cools down the air within the courtyards and with the help of cross ventilation, allows cool air to enter into the building.			
3	Contextual response	The architect also incorporated landscape design. He created artificial hills all four sides that promote aesthetics and attain connection with the built form.			
6	Geometry	Geometric concepts were used in different ways in the design including planning, façade, sections, form, space, and in details like columns. The design developed strong links between geometry, nature, and space.			
8	Materials	The materials that have been used are environmentally responsive and are locally available.			

design features. This paper emphasizes and suggests seeking a hybrid/eclectic design approach. A summary of these design approaches is provided in Table 2.

Responsive techniques should be used in architecture, to reduce energy consumption and pollution linked with construction. Architects should be trained to follow simple techniques of developing conceptual design not only at a cognizant level but also at subliminal level; they should be naturally apt and trained towards using transformation techniques of vernacular and traditional architecture and use different strategies to design, while strongly keeping the context, users and local materials in mind. The design approach should try to amalgamate the traditional methodology with contemporary styles, to re-establish the lost and evolve a new identity for architecture in a given context. All the three projects discussed here have adopted this amalgamation technique. In Telenor building, the Architect beautifully created moving grid-like patterns through a series of linking courtyards, and the building materials (bricks) were used on a modular grid in the plan as well as in the façade, reflecting rational and modern approach. The Faran Mosque took inspiration from modern Islamic architecture and successfully created spaces

responding to the local climate and completely avoiding unnecessary ornamentation. For the architects, Regionalism as a concept did not become a technique only to resolve the energy crisis, but was used to achieve a greater objective of designing responsive buildings.

RECOMMENDATIONS

A building's design and aesthetics should be consciously taken through an iterative process, and with the help of available powerful modeling tools, design teams may decide on how specific elements, such as aerodynamic forms, structural systems, vertical landscaping, renewable energy features, and shading devices can be applied to improve the overall design.

Today the need is to find new architectural meaning, methodologies that are flexible, aligned with nature, and also breaking past typologies and setting new trends. A design strategy should be based on the perception of form that creates equilibrium between the site, the context, the building and its user. The use of new tools and techniques should become an integral part of the design process to produce responsive architecture.

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TRADITIONAL VALUES VERSUS MODERN CONVENIENCES: AN ANALYSIS OF TRADITIONAL COURTYARD AND CONTEMPORARY HOUSE DESIGN TRENDS IN LAHORE

*Fariha Tahseen**

ABSTRACT

Courtyard house, as one of oldest forms of housing tradition, is a remarkable form of residential architecture due to its attributes of naturally climate controlled spaces, spaces of peace and seclusion and as a central nucleus (a social space) around which domestic life revolves. In Lahore, visible transformation of housing trends has continued after independence (1947) with several emerging issues of growing population, rapid densification and exponentially rising land value. By 1960s and 70s, bungalow style of housing with a flavor of modernism inspired middle and upper middle income people to adopt modern life style. All these facts impelled courtyard style of housing into complete disuse. Researchers and designers are certainly aware of the need to cope with local climatic and energy crisis in residential architecture to enhance physical comfort of inhabitants, which needs to analyze design and performance patterns of traditional courtyard houses, in comparison to modern detached houses. This research paper, through analysis of two local case studies in Lahore, explores how a courtyard house can be revived with minimal interventions to achieve climatically responsive houses that would address adequately the climatic concerns. Findings on evolution and aspects of housing typologies (courtyard house, detached and semidetached houses), followed by comparative case studies analysis, and field investigation through questionnaire and interviews supplement research methodology for this paper.

Keywords: Courtyard house, Detached house, Climatic Responsiveness, Physical comfort, Design and Performance patterns, Lahore.

INTRODUCTION

Courtyards as private open spaces have been in use in residential architecture for almost as long as people have

lived in constructed dwellings. The courtyard housing carries the potential to solve many climatic and social issues of housing. The concept of courtyards originated in Egypt and was later passed on to Mesopotamians, the Islamic world and was adopted all across the globe. However, after the advent of industrial revolution and flourishing of the British Raj in the sub-continent, an evident change in architecture and life style of people was witnessed because of the invention of modern commodities, like heating and cooling appliances, as a result of which the courtyard houses were replaced with detached and semidetached houses. Furthermore, the British influence, led by inspiration from British Colonial architecture and a desire for adoption of modern lifestyle influenced from the West, replaced traditional courtyard houses. More reasons behind the replacement of the traditional courtyard houses with the detached and semidetached housing typologies are the population growth and environmental concerns. This paper is structured by narrating aspects and general perspectives of courtyard houses and detached houses, followed by a generic comparison, in the context of Lahore. An analysis of a contemporary traditional house and a modern detached house in Lahore with a description of style of prevailing housing trends informs the paper.

ATTRIBUTES OF TRADITIONAL COURTYARD HOUSES

The initial logic behind the evolution of the layout of a courtyard house was to achieve an enclosed territory which was protected from invasion by humans and animals. With the progress of time, its plan evolved to achieve climatic and functional efficiencies. Thus, the essence of the courtyard house is embedded in fusion of environmental and climatic aspects, together with social and cultural values, which is perhaps the main reason behind its long survival as a house type.

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Like other regions of the world, in the sub-continent, the layout pattern of the courtyard house was influenced by regional variations. The type predominantly evolved in the Mughal Period (late sixteenth to early eighteenth centuries) and later during the British Raj (from late eighteenth to early twentieth centuries). The courtyard houses of these eras were adjoining each other, with no compulsory open spaces around them. They opened directly onto the streets and worked in harmony with the street profile and the social life. Visitors had to stop at the entrance threshold, where there was a sitting space known as '*baithak*'. The courtyards were usually square or rectangular in shape, with covered corridors or galleries around them, that worked as circulation and buffer spaces for privacy. The size of the courtyards and the height of the walls around regulated the climate of the indoor spaces, as narrowness maintained shade in summers but still it had to be wide enough to receive the winter sun. Functions of the rooms (except the kitchen) were not fixed, but their occupancy depended on thermal comforts during summers and winters. Randhawa (1999) states that the physical design and existence of typically planned courtyard structures complemented the society of its times and the local climate.

