International Journal of Architectural Research

Architecture Planning
Built Environment Studies

An International Fully Refereed Journal
Published three times a year
http://www.archnet.org

Chief Editor
Ashraf M. Salama

Includes
Regular Refereed Papers
Review and Trigger Articles

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ArchNet International Journal of Architectural Research

ArchNet-IJAR

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## Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Culture, Whose Space and Which Technology?</td>
<td>7/19</td>
</tr>
<tr>
<td>The Contested Transformation and the Changing Historic Built Environments of South Asia</td>
<td></td>
</tr>
<tr>
<td><strong>Tasleem Shakur, Ishrat Islam, Javeria Masood</strong></td>
<td></td>
</tr>
<tr>
<td>Economy, Environment, Culture: Global Dreams by Two Asian Cities</td>
<td>20/41</td>
</tr>
<tr>
<td><strong>Mahbubur Rahman</strong></td>
<td></td>
</tr>
<tr>
<td>Participatory Planning at Mesa-Koru: Toward a More Sustainable Future</td>
<td>42/56</td>
</tr>
<tr>
<td><strong>Aydin Özdemir, Metin Başal, Fürüzan Aslan</strong></td>
<td></td>
</tr>
<tr>
<td>The Role of the Liveable Promenade in Revitalizing an Entertainment Tourism City:</td>
<td>57/74</td>
</tr>
<tr>
<td>The Case of Sharm El-Shaikh, Egypt</td>
<td></td>
</tr>
<tr>
<td><strong>Khalid  S. Al-Hagla</strong></td>
<td></td>
</tr>
<tr>
<td>Controllability of Traditional Neighborhood and its Simplified Layout</td>
<td>75/84</td>
</tr>
<tr>
<td><strong>M. Salim Ferwati</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Samra M. Khan</strong></td>
<td></td>
</tr>
<tr>
<td>Sustainable Architectural Design:</td>
<td>99/110</td>
</tr>
<tr>
<td>Reviving Traditional Design and Adapting Modern Solutions</td>
<td></td>
</tr>
<tr>
<td><strong>Ibrahim Mostafa El Demery</strong></td>
<td></td>
</tr>
<tr>
<td>The Meanings of Dwelling Attributes for Temporary Residents from</td>
<td>111/129</td>
</tr>
<tr>
<td>Different Cultures: The Case of Korean Temporary Residents in the United States</td>
<td></td>
</tr>
<tr>
<td><strong>Eunsil Lee and Nam-Kyu Park</strong></td>
<td></td>
</tr>
</tbody>
</table>
Comprehensive Environmental Design (CED) Studio in Two Architecture Schools in Karachi: Evolution, Process, and Impacts  
Noman Ahmed  

Assessment Tools: Mathematical Factorial and Adjacency Distribution Theory for Housing Typology in Gaza City  
Emad S. Mushtaha, Mohammad Arar, Faisal Hamid  

History, Morphology and Perfect Proportions of Mughal Tombs: The Secret to Creation of Taj Mahal  
Krupali Uplekar Krusche, Danny Aijian, Selena Anders, Iva Dokonal and Jill Kapadia  

Re-Usability of High-Rise Buildings: A Case Study of the Arts Tower in Sheffield, United Kingdom  
Ali M. S. Kashkooli and Haşim Altan  

Review and Trigger Articles  

An Architectural Analysis: The Museum of Contemporary Art, Tehran, Iran  
Kambiz Navai  

The Generative Nature of Islamic Rules for the Built Environment  
Besim S. Hakim  

Cultural Evolution and the Arab House in Egypt  
Book Review: La casa araba d’Egitto: costruire con il clima dal vernacolo ai maestri contemporanei by Adelina Picone  
Ashraf M. Salama
WHAT CULTURE, WHOSE SPACE AND WHICH TECHNOLOGY?
THE CONTESTED TRANSFORMATION AND THE CHANGING HISTORIC BUILT ENVIRONMENTS OF SOUTH ASIA

