

Metro Induced Impacts on Historic Buildings: A Case Study of Dai Anga Tomb (Lahore)

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Abstract: The threats to historic urban areas generated by new infrastructure and urban development have been of apprehension to the communities since the mid-1960s. Since that time, developing perceptions of urban ritual conservation and its role in urban restoration and regeneration have been talked through global, regional and local ideologies and direction for the amalgamation of those new developments into the historic environment. Over the last decade, the urban protection challenge has grown up to a critical scenario due to hasty urbanization that lead into muddled development and revolution of cities globally. Conserving significant urban milieus at this time is one of the most crucial and thought-provoking cultural heritage conservation issues met by the communities universally. The historic city Lahore, considered to be the cultural capital with large number of Mughal's monuments, Unfortunately, affected by the Infrastructural development of the modern time period. Infrastructural development, environmental degradation, decay and aging along with negligence are being faced by the numbers of historic buildings in Lahore. The obtained result through GIS mapping depicted the increase in vehicular traffic and air pollution due to infrastructure development (27.1 Km orange line metro). Polluted environment severely damaged the historic buildings along the G.T road Lahore especially the selected case study area comprising of Gulabi Bagh Gateway and Dai Anga Tomb.

Keywords: Urban development, Historic, Environment, Cultural, heritage, Vehicular traffic

I. INTRODUCTION

With the hasty expansion of the urban rail transit system and the construction of buildings, ground-borne effects induced by subway trains and their influence on building structures have become major environmental concerns in urban areas. Usually, it is very rare for vibrations from train maneuvers to cause any sort of building damage, even minor cosmetic damage [1]. Nevertheless, there is from time to time an apprehension regarding long-term vibration effects on historic buildings located near the subway lines. Traffic vibrations are usually low, but lasting, which could lead to potential damage, like building material fatigue and foundation settlement to historic buildings. For structures that have suffered from weathering, desquamation, or have cracks, even low velocities could give rise to fatigue damage with frequent occurrences. In Europe, damage to some historic buildings caused by road traffic has been reported by Bata (1971) and Clemente and Rinaldis (1998). To protect heritage buildings against traffic-induced vibrations, many studies have been performed in Great Britain, Italy, and Spain (Ellis, 1987; Bazaco et al., 1995; Chiostrini et al., 1995; Sanò et al., 1998; Crispino and D'Apuzzo, 2001; Pau and Vestroni, 2008). In China, there has been doubt that the rapid development of desquamation and cracks of frescoes and sculpture are related to the traffic vibrations in the Longmen Grottoes and Dunhuang Grottoes. Some Journal of Zhejiang University-SCIENCE A (Applied Physics & Engineering) ISSN 1673-565X (Print); ISSN 1862-1775 (Online) www.zju.edu.cn/jzus; www.springerlink.com E-mail: jzus@zju.edu.cn * Project supported by the National Natural Science Foundation of China (No. 51008017), and the Fundamental Research Funds for the Central Universities (Nos. 2009JBM074 and 2009JBM075), China © Zhejiang University and Springer-Verlag Berlin Heidelberg 2011 Ma et al. / J Zhejiang Univ-Sci A (Appl Phys & Eng) 2011 12(10):782-793 783 studies have indicated that, by the vibration of railway and highway, the disasters to the historic structures from vibration in the last 30 years has exceeded the total experienced in the prior 1000–1500 years (Zhang, 2002; Lei et al., 2009).

Orange line metro train is one of the first ever mass transit system links the one end of Lahore from Raiwind passing through center of Lahore and connect it to Grand Trunk road in the end at Dera Gujran[24]. [15] The project is being completed with the mutual partnership of Pakistan and Chinese governments with the financial cooperation of Exim Bank of China. In the context of China-Pakistan economic corridor's development. The expected user turnover in this 27.1 Km long corridor is almost 25000 passengers a day which will expected to be double up-till 2025 estimated to be completed in 27 months by the end of the year 2017 still delayed due to instable political and economic conditions. [9],[12],[13]The environmental impact assessment report gave certain suggestions and recommendations in order to provide fruitful results about the physical, biological and sociological impacts, may be caused during the execution of the project Government of Pakistan has made enactment 1997 regarding the protection and conservation of the historic buildings of historic areas and and to protect the surrounding environment in Antiquity Act and provide environmental protection Act 1997 to protect the monuments from the environmental hazards, necessary to conduct primary and secondary surveys and take prior permission before project execution and after the full completion [2].