Researchers (Sharif, Zain & Surat, 2010; Edward et. al., 2006; Reynold, 2002) agree that sustainable developments are self-generating in terms of energy consumption, and keep renewing and replenishing themselves for future generation as well. Use of local material, reduction in energy consumption and integration of socio-cultural values contribute effectively to build a sustainable house. 'Traditional buildings are a product of an age long tested and trusted reaction to environmental realities. This set of structures deserves conservation in their efficiency, low-tech solutions and popular acceptability among users' (Sharif, Zain & Surat, 2010: 4029). Edward et. al. (2006) agree that courtyard houses are responsive to low rise high density urban housing, and offer an appropriate form of housing within contemporary mixed use sustainable urban development. However, Amadouni (1994) contradicts this notion to some extent by stating that a settlement with courtyard housing results in compact urban scheme, which contributes to only physical sustainability, but to achieve comprehensive sustainability in terms of socio-cultural stability this concept of courtyard housing as compact urban scheme is not sufficient.

A central position for a courtyard is allocated in a house since it functions as climate modifier. Likewise, several authors acknowledge climatic benefits of a courtyard house. Donham (1960) mentions that a small courtyard is an excellent thermal regulator in many ways. Olgay (1963),

Fathy (1986) and Donham (1960) recommend small courtyards for providing satisfactory indoor environmental conditions for hot and dry climates. Rapoport (1969) also supports the fact by stating that a courtyard house, as a traditional house type, has many advantages as being climatically responsive. Edward et. al. (2006) refer to a courtyard house as being widely accepted as a thermal moderator in hot and dry climates. They do this after examining various case studies of courtyard houses across the world, and identify several ways in which a centrally enclosed, open-to-sky courtyard can effectively reduce day time temperature by promoting air circulation and increasing the humidity content when provided with a water body or fountain.

The theories, concepts, ideas and philosophy behind significance of courtyard housing focus on aspects of centrality, enclosure, origin and unity as historically courtyards have been used for many purposes including relaxing, working, playing, sleeping, cooking, celebrations and even as places for keeping animals. Extensive literature has been produced on courtyard housing, its features and many aspects as it is a purposely built housing typology with diverse and peculiar features that have lead many researchers to analyze it.

ASPECTS OF MODERN DETACHED/ SEMI DETACHED HOUSES

The origin of a detached house as a 'bungalow' or a 'villa' can be traced to Roman times, when the extroverted nature of a villa was supposed to show off wealth and status of the inhabitants. 'Basically, the modern non-courtyard house is a rectangular prism (or an agglomeration of rectangular prism) placed at random on the building plot with a garden at the back and at the front, along three sides or all the way round; it is in effect 'a box in the garden'' (Al Azzawi, 1984: 35). In the sub-continent, the British Raj was the pioneering spirit of introducing the villa/bungalow style of house. Randhawa (1999) states that the courtyard style of housing as inappropriate for the British sensibilities of privacy. Classical western models were inappropriate too, due to letting in undesirable light and heat. With considerable experimentation, they derived at the bungalow style, which was a cross between the English cottage or modified Palladian villa, with a corridor around the house, instead of a courtyard within. Incorporating verandahs served as buffer space for preventing direct sunlight from reaching rooms. This structure was raised on a plinth and had a verandah as the entrance foyer, which acted as a transition space within the bungalow. All bedrooms, with attached bath, surrounded the central

hall. Every room was purposely functional. Kitchen at rare side of the bungalow was connected with a corridor, which had direct access from the servant quarter.

The detached villa displayed a leisurely and ostentatious lifestyle, as narrated by Al-Azzawi, 'Modern non-courtyard houses satisfy a personal and social need, namely, the need for a symbol of social success and social status' (Al-Azzawi, 1984: 278). A house front garden was supposed to be a status symbol, to impress visitors and passerby. Al Azzawi further states in his analysis of the detached modern house, 'there is a tendency nowadays to replace the outer boundary wall by a metal rail which invites overlooking by passer-by. The reason for this is to show the front elevation of the house to the passer-by; this is yet another manifestation of the status symbol' (Al Azzawi, 1984: 251). Besides raising social and wealth status from a modern detached house, another imperative to achieve in the villa type of house is an enclosure which is self-contained and maintains its own indoor climate by active strategies of cooling.

A detached enclosed modern house is advantageous in terms of safety and as an enclosed territory which can avoid dust accumulation, and for avoiding cold winds during winter season. Edward et. al. (2006) states that modern self-contained housing type has an environment which "is mainly controlled by mechanical means (air-conditioning, etc) with the inevitable consequence of isolating the interior world from the exterior. This is what is called the 'exclusive' model, because the form of the building and the nature of the envelope encourage isolation" (Edward et. al., 2006: 224). In a research Ron Apelt et.al. (2003) find that greenhouse gas emissions responsible for global warming are attributed to the electrical appliances in residential operations. It is also argued that western models of housing that are promoting the use of these appliances are less concerned with the local climate, building methods and cultural traditions. Building regulations and planning laws are also adopted and modeled on European practice. 'In such buildings people are isolated from their surroundings, becoming physically and socially separate. Cheap energy sustains such practice but, as the lens of history shows, it is a form of urbanism far removed from the carrying capacity of local resources and local customs' (Edward et. al., 2006: 224).

The design pattern of a house can contribute effectively, creating a microclimate, by taking advantage of beneficial aspects of climate and avoiding the unfavorable aspects. Understanding the needs of a house with respect to climate, orientation, form and layout to cope with the local climate and decrease dependence on artificial means of ventilation

should be priority for designers. It can be argued that if buildings do not take into account climatic factors then the resulting conditions will make the demand for air-conditioning perfectly reasonable. With this premise the paper moves onto the introduction of the research methodology and then onto describing the findings and analysis of the research.

RESEARCH METHODOLOGY

The key objective of this study is to analyze housing patterns and design for improved physical performance and thermal comfort of inhabitants with a concern for local climate, confined energy resources and to promote regional identity and sustainability. A typological analysis of a contemporary traditional house and a modern detached house in Lahore was conducted as a description of style of prevailing housing trends. This analysis was based on plan configuration, use of outdoor spaces, façade treatment and urban configuration. Furthermore, a survey was designed for data to be collected from forty seven residents to inquire about their preference of housing style, climatic responsiveness of their houses and the level of satisfaction with indoor thermal comfort and ease of performing daily tasks. This survey was supported by qualitative interviews of residents of surveyed houses and two architects (one designing modern houses while the other designing traditional courtyard houses in Lahore). These findings enabled the researcher to arrive at conclusions with several recommendations.