Tasleem Shakur, Ishrat Islam, Javeria Masood

Abstract
Based on two case studies in Dhaka (Bangladesh) and Lahore (Pakistan), this paper attempts to illustrate how the emerging cultures and spaces are continuously either negotiated or contested (Shakur, 2008). Historic Mughal city of Lahore (Pakistan), once the cultural capital of Asia, has expanded speedily over time. A prominent example of such a case would be Anarkali, a vibrant bazaar from the 17th century. Anarkali has adapted the modern living in a disorganised manner. Even today the inner you go to these galli mohalla, the richer the environ gets as a lot of old residents have still kept on with the indigenous aspects. A thousand miles away in the east but in a similar cultural setting of Lalabagh (in old Dhaka, the capital of Bangladesh) is considered as one of the prime icon of Mughal architecture in Bangladesh. The magnificent fort, since 1678 experienced changes in socio-political and cultural contexts. The surrounding built environment has significant visual impacts on the inside space characteristics of the conserved fort. As a result, contradiction among the old and new, complexity between the space uses and the incongruity between architectural language raises question regarding appropriateness of this historic structure in its present milieu.

Keywords
Architectural language; contested space; cultural representation; post-modernity; regeneration; hybrid infratstructure.

Introduction
While the slums and squatter settlements of the developing world had been steadily increasing with densification and lack of infrastructure despite intervention by non-government and aid agencies, the historic mixed urban areas seem to have a different trend (Shakur, 2008). The South Asian subcontinent contains a glorious socio-cultural and political history. Monuments erected in various historic periods still carry the essence of the past. As a part of the subcontinent, Dhaka and Lahore are heir to a very old and rich heritage. Based on two case studies in Dhaka (Bangladesh) and Lahore (Pakistan), this paper attempts to illustrate how the emerging cultures and spaces are continuously either negotiated or contested through various socio-economic, political, cultural and aesthetic factors with their implications from local to international world.

Background of Lalbagh Fort and Anarkali Bazar
Much of Dhaka's historic past has been eroded both by human and natural forces. Lalbagh
Fort or Fort Aurangabad is one of the glorious examples of Mughal structures. Construction of the Fort at Lalbagh was undertaken by Shahzada Walajah Muhammad Azam Shah Bahadur, son of the Mughal Emperor Aurangzeb in 1678 AD (Ahmed, 1984). The scheme of the fort already initiated by Shaista Khan during the first term of his Viceroyalty from 1664 to 1677 at once attracted his attention. With some modification in the original plan, he set himself to the task of building the Fort, which he named after his father as Fort Aurangabad. Shaista Khan took over the Viceroyalty for the second time in 1680, and managed affairs for eight years. His daughter Pari Bibi died in 1684; her death greatly upset Shaista Khan, who abandoned the Fort project, considering it inauspicious. So, the surviving remains of the Fort stand unfinished from the very start.

The incomplete Fort was envisaged as a walled palace rather than a siege fort. Spreading over an area of nineteen acres, it appears to have been planned with a rectangular outline, 1,082 feet long and 700 feet wide. Some interesting parts of the Fort include the building complex in the south-eastern portion, consisting of a massive gateway, a large bastion and the adjoining pavilion. Other notable parts are the fortification wall in the south and west, a second massive gate standing in the north-eastern parts and a smaller incomplete gateway about 750 feet west of it. The central area of the fort is occupied by three buildings: The Diwan-i-Aam and the Hammam on its east; the mosque on the west; and the tomb of Bibi Pari in between the two (in one line, but not at equal distance) (Qadir, 1993). This glorious piece of architecture did not get attention as a historic structure before 1842 (Mamum, 2000).

In a similar setting, Anarkali Bazar in Lahore is closely linked with the Walled city, a historic and earliest settlement of the cultural capital of South Asia. The culture of which reflects a lot in that of Anarkali. The walled city marked not only the first point in the growth of Lahore but is also the only living example of the most culturally rich, indigenous rooted, pedestrian friendly and sustainable built community. The name Anarkali (Pomegrante Blossom) was given to one of the favourite inmates of the harem of Emperor Akbar. Akbar’s son Emperor Jahangir built a mausoleum over the grave which lies near the Lower Mall. Anarkali Bazar has been a favourite of shoppers for decades (Lari, 2003). Named after this woman, the bazar sprang up on a piece of land occupied by British troops after the annexation of Punjab (Nevile, 2007).