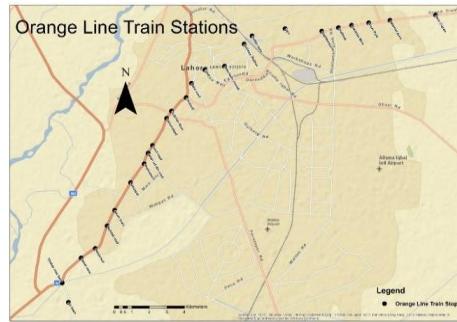


Fig.1: Source: generated by the author

- The main purpose of the orange line metro is to provide the safe and convenient journey to the users. The marked locations of the stations along the routes depicts the quick transference of passengers in rapider distance, Eminence public conveyance with environment responsive establishment Provision of safe conveyance
- Reduction in congestion and travel time
- Reduction in fuel consumption

There was not a comprehensive project implementation plan. Environmental problems are being generated due to rapid urbanization trends in developing countries like Pakistan[20],[2]. The Global carbon cycle is disturbing due to the increasing trend in CO being produced by human induced activities and urban development[16]¹.The land cover change depicts increasing trend in land-use change determining the effects of modern urban growth on adjacent atmosphere[19]. The area selected for study represent the historic district consist of number of historic buildings and structures from ghari Shahoo to Shalamar Garden along the Grand Trunk Road (G.T Road².The famous conservationist Professor Kulbhashan jain describes that there should be proper conservational plan divided into different steps as a whole to the smallest part as a sculpture conferring to the historical identity to embrace the historic urban conservation phenomenon.[4],[22] A conservationist or a historic manager should enlist the structures of historic importance according to their identity, morphology and typology, there future capabilities and present conditions. [23]The high accelerated and heavy vehicular traffic may cause damage to the structures of highly important historic buildings having high growth forces of the historic district to the city itself [9],[20]. Urban development in the form of visual intrusion, encroachment and vibrational effects may cause damage and disturbance to the historic structures within the range of 200' of its happening, and government agencies should be taken care of it.[19],[26],[27],[28],[30]The situation is worst in the case of a developing county like Pakistan, where priorities to the preservation and conservation of historic structures are least bothered. The Venice and charter. The international charter which complement the Venice Charter provide the ways and approaches to form and safe-guard the historic districts. ICOMOS charter is also implemented in Pakistan and Antiquity Act 1971 is used to safeguard the historic structures, monuments and historic districts to prove its role in urban and regional planning & development.

Anything which is more than 100 years of age and have some social, architectural, cultural, economic, emotional and cultural impacts is called the historic[3].

The process of describing the boundary or the outer edge of any building or area is called the boundary delineation.

The historic preservation & protection are the programs and tools which can be done with the help of public private partnership and community mobilization for the conservation of historic districts and structures (german historic protection chapter4). Decay is prevented by the conservation actions.[3]

A group of historic buildings, a full neighborhood, land scape or a streetscape and collective sites, which are culturally, historically and architecturally relate with one another are called a historic district.