LINK BEHIND RISING TEMPERATURES AND HOUSE DESIGN

Lahore features hot semi-arid climate that comprises of long and intense hot summers, an unpredictable warm and dry winter, dust storm and monsoon. Sun, wind and humidity or precepitation are the three primary forces determining the climate of a region. However, the sun is seen to be the most dominant. A research study conducted by Sadiq (2010) calculated the mean maximum and minimum temperature for Lahore over the period 1961-2007, which showed an increasing trend in temperature with rates 0.025C and 0.054C per year (Figure 1). One of the major reason behind production of heat in the urban areas is the heat released from buildings due to machinery used in buildings, lack of greenery and vegetation, traffic and air pollution, industrial wastes, insensitive use of material and building techniques that add to rise in temperature.

According to statistical data compiled for a research study about passive and low energy architecture in Lahore, the energy consumption of residential buildings in Pakistan

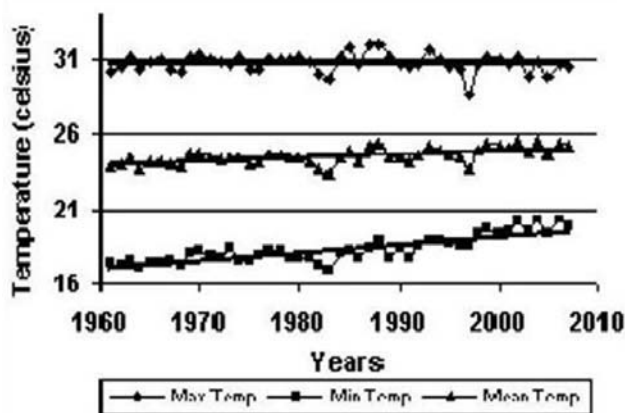


Figure-1: Tmax, Tmin, Tmean of Lahore.
Source: Government of Pakistan Finance Division, 2020.

Appliance	Percent of Households Owning 2003/04	Percent of Households Owning 2007/08	Increase (in Percentage Points)
Air Cooler or Fan	83.3	86.4	3.1
Sweing or Knitting Machine	52.7	72.7	20
Television	41.6	63.2	21.6
Washing Machine or Dryer	37.8	48.8	11
Water Pump	31.7	54.5	22.8
Refrigerator or Freezer	27.9	40.3	12.4
Radio	13.4	40.0	26.6
Air Conditioner	2.8	6.6	3.8
Personal Computer	2.7	8.5	5.8
Cooking Range of Microwave	2.5	6.0	3.5

Figure-2: Appliance Ownership in Punjab.
Source: Government of Pakistan Finance Division, 2020.



Figure-3: Wall Creepers Covering Exterior Facade.
Source: www.googleimages.com



Figure-4: Living Room.
Source: www.googleimages.com

accounts for almost forty percent of the electricity generated and the consumption rate is increasing at fourteen percent per year. Figure 2 shows that appliance ownership and usage (especially air conditioners) has grown over the years in Pakistan, resulting in increase in energy consumption and rise in overall surrounding temperature.

RESIDENTIAL TRENDS IN LAHORE: A TYPOLOGICAL ANALYSIS

Before establishing a comparative typological analysis, it is required to identify and examine an example of a modern traditional house parallel to an example of a typical modern detached house in Lahore, to describe the aspects of both housing typologies. The parameters to examine the case studies are micro-climate, utilitarian facilities, form of houses and how they merge with surrounding environments, planning and use of materials.

Case study of a Contemporary Traditional House in Lahore

Traditional architecture is characterized by use of local materials, rich design vocabulary, construction techniques and a concern for natural light, air circulation and integrated vegetation. A traditional house designed by an eminent Architect Kamil Khan Mumtaz (expert in traditional architectural practices) was taken as a case study to analyse a traditional house based on the above analytical parameters.

This house creates an indoor versus outdoor visual connection and also maintains a close relationship with nature. The central living/ lounge space is airy, well ventilated and adorned with an aura of grandeur (Figures 3-4). The high vaulted ceiling of the lounge with floral motifs (Figure 5), a feature of Islamic architecture, is not only visually appealing but also regulates the indoor temperature, as it has been



Figure-5: Vault structure and floral patterns on ceiling.
Source: www.googleimages.com



Figure-6: Aerial View of Wind Catcher.
Source: www.googleimages.com

established that for every one foot (30 cm) rise in the ceiling height (besides standard height) reduction in temperature by three degrees centigrade can be achieved.

The use of facing bricks on entire façade enhances the indoor thermal performance, as bricks have adequate time lag which result in blocking summer sun radiation. Good insulation value of bricks help in avoiding indoor heat loss during winters. The use of traditional porous brick paving, when sprinkled with water before mid-day or during the afternoon, absorbs and retains some water, which helps in reducing floor temperatures and also helps in creating cooling effect by evaporative cooling.

The vault structure at the building roof top is designed purposely as a wind catcher (Figures 6-7) A central open-to-sky hexagonal courtyard with Palm trees, catches natural day light and creates a passage for air circulation (Figure 8). Plantation in the courtyard obstructs direct sun glare and provides shading, which helps in reducing ground surface temperature. The veranda provides shade for doors and windows from direct sun glare. The outer façade of the

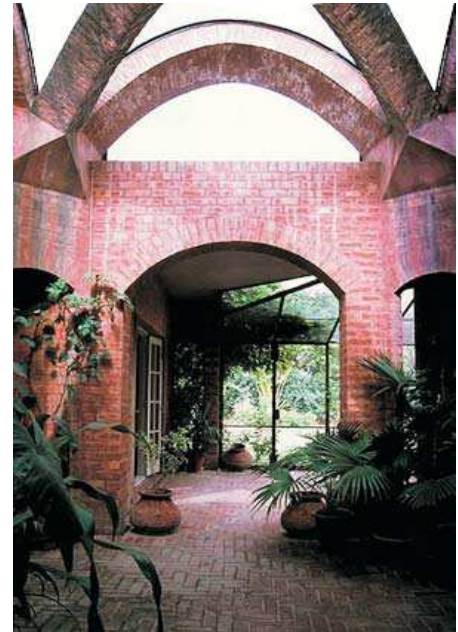


Figure-7: Wind Catchers Inside the House.
Source: www.googleimages.com



Figure-8: Central Courtyard with Palm Trees.
Source: www.googleimages.com



Figure-9: Central Space for Natural Light Provision.
Source: www.googleimages.com

house is quite simple yet elegant, not having excessive window openings. The overall thermal comfort of the house is enhanced by a dramatic play of shades and shadows.