**Research Framework**

This research seeks to find commonalities in two geographically apart but similar cultural settings through identification and evaluation of existing trends of development around two historic sites and also study effects of the surrounding built environment. It may be interesting to note that while Dhaka’s researcher undertook a more planning oriented methodology, the Lahore researcher opted for more of a morphological/perceptive method (architectural). Questions are being raised if the transformations without apparent active participation of governments, non governments or professional groups have provided a successful regeneration? The outcomes of the research focus on the factors responsible for incompatible land use and to provide guidelines to preserve the appeal of these heritage sites.
In the case of Lalbagh Fort, the chronological change of the structure over time has been documented here. It has also sought to give an overview regarding the change of its surrounding land use and its impact on this historic site. About 90 buildings surrounding the fort in four directions were surveyed to understand the present development trends in the area. For analysis of the heritage site, some variables are considered and according to those variables data was collected. Land use pattern, building height, construction year, building structures, ownership status, etc are included. The impact of the adjacent urban fabric on the historic site has been critically reviewed in this paper.

**Lalbagh Fort in Passage of Time**

The ownership and use related information about Lalbagh Fort is almost unavailable after departure of Shiesta Khan at the beginning of 19th century. It is assumed by the historians that this Fort was used by the Mughal soldiers until the shift of the Capital from Dhaka to Murshidabad. This fort became abandoned then. Most of the structures of the complex became dilapidated and unhealthy, including the pond (Mamun, 2000).

In 1842, the Dhaka Committee undertook a programme to develop the Lalbagh Fort complex as a recreational centre of the city. This project ended in 1847. The government sanctioned money for this development work but at the same time convicted people who were in jail were employed in the repairing work. In 1853, the cantonment was shifted to Lalbagh Fort and used until 1857. During the Sepahi mutiny Lalbagh became a symbol of protest against oppression of British Rule. After 1857, for a long period till 1947, this Fort was used as the barrack of police force. By this time, this grand Mughal
architecture has been declared as a historic conservation site. Archeological Department of Bangladesh undertook an ambitious project to preserve this fort complex. The preserved and renovated structure gives an image of the glorious past of this fort. Now it has a museum inside and the gardens are maintained. This huge complex turned into a breathing space for the entire old Dhaka. Everyday it is visited by a good number of visitors. The following photographs (Figures 2 and 3) portray the history of Lalbagh Fort- transformation from a restricted military establishment to a centre of cultural and social urban space of interaction.

Fort Complex in Present Physical Context

Land Use in the Area
With the change of political and cultural history, the physical fabric of the areas adjacent to the fort has undergone drastic changes. With growth of population, land use all over the the Dhaka city is transforming at a very fast pace. Low density residential land uses have been replaced by high density mixed uses. In Figure 4, the construction year for the buildings is shown. It can be clearly seen that the construction rate of buildings increased as time passed by. A major share of buildings was constructed after 1950. Before that, the most part of the fort adjacent area was vacant. About 92% plots are privately owned in the study area.

The trend of land use pattern has been changed notably in different times. The findings of the survey show that most of the structures were used for residential purpose and there was a significant number of vacant land as well. But most importantly, the mixed land use was absent in the original land use of a plot. Mixed land use was introduced in the 1970s, although that was very low in percentage with respect to residential use. But eventually, the commercial uses, like shops, offices, garage, storage etc have occupied most the ground floors of the buildings. To cope with this, the land use pattern has changed and the mixed type land use became dominant. From the Figure 5, it can be seen that, in present time a major share of the plot has mixed land use and commercial use.
Building Height Adjacent to Fort
While studying the development trends in the surrounding area of Lalbagh Fort, it is observed that the percentage of one and two storey buildings is higher (Figure 6). But most of these low storey buildings were constructed long ago. Most of the recent buildings are 5 storey or 6 storey. Replacement of old buildings is taking place at a high pace. But no special guidelines have been developed for this historic site to regulate new development considering the image and characteristics of the Lalbagh Fort.

Visual Analysis of Surroundings
Effects of Building Height
Within the site there are a considerable number of buildings with a height that creates visual obstruction from the historic site. From the collected data, it is seen that a major share of buildings are three storey and above. But the most annoying factor is that the buildings constructed in recent years are five or six storied. So, the height of the buildings has negative impact on the historic site. The uninterrupted background of the fort is now obstructed with buildings of different height, color, texture and form. This visual obstruction causes the degradation of the attraction and historic appeal of the Lalbagh Fort. Figures 7 and 8 show the buildings surrounding the wall of the fort.