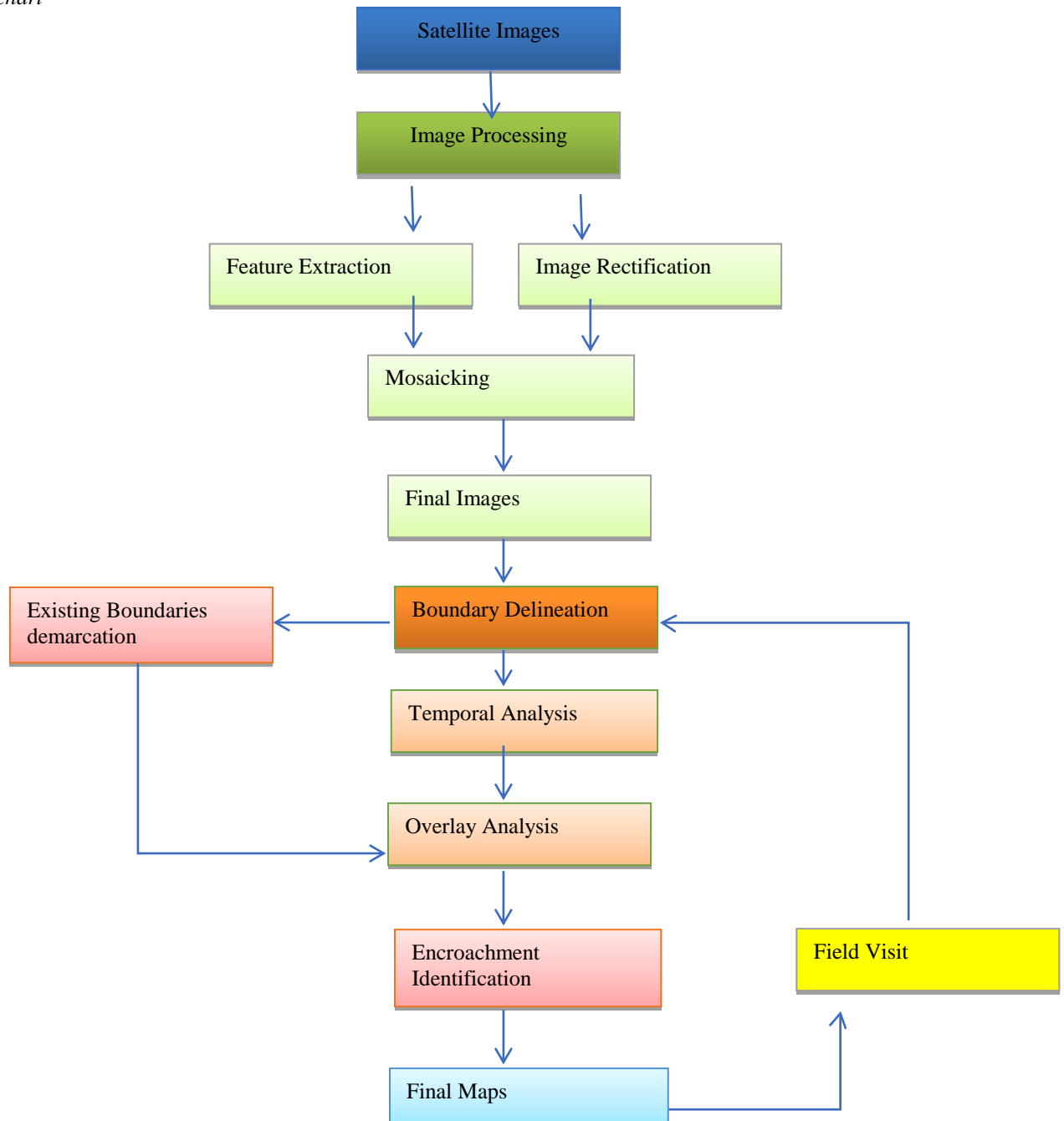
Architectural integrity, uniqueness and cohesiveness are the basic characteristics of any historic center or historic district. [3],[13]The form of the historic district may be the simplest and each historic district has its own preservation objectives, [4],[16],[18]The selected historic district is of esteemed importance due to the Mughal era monuments, which are rich in building style and architecture, creating a rich feeling of integrity, continuity, belonging and visual continuity and value as well. [5],[16]These structures contain Archaeological and historical morphological detailed information and need special attention and care by professionals. [6]In order to reduce the harmful effects of urban development and commercialization in the historic district of any historic city throughout the world.[8],[9] There are certain historic boundaries followed by certain designated criteria with consistent design elements, thematic behaviors, well designed construction period and architectural style etc are certain basic elements which are considered to be adopted for the declaration of historic districts. The selected area can be