Case Study of a Modern Detached House in Lahore

A modern detached house is characterized by individual expression, and has an isolated structure standing on the ground, with compulsory open space all around or at least along two or three sides. A typical modern house in Lahore is selected to examine typical aspects of a modern detached house. Set back requirements allow every ten marla (300 square yards) or bigger house to have a small garden in the front and a car porch area under the front terrace. Setbacks are also required to be provided at either side of the built form and at back rear side of the house too. It is generally considered prestigious to have a well maintained front lawn and a posh interior environment (Figures 10-11).

The front lawn is used in early morning and late evening. Bedrooms of the first floor and the drawing or dining rooms have windows looking into the front lawn. Therefore, only two or three rooms of the house can enjoy the view from the garden. During peak hours of the summer season, heavy curtains or blinds are used to cover windows to avoid excessive sun glare and heat (Figures 12).

A modern house is generally enclosed for security purposes and for protection from unwanted sun, wind, rain, dust and insects. Indoor thermal comfort is preferred to be achieved by mechanical air conditioning systems. This promotes the use of heavy curtains, rugs, furniture and variety of lights that enhance the ambient environment but adds to the air conditioning loads. In summer months, the inside-outside visual space sequence is not often experienced because of the discomforting glare from outside, which obliges the inhabitants to keep curtains drawn for a considerable number of hours during the day.

TYPOLOGICAL ANALYSIS

Plan Configurations

Evidences of centrally designed courtyard housing can be found in the historical 'walled city' of Lahore. These houses were built side by side with common walls, having narrow frontages and a central courtyard surrounded by rooms (Figure 13). Such houses have almost disappeared from the urban context of Lahore now. However, a survey of contemporary traditional houses in Lahore revealed that the layout plans do not have a central courtyard space surrounding by rooms, but the courtyard space has shifted from the centre



Figure-10: Front View of Modern House.



Figure-11: Lawn in the Front Portion of the House.



Figure-12: View of the Dining Room.

position to being a pocket space on the right or left side of the plot (Figure 14). This space is popularly known as the 'patio'. Apparently this space tends to function like a courtyard as in the older traditional houses. The functional relationship of this outdoor space is to give visual aesthetics to the lounge area, bedroom and an outdoor link for kitchen ventilation. In a modern detached house, at times this side space is designed as a patio for outdoor purposes, like washing and drying. The location of this space is within the compulsory open spaces of the plot.

The survey analysis also demonstrated that the layout plan of a traditional house and a modern detached house were almost the same, (due to the narrow frontage and elongated shape of the plot) except for the provision of the courtyard or a patio space in the plot's compulsory open space area.

Over time, with the evolution of the house as a typology, the central lounge space has adapted many socio-cultural features of the courtyard, such as family gathering/ relaxing and acting as a connecting space to the rest of the rooms in the house. The outdoor open to sky space has been converted into an enclosed indoor space with family activity centered around modern appliances, such as the television. This space is usually equipped with an air conditioner to achieve a comfortable indoor environment. The central lounge space surrounds the bedrooms, kitchen, dining room, outdoor patio

or courtyard and contains a staircase lobby for accessing the first floor. The lounge space of many of these houses is a double height space with large size windows providing visual connection with the outdoor patio or garden. The first floor of the house has bedrooms with attached bathrooms, a store and at times a study room and also an access to a front terrace or balcony, which is not often used, because of privacy constraints, but it is provided for visual aesthetics.

Use of Outdoor Spaces

In the traditional housing of Punjab there were generally typical courtyard houses with courtyards located on the ground level, which were completely open to the sky, and had adjoining rooms opening directly onto them. Special consideration for plantations, water fountains and shading was given as most of the times (morning, evening, nights) were spent in these courtyards and many activities such as cooking, washing clothes, drying, eating, sleeping, children playing, family gathering used to take place in the courtyard. In the rural areas courtyard houses had mud finishes and in urban houses plaster, paint finish and bricks were used for external finishes with beautiful patterns and ornamentations on the façade of houses for the elite.

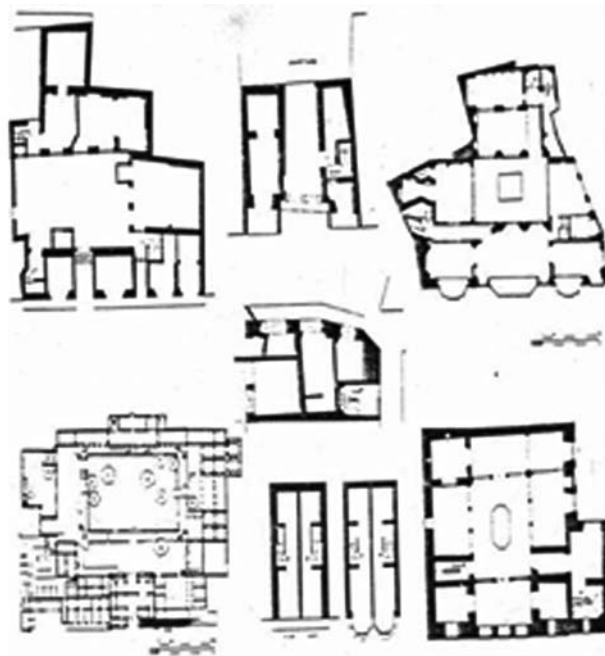


Figure-13: Layout Plans of Traditional Courtyard Houses in Lahore.

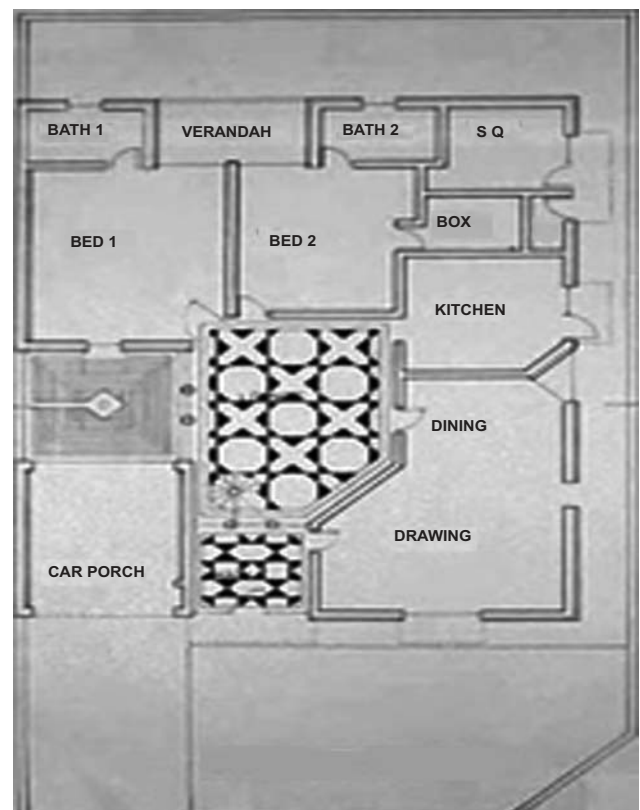


Figure-14: Layout Plans of Traditional Patio Houses.