Impact of building color/material on Lalbagh Fort
The buildings around the heritage site have a great variation of colour. This is because of the difference of taste of building owners and another main factor is the lack of proper rules or guidelines. From a visual survey, it is found...
that a high percentage of structures are not painted and in has a dilapidated look. Buildings particularly painted green, violet, or yellow disturb the image of this historic site. Some of the recent buildings have doors and windows made of Thai glass on the front side of the buildings, which is totally incompatible with the appearance of the fort.

SWOT Analysis: Prospect of Conservation of the Fort Area

It is evident from the survey findings and interview with the local residents that the historic image of the fort complex is under threat due to the unplanned development in the adjacent areas. The fort complex and the structures inside it have been preserved and maintained. But until today no attempt has been undertaken to regulate the surrounding areas. As a result the historic appeal of the fort is affected. Considering this aspect a SWOT analysis has been done understand the constraints and potentials of conservation in the adjacent areas. Figure 9 shows the findings of the SWOT analysis. A list of intervention strategies has also been showed in the diagram which can be undertaken by both public and private initiative to protect this Mughal fort.

Anarkali

Historic Mughal city of Lahore (Pakistan), one time cultural capital of Asia, has expanded speedily over time. Initially it covered an area of 2.56km² but today covers an area of 1,772km². This evolution has come about as a result of a number of factors e.g. trend of urbanization, increasing population, commercialization etc. and their factors have acted as catalysts to all the ad-hoc urban fabric that we experience in the city including old settlements which have in an effort to accommodate the increasing needs and changing lifestyle trends have ended up being undesirable for everyday living. A prominent example of such a case would be Anarkali, a vibrant bazaar from the 17th century, located in the heart of the old city close to the famous fort and Badshahi mosque (Figures 9 and 10). Lahore is a city whose various sections not only were developed in different time periods but were also meant to be self-contained to distinct social groups, economic functions and technologies.
“The world in general has few cities that interweave so seamlessly a great vitality today (the city is about the twenty-fifth largest on the globe) with an unbroken and luxurious history (spanning the last two millennia). Only in Lahore do you find the sepulchre of the legendary Anarkali, the star-crossed dancing girl buried alive for her love of the young prince Salim (the film Mughal-e-Azam is a version), inside the dusty Archives of the Punjab Secretariat, which was a mosque that the British whitewashed, and is now decorated with portraits of British colonial governors. Layers and layers: it’s that kind of place.” (Pakistan Paindabad, 2009)

Anarkali bazaar is a famous bazār (market) in Lahore, Punjab, Pakistan. It is one of the oldest surviving markets in South Asia, dating back at least 200 years. The market derives its name from a nearby mausoleum thought to be that of a slave girl named Anārkalī, buried alive by order of the Mughal Emperor Akbar for having an illicit relationship with the Emperor’s son, Prince Salim, later to become Emperor Jahāngīr.

Anarkali Bazar is the oldest bazaar of Lahore, Pakistan, yet it has coped with the changing times by introducing new trends in business. Today it can be considered as one of the best business centers of Pakistan. Anarkali Bazar is divided into two portions, the Old Anarkali Bazar and the New Anarkali Bazar. The Old Anarkali Bazar is famous for traditional food items while the New Anarkali Bazar is famous for its traditional handicraft and embroidery cloths. Babar Handicraft and Gift Centre is the oldest shop located at 110 New Anarkali. It is famous for its quality of hand made products. (Wikipedia Anarkali Bazar, 2009)

**Unique Location**

The geographical location of Anarkali is very strategic. Its link with the Mall puts a stop to the inner-city and the modern city to come in contact. It is very interesting as there is an
interaction between the two sets of environs but neither enclaves the other. Though, now it does seem that the modern elements of the built environment and the culture have been very welcome in to the older masses.

Perpendicular to the Anarkali runs The Mall (Figure 9); one of the major arteries of the city, stitched on to which are some of the very important Government and private Built masses; High Court, GPO [general post office], National Assembly, Town Hall, major academic institutes i.e. National College of Arts, Punjab University, Town Hall just to name a few. This is the connective spine of the old Lahore [Walled city] to the new Lahore [Cantonment up to Defense and so forth]. The Mall also marks a boundary to Anarkali and has also played an important role in stopping the modernistic uncontrolled commercialization to totally hack the older settlements of the city. The frontal facing the mall road is treated very modern. The material used, the interiors, lighting, usage are all new and take over the older indigenous structures that to date can be experienced as we move inwards into the area.