considered as a historic district as it contains almost all the features of an antique historic districts³. Metro induced threats were addressed by different protestants in several protests in Lahore in order to review the Metro route for the safeguard of these cultural sites. The activists said that they were not against the modern urban development but were in a favor of historic site's protection which were under threat of disruption along the Metro's route, which was a clear violation of Antiquity Act 1975 Section (22) does not allow any construction within the distance of 200 feet considered to be a blatant violation of international laws prevailing in the country for the the protection and conservation of historic heritage sites. There were various professional organizations like (PCATP) Pakistan Council of Architects and Planners, (IAP) Institute of Architects and Planners, Union of international architect, human right commission and various national and international agencies of Public and private categories were protested against this inappropriate development in Lahore, which is questionable as the government is violating the law made by herself for the protection of heritage sites. It was claimed that the remedial measures of the pollutants created during the construction work were not addressed properly in the environmental impact assessment (EIA) report. The members of Lahore Bachao Tahreek and other protestants were worried about the particulate matters being produced during the construction work and traffic delays which were produced during this development work, negatively effects the precious structures[12]. Polythene curtains and temporary fencing were not provided in dense areas like Lakshami chowk , Chauburgi and the Shalamar garden (Mughal Pura) along the route to protect the sites from pollutants. The honorable court also have given the verdict against the Orange line Metro construction as illegal besides the historic structures falling within the range of 200 feet distance. [29], [30]Conservationist along with the LDA authorities prepared different conservation plans to protect the historic structures along the routes to fulfill the legal requirements. A prestigious, unique, authentic heritage historic district can safeguard the historic resources and built heritage. It is an important tool for the city administration to restrict the mismatched zoning, inappropriate alteration, over development, protection of original structures which will ultimately be enhanced economic value and investment, which ultimately leads towards the savings of tax[13],[15], community organization, safeguard the traditional architecture style and protection the historic conservancy and prevention from the devastation of these monuments, better sagacity of affiliation in buildings and structures⁴.The residents along with the mutual cooperation of city administration and local authorities can maintain and develop, restore, preserve and reconstruct the historic district[17]. Fielden in his book illustrate that through the efficient and up to date utilization of historic assets the cultural value of the area can be enhanced (fielden, 1989, p. 99) The building having not significant historic importance apparently altered to be of historic importance should be discouraged and any structure should depict the history of its time of original formation[21],[22].

[41]Dai Anga tomb and Gulabi Bagh gateway is situated at $31^{\circ}34'44.83''\text{N}$ and $74^{\circ}51'38''\text{E}$ in the city of Lahore, Pakistan at the northern side of the Lahore G.T road. After the construction of Shah Nahar in 1639-1640 and the development of Shalamar Garden in 1942 the area was given special attention by the royal elite of the Mughal era and developed as an elite neighborhood, A lots of gardens, structures, mosques were developed afterwards. The present gate Gulabi bagh was constructed in the year 1065 in the memorial of honorable Persian Mirza sultan Baig who was the companion of the king Shahjahan son in law Ghiyasuddin Mirza. Gulabi Bagh was a big garden at that time at the Chaharbagh pattern with central baradari, radial walkways, a pavilion, fountains and the number of wells to water those fountains and garden as well⁵ (Latif, 1981). The garden was converted into a funary garden after the death of Shahjahan wet nurse Sharfunisa (Dai Anga) in 1671. The foundation stone of Begumpura was laid down as an elite class neighborhood after the death of Nawab Saifudaula's (1707-1737) wife Nawab Begum. The Gulabi Bagh sustained as the same till 1900 and converted into a police station during the colonial period⁶. It is well described in Naqoosh that the garden was rightly conserved till 1927, but due to vandalism and encroachment after partition its originality cannot be retained with the passage of time⁷. The monument is encroached by the adjacent neighbors with increasing trend and the site is fully lost its spatial relationship with the other design elements. (Management Guidelines for World Cultural Heritage). The 59'-0" squared chamber single storied tomb have 28'-0" diameter doubled chambered dome with total height of 18'-9" with stairs and archways.