In contemporary traditional housing, because of the limited plot size and setback requirements, the courtyard space have shifted towards plot side boundary wall. The same features of brick and terracotta pavements, central fountain, plantations, bird cages, dramatic play of shades and shadows are incorporated to maintain an introverted character with ambience and aesthetics, as in traditional courtyard houses. However, if central courtyards are provided in contemporary houses they only fulfil climatic and aesthetics purposes, they are not used as multi-activity areas for daily house hold activities as in traditional courtyard houses.

A contemporary modern house follows the imperatives behind a detached villa, as a symbol of social status and prestige holding extraverted character. Some of the constrictions that need to be addressed are limited plot size, need for a car park and setback requirements. A front lawn is preferred which needs to be maintained for creating a pleasant environment. Since the lawn is a semi-private domain, therefore it cannot be used for household activities like washing and drying clothes, or for eating and sleeping outside.

Façade Treatment

The choice of materials for façade finishes significantly distinguishes traditional houses from modern houses. The traditional house use indigenous material such as fair faced brick, lime plaster, stucco, terracotta paving, wood and avoids excessive window openings or glass treatment. Whereas a modern house has plaster and paint finishes, and is often clad in tiles. Provision of large sized windows on the front façade is a significant feature of a modern house. This however, adds to the air conditioning requirements and reflective glazing with polyurethane sheets are often used for insulation purposes.

An interesting feature of contemporary traditional houses is their repetition of design features from historical traditional houses. A contemporary traditional house may at times incorporate design features and elements with intricate detailing to reflect aesthetics of traditional architecture within contemporary forms. Some of these elements are used in terraces, arcades, overhangs and galleries. Some of these ornamental features (like trellises) help regulate microclimate by shading walls and windows and also facilitate air circulation (Figure 15).

Urban Configuration

In historical areas of Lahore, where traditional courtyard houses exist, street layout are quite compact, with the streets

being as narrow as six to ten feet. Although this street works for thermal efficiency, as a microclimate is created and houses are shaded from direct sun exposure by neighbouring walls, yet the congestion and resultant infrastructure services provision is problematic. The high density and street layouts however, promote and support pedestrian friendly activity in the neighbourhood. In comparison, as per the byelaws, the street widths in new neighbourhoods vary from twenty-four to thirty feet, which facilitates the movement of cars, but does not promote walking activities. It also exposes houses to direct sun light exposure, and results in dependence on air conditioners.

COMPARATIVE ANALYSIS

Based on the literature review and case studies documentation and analysis, the following points can be highlighted:

1. One of the most inspirational qualities of courtyard houses is its local character. 'Careful studies of many other 'ethnic' courtyards worldwide would reveal unique and personable characteristics all their own, and would add to the richness of worldwide 'courtyard culture' (Amadouni, 1994: 45). A modern detached house possesses diversity in features, materials and design aspects, which at times, articulates individuality but leads into typological ambiguities and raises questions about aspects of regional identity and local character.



Figure-15: Balcony designed as part of front façade of a contemporary houses.

2. In a detached house compulsory open space has to be given all around the built form, which compromises the quality of the open space. In a courtyard house the open space can be combined into the courtyard, especially if the house is being designed in a location where byelaws are not very strict, thus a courtyard house is more efficient in terms of planning.

3. A courtyard house has various habitable rooms suitable for different seasons and hours of the day, however a modern detached house lacks this aspect. In courtyard houses, traditionally rooms were not specified by function, as the courtyard is a multifunctional space accommodating various activities, with other rooms considered for diurnal variations. On the other hand, in detached houses, as an inspiration of bungalow style of housing, all rooms have a fixed function with no multifunctional space.

4. The courtyard house is the most suitable typology for non-conventional energy conservation and efficiency, which is achieved through reduced energy demand and by promotion of passive heating and cooling. In a research study conducted by Amadouni (1994), it is concluded that it is preferred to have substantial energy savings based on house form and nestling configuration and breathe healthy air, rather than super insulate buildings and suffer the sick building syndrome. He also argues that 'closely nestled housing typologies, such as courtyard or row housing, are more energy efficient than detached housing, for the sole fact that the additional exposed surfaces of the latter require much more energy to heat in winter than the others' (Amadouni, 1990: 56).

5. A courtyard house has windows which open inside the courtyard, therefore, they can be left open during summer nights for air circulation and cross ventilation. In a detached house windows are facing the front lawn or other sides, which cannot be opened during summer nights for security and privacy reasons.

6. A courtyard house is designed primarily to cope with hot and dry climate due to its open air design and planning, which is good for summers. But its design is not capable to block cold winds. However, an enclosed modern detached house is not efficient in keeping the summer heat away or addressing the extreme cold weather, and is dependent on artificial means of ventilation in the Pakistani context.

SURVEY FINDINGS

A survey with eighty residents (living in forty-seven different houses) was conducted to explore residents' preference of

housing style in Lahore, climatic responsiveness of their existing dwellings and their level of satisfaction with indoor thermal comfort. Among these twenty-two houses were traditional courtyard houses in Lahore, and rest were detached or semi-detached houses in Lahore.

The findings were tabulated on a Bedford scale for level of thermal comfort or discomfort in houses. In responses received, there was a marked difference in thermal comfort levels of both housing typologies. In traditional houses, comfort levels varied from 'comfortable' to 'too cool', however few residents were quite unsatisfied. Whereas in modern houses people marked 'comfortable' to 'too warm' range. Here a marked deviation was observed, since one resident marked much too cool (Figure 16-17). The survey analysis also demonstrated a higher percentage of use of air conditioners for cooling in modern houses as compared to traditional houses (Figure 18). There was a marked difference in satisfaction of thermal comfort level for residents of traditional houses as compared to modern houses. Another considerable finding of this survey was that sixty five percent

Much too Cool -3	Too Cool -2	Comfortable Cool -1	Comfortable 0	Comfortable warm 1	Too warm 2	Much too warm 3

Figure-16: Bedford Scale of Thermal Comfort Level.

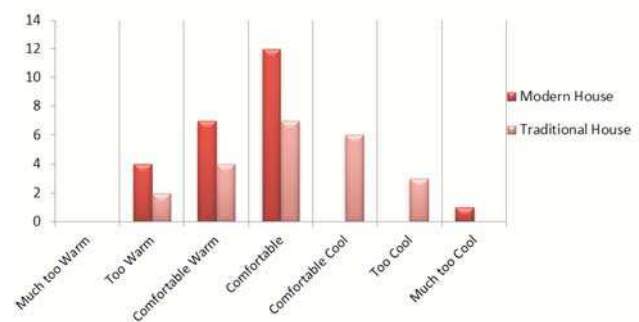


Figure-17: Thermal Comfort Level of Traditional and Modern Houses for Summer Season in Lahore.

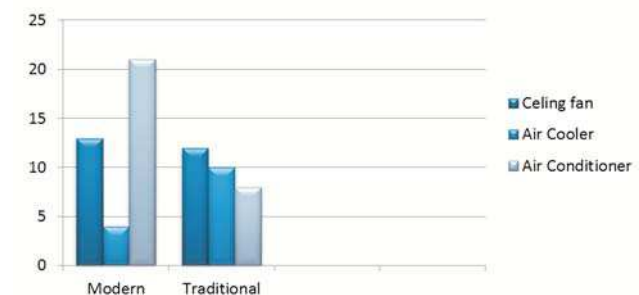


Figure-18: Electric Appliance Usage for Cooling During Summer Season in Traditional and Modern House in Lahore.

of the residents of modern houses wanted to continue to live in modern houses in the future, whereas seventy percent of the respondents of the traditional houses desired to continue living in their houses in the future too.

Another important objective of this survey was to inquire about residents' psychological response, besides physical comfort for the indoor thermal environment, due to high temperature and inability of houses to cope with hot summers in absence of mechanical aids of cooling. In response, residents of modern houses complained more about physical discomfort and difficulty in coping with daily activities, as compared to residents of traditional houses (Figures 19 and 20).

The extent of use of outdoor space was almost the same in the modern and traditional houses. Residents preferred to spend more time in the outdoor spaces in the evenings and at night time, while they preferred to stay indoors from noon till evening. In traditional houses the residents were spending almost the same amount of time sleeping and entertaining in courtyards, verandas and on roofs (Figure 21). Residents of modern houses preferred to utilise the front lawn in the morning and evening time. Residents of traditional houses used the rooftops in the evening, and slept there at night time too (Figure 22).

Micro-climate is an important element that affects human thermal comfort, in terms of physical and psychological response and can be modified through design. Amadouni emphasizes the need and significance of a space incorporating some elements of nature; 'even a tiny private courtyard-garden, open to the sky and the elements, fulfils the occupant's need to be in contact with nature. It also confines the extents of his/her vision, thus demarcating his/her territory and providing a frame to enjoy the ever changing diurnal and seasonal time' (Amadouni, 1994: 44). Thus, the courtyard houses not only provide a solution to achieve thermal comfort but help bring nature in closer contact to the inhabitants, if designed adequately. The higher satisfaction level for thermal comfort and ability to perform daily activities in the multi-purpose space of the courtyard, and lesser dependence on mechanical means of ventilation, hence proves courtyard houses to be more thermally responsive in comparison to modern houses.

FINDINGS THROUGH INTERVIEWS ON FACTS OF DECLINE IN COURTYARD HOUSES IN LAHORE

The interviews with architects informed about the various

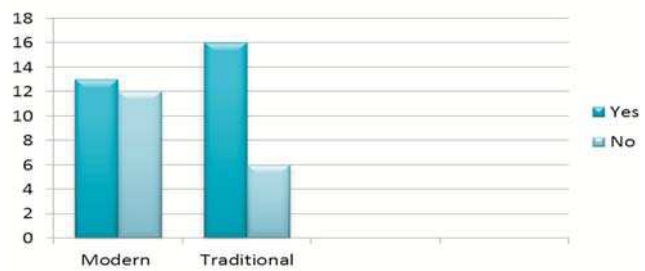


Figure-19: Satisfaction/Dissatisfaction with Thermal Comfort Level in Traditional and Modern Houses in Lahore.

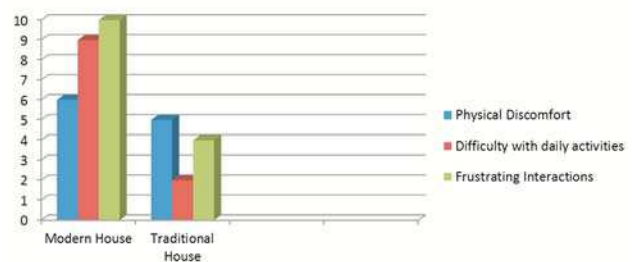


Figure-20: Feeling to be Uncomfortable Due to Thermal Comfort Level in Traditional and Modern Houses in Lahore.

Traditional House	Morning 8am -12am	Noon 12am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am
Patio	**	**	*****	
Courtyard	*****	*	*****	*****
Roof	**	*	*****	*****
Veranda	*****	***	***	*****
Indoor	*****	*****	*****	*****

Figure-21: Use of Indoor and Outdoor Spaces During Different House of a Day in Traditional Houses of Lahore.

Modern House	Morning 8am -12am	Noon 12am - 6pm	Evening 6pm - 10pm	Night 10pm - 7am
Patio	**	*****	***	
Front Lawn	*****	**	*****	
Roof		*	*****	*****
Veranda	**	*	*****	
Indoor	*****	*****	*****	*****

Figure-22: Use of Indoor and Outdoor Spaces During Different House Of A Day In Modern Houses Of Lahore.

reasons behind the decline in courtyard housing. The first reason is the stigma attached to courtyard houses. Wide range fluctuations in economic circumstances warrant only high income group to achieve purposely built traditional houses specially designed by architects who have expertise in traditional and vernacular architecture. However, on other side, low income group living in old historical areas of city of Lahore have courtyard houses in dilapidated situation often stigmatized as old fashioned.

The second reason was lack of adequate security as being a major concern behind preferring a modern house. Because of the security threat people do not prefer to sleep outdoor and prefer to have only one entrance/exit door for the entire house. They cannot keep doors and windows open all night, so courtyard houses are no more considered to be safe in this situation.

Another reason of preferring a modern detached house was expensive land value and the requirement for provision of compulsory open space, according to the laws of the building regulatory authority. These laws force occupants to cover as much space as possible on the plot (after leaving setbacks) in a way that maximum number of rooms can be achieved to accommodate all family members, which does not leave space for a courtyard. Individualisation of rooms and privacy demand, not only for women. With increasing vehicular demands, a car porch is a requirement in a house too. Thus, after having accommodated all these spaces, little or no room is left to design a courtyard.