II. MATERIALS & METHODS

A. Flowchart



B. Choice of The Extent

Study area selection for the priority of analysis the historic site's identification and selection was necessary for the delineation of the boundaries of the historic sites. Certain points need to be studied which are as follows.

- Choosing an overall site
- Demarcating definite limits
- Restrictive the size

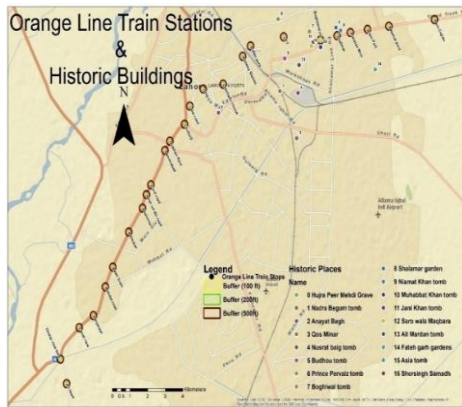
As Lahore is an historic city, there are numerous monuments and historic sites for the selection but the study was focus about the Mughal sites along G.T road and along the Orange Line Metro train route

Following points should be considered for the selection of the area

- Privileged time
- Inside suitable funds
- untroublesome scale

III. RESULTS

The List of identified Historic places is mentioned below:



FID	Shape *	OID_	Name
0	Polygon ZM	0	Nurat Baig tomb
1	Polygon ZM	0	Shrine of Shah Bilaw al/Shersingh Samadh
2	Polygon ZM	0	Shalimar garden
3	Polygon ZM	0	Qos Minar
4	Polygon ZM	0	Asia tomb
5	Polygon ZM	0	Shrine of Jani Khan-2008
6	Polygon ZM	0	Hujra peer mehdi grave
7	Polygon ZM	0	Nadra Brgum tomb
8	Polygon ZM	0	Anayat Bagh
9	Polygon ZM	0	Bodhou tomb
10	Polygon ZM	0	Prince Pervaiz tomb
11	Polygon ZM	0	Bogiv al ttomb
12	Polygon ZM	0	Namat Khan
13	Polygon ZM	0	Ali Mardan
14	Polygon ZM	0	Fatehgar gardens
15	Polygon ZM	0	Shrine Jani Khan tomb new
16	Polygon ZM	0	Muhabbat khan tomb new



Fig.2 Source: generated by the author

IV. CONCLUSIONS

The orange line train stations have been marked and the historic buildings were also identified. The buffer around the stations of 1500, 1000, 500 and 200, 100 feet distance were drawn and it is obvious that almost nine historic buildings are falling in the 1500 feet buffer and four historic building are falling with in the diameter of 200'. Dai Anga tomb is one of them, which is the violation of AntiquityAct, ICOMOS charter and Bora charter

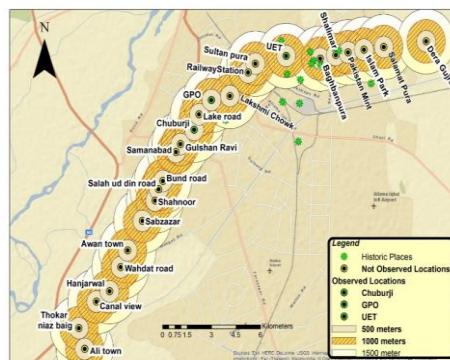


Fig. 3

The rain water and other weather effects are directly effecting the monument and internal masonry due to the deteriorated external finished layer of the structure. The seeping down of rain water directly from the roof and absorption from the ground is clearly seen in the structure. Thermal variations, moisture and vibrations are different irritants which disturb the historic structures and causing cracks in it. Archaeological department is responsible for the maintenance of the remaining garden along with the Pakistan Horticulture Authority with the development of limestone patch work.