Socio-cultural variations also influence different aspects of life. One reason for the decline in the desire for courtyard houses is breaking up of nuclear families. With the passage of time, and with the nuclear family system in decline, the courtyard house is being abandoned with trends showing shifting towards modern, single family, detached house. A local architect designing modern villas, mentioned that due to the impact of globalization and frequent travelling experience in western countries, people demand to have a western house. Lack of regional identity and local character in residential built environment is a major concern behind decline of courtyard house. An attraction and desire for modernization and international style; followed by an exotic display of wealth adds to a demand for a detached bungalow style house. Lack of concern for addressing indoor micro-climate and thermal comfort levels results in dependence on mechanical heating and cooling systems. Therefore, courtyard houses find it hard to keep their identity and prestige. The transforming trends of courtyard housing have also resulted in the loss of skilled labour, masons and experts

who are skilled in local construction and decoration techniques.

RECOMMENDATIONS AND CONCLUSIONS

A courtyard house is a versatile typology which serves a wide range of affordability, which is one of the greatest challenges of contemporary times. Courtyard housing can be cost effective and climatically responsive. Besides, by adjusting bye-laws and promoting the use of indigenous materials such as bricks, lime plaster, terracotta tiles and wood a courtyard house can add a local flavour to the urban landscape. A courtyard house can also incorporate natural vegetation with water bodies to improve the overall ecological footprint of the house.

A typological analysis of courtyard houses in various regions by Amadouni (1994) demonstrates that it can have various spatial organizations, for example I-shape, L-shape, U-shape, O-shape, B-shape, T-shape, H-shape and Z-shape. These patterns can be adopted according to the shape and size of plot. A typical layout house plan of Ancient Greece (Priene), mentioned by Reynold (2002), is an example of a courtyard house with an elongated narrow frontage. Therefore, with slight variations in housing setback byelaws, an efficient and functional courtyard house can be designed. Instead of alleys as predetermined compulsory open space, a certain proportion of open rectangular or square space, adjacent to the neighbouring plot and separated with partition walls can serve as a communal courtyard. This can be a visual retreat for all connected rooms and a breathing space with a tree in the centre for shading.

Adaption of modern techniques, new materials, design and layout patterns of houses have contributed in raising heating and air conditioning demands. Even small capacity heaters and air conditioners can have a major effect on optimal house indoor environment, which is designed with passive techniques. Maximum reliance on mechanical aids to meet our needs of thermal comfort has resulted in losing indoor outdoor connections.

There are certainly limits to the extent that we can cautiously improve our indoor environments by adjusting external climatic factors and by incorporating passive methods of design. However, beyond this limit, we need heating and cooling aids which consume energy. Consciously planned and designed houses with a passive design approach and an additional support of active techniques complement each other. Nowadays problems arise when we exceed our dependence on heating and cooling devices, as a consequence

we unconsciously increase energy consumption which results in depletion of natural resources. On one hand these modern devices provide a comfort level and on the other hand they contribute to environmental hazards, by expelling negative heat content as waste output. We are not breathing natural air; we breathe mechanically processed air which has reduced our powers of resistance and capacity to bear climate forces.

In short, old wisdom of our traditional values blended with contemporary trends and needs can be a subtle combination to overcome our local issues of energy consumption, physiological and psychological comforts, as well as saving our built environment from degradation for our future generations.

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COMPLEXITY AND CONTRADICTION IN ARCHITECTURE

Robert Venturi

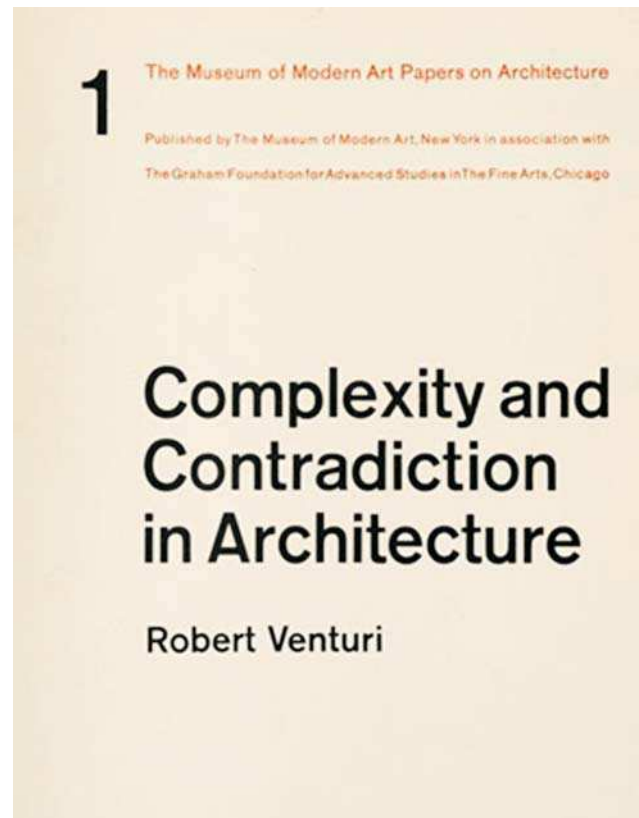
Re-published in 2002 by the Museum of Modern Art (New York)

Reviewed by Humaira Nazir*

Robert Venturi, one of the twentieth century's great architectural icons, wrote the most significant treatise entitled "Complexity and Contradiction in Architecture" that was first published in 1966. This impressive book has been translated into sixteen languages and has become a significant source of architectural literature. The writer, Robert Venturi, a prominent postmodernist, a symbol of American architecture, and theorist was born in 1925 in Philadelphia. As an undergraduate, he studied Architecture at Princeton, and in 1950, he received the highest distinction for his MFA degree from the same University. He served faculty positions at Yale and Harvard and trained under Eero Saarinen and Louis Kahn before starting his own practice. He established his architectural firm in 1964, directing it from 1967 to 2012, with his spouse Denise Scott Brown and in 1991 he received the renowned Pritzker Prize for Architecture.

Venturi explored the concept of how complexity and contradiction in architectural form. He questioned the orthodox modernism and ventured into possibilities of how more sense can be created in architecture rather than only the simplified form pursuit. He felt that Modernist movement in its effort to push away from traditional and start from scratch, failed to sustain the nature of architecture. He discussed ideas and proverbs, like "the difficult whole and less is a bore", which eventually became theory of architecture and inspired numerous post-modernist architects.

This book is presented in a unique architectural text in which Venturi backs his arguments with illustrations of buildings. It offers a poetic perspective on the complexity, as to how architectural form takes place, and then the function of symbolism in the process of design. It reconfigured architecture, by relooking the simplistic conversation in modernism into a reconnection with history, decoration, ornament and complexity and contradiction. Criticism of modern architecture and search for postmodern architectural elements, focused on complexity and contradiction, is the core idea of the Book. The Book has eleven chapters and



three hundred and fifty black and white architectural photos, ranging in types from images, architectural plans and elevations to rough sketches. Some of these sketches have been made by Venturi himself in order not just to clarify his arguments but also to make them digestible, serving as historical references and highlighting the ideas of the author.

In the introduction to the Book, Vincent Scully writes, "potentially the most significant literature on the making of architecture" after Le Corbusier's *"Towards a New Architecture,"* printed in 1923. Scully indicates that while Le Corbusier promoted a "noble purism," the approach of Venturi is opposite: he believes that architecture should accept the complexities and contradictions of urban reality. The introductory Chapter concludes with the statement,

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that creating and experiencing architecture are often "critical-historical actions," and the power and meaning of our interaction with buildings must rely on knowledge of history. Venturi's opening part, after Scully's introduction explains complexity and contradiction as an effort at architectural critique and an explanation for his work. Complexity and Contradiction thrives in utilizing historical knowledge to enhance understanding of architecture as a profession.

The initial chapters of the book are well written, relatively concise and relevant to contemporary architecture and design. Here Venturi admits his emotional appeal for complexity and contradiction and demonstrates the periods of western history that illustrate the best of architecture: Mannerism, Baroque and Rococo. The chapters One and Two are formalistic criticism of the rigid hegemony of the architecture of modernist philosophy, stating that "simple is always better" and that "form must follow function". He discusses architecture as the only place where unnecessary and simple development takes shape, in both thought and material reality. All other types of art embrace and encourage complexity in their art form, particularly in the multitude that arises in poetry, fine arts, and even in mathematics, where there is an emphasis on building on the variety of possibilities. He respects simplicity, and for him, an inner complexity achieves true simplicity. The Doric temple, for instance, is an example of Venturi's rationale, implying that the temple as a whole elicits harmonious simplicity via a distorted form and internal tension (complexities and contradictions). The initial Chapters conclude that the design of complexity and contradiction has a special responsibility towards the whole, it must represent inclusion instead of the simple unity of exclusion, thus "more is not less".

Chapter Three, "ambiguity," is appropriately named and it is self-descriptive. Venturi explores the "gap between physical reality and psychological impact" characterized by the conceptual expressionism of the innovative art world that has already successfully mastered the concept of conflicting tension, paradox and contradiction, aiming at dramatic creativity and chaos. In Chapter Four, Venturi states that a design paradox is indirect and is dictated by "yet". For example Villa Savoye is inwardly simple but complex on the outside. The buildings of Barrington Court are symmetrical though asymmetrical. Kahn used simple concrete and polished granite in his buildings. While "either-or" generally characterizes modern architecture, contrary elements of design tend to contain "both - and".

Chapter Five is a continuity of "contradictory levels", introduced in Chapter Four. Venice's Ponte Vecchio has been quoted as a clear example of multifunctionality. A bridge,

an arcade, shops and boat piers present a 'whole' design. According to Venturi, symbolism or value could be as essential as function, in short, a gateway. He ends the Chapter by acknowledging Mies's I-beams as components of rhetoric, ornamented by Mies. One of Venturi's most fascinating Chapter's is Chapter Six, "the conventional element." About order, he cites Mies, lamenting on our time's uncertainty, and Kahn saying that order does not equal to orderliness. He further explains, "should we not search in the complexities and contradictions of our times for meaning? which would explain breaking the order. There needs to be order before it can be broken. If conditions contradict order, order will bend and break. Breaking the order strengthens meaning. Formalism is pure order; no order is chaos." In clear support of the context, this beautifully written and debated paragraph is accompanied by case studies of buildings designed by both Le Corbusier and Alvar Aalto.

Venturi acknowledges a compromise in architecture in Chapter Seven, citing the example of the curved front on Palazzo Massimo to suit the street line, that he relates to as an adapted contradiction, an arrangement, a solution without a loser or winner. In Chapter Eight, shock treatment ranging from rhythms, directions, scale and function in contradiction, from Michaelangelo to Gaudi to Cubism, have been cited. In Chapter Nine, Venturi discusses the flowing space, harmony between outside and inside, as one of the achievements of the modern movement. The examples in this Chapter demonstrate ways of differentiating between spaces with focus on light from the exterior. In Chapter Ten, Venturi informs us of the aim of unity besides simplification, debating the challenging unity of inclusion instead of the simple unity of exclusion, and the Gestalt's psychology that a whole is a product that is more than the sum of its elements. The book ends on Chapter Eleven with simple design examples by the writer. He includes the example of the Vanna Venturi House, showing typical concepts of the residence (pitched roof, chimney), its links to historical buildings (arch, lintel, and keystone ornamentation) and spatial 'complexities and contradictions', like his staircase that leads nowhere.

Overall, the book is practically an ideal book of theory. It also makes one appreciate post-modernism and post-modern art theory, literature and music. Venturi's arguments are bold and straightforward and supported by the first-person narrative. The key points are very simple to grasp and are based on a valuable interpretation and framing method. I admire his pragmatism in this brief yet sweeping analysis of the connections between architectural forms. His methodology is encyclopedic and his focus has spread around the globe, and among poles on the timeline, from the

centralized gates of the Temple at Edfu to the house he constructed for his mom in the outskirts of Philadelphia. The most fascinating aspect of the book is the critical analysis of Venturi's numerous projects and how he "reads" those as an architect. For instance, the book clearly shows how to view two neighboring and similar buildings, as not only symmetrical but also having a "duality" in demand for "design."

The ending of the book, is a way to know how his ideas are interpreted into the built form, but it is felt that most of his projects do not achieve the same degree of complexity as those mentioned in the book or the contradiction is simply too easy to read and does not add sense to the whole. Another drawback is that frequently the author dwells too long into a simple argument. Additionally, the biggest error in the book is that the built work examples are right at the end, and consists of small images of some remarkable buildings that could have been adequately detailed.



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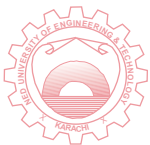
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