During the short term or immediate action plans the lime plaster is done to protect the structure for further decay and detailed longterm plans are prepared to protect and restore the decayed and broken parts of the structures, like Kashi Kari, plaster work with the similar construction material. The effects of vibrations on human and structures are devastating if it cross the limits of 65 decibels and the vibration impacts of the nearby road side traffic is more than 5mm and presently it is 0.33 mm which is within the range. The present urban development is creating visual pollution which has snatched the visual identity of these

marvelous historic structures. The presence of gardens of these elegant structures are no more and the boundaries are going to be shrinking continuously.

V. RECOMMENDATIONS

Three R principle concepts should be kept in mind while developing which is reflect the identity you keep. Resist for any change going on in your cultural identity. Restore the identity. Comprehensive planning approach along with the formulation of inventory of historic sites is recommended.

Community participation with public awareness and coordination of local council and their future plans about the preservation of historic sites and let the community aware about the benefits for the preservation and restoration of historic sites.

Tax benefits identification in the restoration work within the historic district.

Enable local governments to prepare conservation and rehabilitation plan at their own in the area of jurisdiction. Zoning byelaws for historic districts should be formulized.

A comprehensive transportation plan should be formulated by the relevant government departments while keeping in consideration of the historic sites with implementation of proper visual and emission standards.

There should be a road map to protect the historic sites from the effects of noxious gases due to the increase in number of pollutants in the city. The deteriorating air quality may reduce the sustainability of the old decaying buildings by the reaction of old construction materials and vehicular fumes and polluted air.

Urban and regional planning process should directly be linked with the protectection of historic districts in the long term planning process.

Better living and sustainable environment should be provided to the residents of historic districts.

Social and cultural diversity should be encouraged. The distinction between the historic district and overall city districts should be clear and distinct.

A collaborative comprehensive and collective vision of the public departments with true professional approach, along with the bureaucracy and Government representatives is the need of the hour.

Proper financial management plan for the maintenance of a historic district by the local and city district government[40],[42].

A comprehensive training and workshop and research award program for higher studies in urban conservation and restoration projects. Adaptation of cultural conservation strategies is the need of the hour to map the culture is also a need of the hour along with the protection of historic district from subdivision by the provision of tax rebate for the promotion of cultural system and climate.

[23]A comprehensive and balance regulatory approach for the protection of historic districts, property tax and other tax incentives for good land stewardship and property tax relief for conservation policy. A designed national conservation policy should respect the significant traditional values, environmental quality, social equity, road standards kin design, construction and reconstruction.

Conservation projects should be integrated with the school's scouting projects along with the cooperation of industry and civic organizations for the active movement of more historic Lahore.

The laws which are being mentioned in the Antiquity Act should be implemented in a strict way. [26] The sensitivity of the Orange Line Metro project with reference with UNESCO should be dealt in serious consideration of Antiquity Act. The results of buffer analysis depict the serious violations of Antiquity Act as 4 out of 28 buildings in the study area are in the range of 200 feet diameter which is a clear-cut violation of conservation laws.

There should be scientific solutions for protection of historic sites along with the sustainable urban development [38],[39].

[40],[42] Urban development should be done with the promise to safeguard the cultural heritage.

The future of urban environment relates with the promise to conserve heritage. The specificity of our heritage structures results in the authenticity of the culture. Pakistan is a diversified country in culture tradition and heritage; it is a tight rope for the conservationist to work between the positivity of heritage and modern urban development.

REFERENCES

- [1] Hickel, J. (a4 January 2017). How poor Countries develop Rich Countries. Global Development professional Network.
- [2] DAWN. (2014, March 22). Pakistan China signed Pact on Orange Line Metro. Retrieved from <http://www.dawn.com/news/1107936>
- [3] fielden, B. (1989). Guidelines for Conservation (Vol. first). New Delhi, India: Raj Press.
- [4] Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability.
- [5] (OECD). (2012). Redefining "Urban": A New Way to Measure Metropolitan Areas. Organisation for Economic Co-operation and Development. OECD Publishing.(2016, 07). Retrieved from www.quora.com: <https://www.quora.com/topic/Developed-Countries>
- [6] A, T. (2017). Crowdsourcing, Sharing Economies and Development. Journal of Developing Societies, 33(2), 191-222. doi:10.1177/0169796x17710072
- [7] Almhafdy, N. (2013). Analysis of the courtyard Functions and its Design Variants in the Malaysians Hospitals. Asia Pacific International Conference on Environment-Behaviour Studies, (p. 12). London.
- [8] Agha, R. (2015). Traditional Environment Perform ance:. Journal of Sustainable Development, 8(8), 28.
- [9] Ali, H. T. (2013). The Climatic Considerations for Planning & Architecture of the Traditional Arab City. Al Rafadain Engineering Journal, 1(21).
- [10] Althor G, Watson JE, Fuller RA. (February 2016). Global urden of climate change mismatch between greenhouse gas emissions and the. Scientific Reports. doi:10.1038/srep20281. PMC4742864. PMID 26848052
- [11] AMEPM. (2009). Educational Planning and management Report.
- [12] Angel, S. J. (2011). Making Room for a Planet of Cities, policy focus report. Lincoln Institute of Land Policy. Cambridge, MA.
- [13] Angel, S. J. (2011). The dimensions of global urban expansion: Estimates and projections for all countries, 2000-2050 (Vol. 75).
- [14] Balilani, B. E. (2011). The role of in between spaces in Shaping the identity of the spatial extent of Iranian Historical Contexts Tehran: Khak Publications.
- [15] Bank, W. (2019). World Bank country and Lending Groups. World Bank.
- [16] Batool. (2014). Quantifying environmental performance of jali screen facades for contemporary buildings in Lahore, Pakistan.

- [17] Batty, M. (2008). The size, scale, and shape of cities. *Science* (Vol. 319).
- [18] Benyus. (2008). A good place to settle: Biometric, biophilia and the return to nature's inspiration to architecture. (N. Hoboken, Ed.) Wiley.
- [19] Chen, N. Y.-P. (1994). *Urbanization Prospects for 21st Century*. Washington, D.C: Islan Press.
- [20] Chen, N. Y.-P. (1998). What do we know about recent trends in. New York: Richard Bilborrow.
- [21] Coates, G. J. (2014). Deep beauty, toward a sustainable and life enhancing architecture of place. Kansas State University, Department of Architecture, Manhattan, KS.
- [22] Cooper, I. &. (1998). *Traditional Buildings of India*. London: Thames and Hudson.
- [23] danan Gu, Patrick Gerland, Francois Pelletier and Barney Cohen. (2014). Risks of Exposure and Vulnerability to Natural Disasters at City Level. Technical Paper, United Nations, Population Division, Department of Economic and Social Affairs, New York.
- [24] DAWN. (2014, March 22). Pakistan China signed Pact on Orange Line Metro. Retrieved from <http://www.dawn.com/news/1107936>
- [25] De la Riva, R. (1997). *Housing A Renewed tradition*. Ottawa: Plex. Dekay, M. B. (2013). Sun, wind, light: architectural design strategies. John Wiley & Sons.
- [26] Department, I. a. (2008). Surface water Industrial and Municipal Pollution in Punjab. 1-132. Punjab, Pakistan: Directorate of land Reclamation .
- [27] Dyson, T. (2011). The role of the demographic transition in the process of urbanization. *Population and Development Review*.
- [28] Fund, I. M. (2009). Way Back to machines. World Economic Outlook Archived, International Monetary Fund. Retrieved September 2011 german historic protection chapter4. (n.d.).
- [29] Government, C. D. (2009). City District Government. Lahore: National reconstruction Bureau, Government of Pakistan.
- [30] Grauman, J. V. (1976). Order of magnitude of the world's Urban Population in History. *United Nations Population Bulletin*.
- [31] Grübler, A. a. (2013). *Energizing Sustainable Cities: Assessing Urban Energy*. Abingdon, United Kingdom: Routledge.
- [32] Gu and others. (2015). Risks of exposure and vulnerability to natural disasters at the city level: A global overview. *Natural Disaster cities*. Retrieved from <http://esa.un.org/unpd/wup/Publications/Files/WUP2014-TechnicalPaper-NaturalDisaster.pdf>.
- [33] Hanushek. (2008). Economic growth in developing countries. Retrieved from <https://hanushek.stanford.edu/sites/default/files/publications/Education%20and%20Economic%20Growth.pdf>
- [34] [34]hanushek.stanford. (2018). hanushek.stanford.edu. Retrieved from hanushek.stanford.edu: <https://hanushek.stanford.edu/sites/default/files/publications/Education%20and%20Economic%20Growth.pdf>
- [35] Harries, K. (1993). Thoughts on a non-arbitrary architecture, Dwelling, Seeing and Designing. *Towards a Phenomenological Ecology*, pp. 41-59.
- [36] HDRO. (2018). Human Development Indices and Indicators. Human Development report Office. UNDP. Retrieved September 14, 2018
- [37] Helsinki. (1998). *Cities Designed for Winter*. Jorma Manty & Norman Pressman (Eds).
- [38] Hillier, B. &. (1982). *The Social logic of Space*. Cambridge: University of Cambridge Press.
- [39] Hosey, L. (2012). The shape of green. In *aesthetics, ecology and design*. Island Press.
- [40] Koch, S. (2015). From Poverty Reduction to Mutual Interests? The Debate on Differentiation in EU Development Policy. *Development Policy Review*, *Development Policy Review*. doi:10.1111/dpr.12119
- [41] Latif, S. m. (1981). *Remains of Lahore*. (N. I. Press, Ed.) Lahore, Punjab: Sh. Mubarak Ali, Oriental Publisher and book seller.
- [42] *Management Guidelines for World Cultural Heritage* (Vol. 74). (n.d.).
- [43] Shao M., T. X. (2006). City Clusters in China. *Frontier in Ecology and the Environment*, 4, 353-361.
- [44] Tadjell, C. (1990). *The history of architecture in India*. Architecture Design and Technology Press.
- [45] Turok, I. &. (2007). The trajectories of European cities, 1960-2005. *Cities, The International Journal of Urban Policy and Planning*, 165-182.
- [46] UN. (2014). *Urban and Rural Areas 2014*. United Nation, Department of Economic and Social Affairs. New York: 14-57760—October 2014—2,000. doi:14-57760—October 2014—2,000
- [47] UN HABITAT. (2018). *UN HABITAT FOR A BETTER URBAN FUTURE*. United Nations Human Settlement programme. Nairobi, Kenya: United Nations Human Settlement Programme. Retrieved from <http://wcr.unhabitat.org/quick-facts/@unhabitat.org>
- [48] Vazquez ST, S. A. (2013). Revisiting the Meaning of Development: A Multidimensional Taxonomy of Developing Countries. *The Journal of Development Studies*, 49(12), 1728-1745. doi:10.1080/00220388.2013.822071
- [49] WCLA. (2014, September). Retrieved 2018, from <http://www.walledcitylahore.gop.pk/>
- [50] Wolff, M. (2012). Strengthening the evidence base for regeneration strategies: the European statistic as a basis for creating territorial knowledge of demographic change. In (C. Cristina Martinez-Fernandez, N. Kubo, & A. &. Noya, Eds.) *OECD Local Economic and Employment Development (LEED) Working Paper Series*.