It is interesting to note how these decades old structures have adapted the technology. In the middle of the brick and wooden built stands a telecom tower, transformers. One cannot miss the thick wiring running all over and around the buildings, the inserted air-conditioners (Figures 11 and 12).

**The Magic of Anarkali**

Going to the Anarkali Bazar was an exhilarating experience. The street, however, appeared narrower. The current vistas on the street are of
banners and electric wiring havoc. The vision of a user upon entering the bazaar is blocked by the havoc of the parked vehicles. The old and new structure knitted together; with the hustle bustle of people of all ages give the place more cultural and social quality. The older buildings have adapted a newer face wined with modern insertions that make an interesting combination. The upper stories are somewhat still the same in appearance in terms of language, the condition though is very poor. The lower stories are all active in public use [commercial i.e.], are very fancy in material. Huge glass display windows showing off shiny interiors and bright lights. (Figures 13 and 14)

We surveyed a retail cloth store during one of the visits to Anarkali. It was a fusion of old structure and new technology. Air-conditioned and well lit with latest lighting technology, the inside looked a complete contradiction of the outside which is a typical [for that area] brick building with wooden Jharoka [balcony] (Figures 15 and 16).

In our quest for information for this research paper we have had the opportunity to interview some old residents of this area and it is in their narrations that one gets a flavor of the true, then Anarkali. Much they say have changed but it is credible that the area and its people have till today been able to maintain a certain language of the urban fabric. Their architecture being very impactful articulates their social and cultural lifestyle.

We also interviewed few people who initially were the residents of walled city and Anarkali but later moved to modern settlements. One such couple who now live in Model town says that not only has their built environment changed but their whole lifestyle has taken a 360o turn.

'I personally knew everyone from Anarkali, our street, the next or the next and here it has taken us more than a decade to get familiar with our very next door neighbours', says Mr. Inam Mahmood.

'I could not figure out how to spend my day, in Anarkali we, the women would all sit together in our shared courtyards and does our house hold work and daily chores. We were like a family, the whole locality, a part of each other’s sorrows and happiness. And other women from nearby

Figure 13 and 14: Present day happenings and cluttered Anarkali (Source: Authors).
would greet us from over their walls and roofs. There is no social interaction here. A house on our street had their daughter’s wedding and we were not even invited. I found it very difficult to adjust in this cold environment’, narrates the nostalgic Mrs Inam.

These interviews identified some very important aspects of the various living styles in context with the anthropological evolution of humans and also the adaptive measures of built environment.

**Emerging Trends at Lalbagh Fort Area (Dhaka) and Anarkali Bazar (Lahore)**

Anarkali at a time was one of the most active and lively strips of the city. Now it has adapted the modern living in a disorganized manner and has thus created disturbance for the traditional old residents. The culture has been forced to take a backseat. The art and architecture [true representation of a civilization] have been ignored too. Even today the inner you go to these galli mohallas (inner city neighborhoods), the richer the environ gets as a lot of old residents have still kept on with the indigenous aspects. But as you move outside towards what can be called New Lahore, this cultural, social and architectural identity fades into the modern influential images. Similarly, the area adjacent to Lalbagh fort has rapidly transformed into a mixed and high density residential area. Like Anarkali, here too with the advent of comparatively high rise buildings (three to six storied apartment housing), there had been a dramatic change in the architecture and cultural identity. However, there seems to be more demolishing of old buildings and construction/ conversions to commercial housing blocks in Lalbagh than in Anarkali. While there are still a large number of relatively old and dilapidated buildings (many in ruins) in Anarkali, near Lalbagh the emerging architecture and planning is very much at odd with the historic site of the adjacent fort. Both the sites have undergone major changes of land use from military to mixed residential/commercial area, but the changes of the urban fabric of Lalbagh appeared more incongruent with its surrounding than what observed at Anarkali. There is still an ambience of Mughal and Colonial architecture in Anarkali which seemed absent near Lalbagh area. What emerges from the analysis of both the sites that
there is a kind of repoliticisation of the historic community without a singular identity in cultural representation, definition of space or use of technology.

**Conclusions and Recommendations**

In a way this was more of an experimental comparative study with two similar historical settings in the same region of South Asia but geographically wide apart and with different research approaches (including empirical and participant observation methods). The team members from architecture, urban planning, design and social science have provided a set of composite findings but similar recommendations. The outcomes of this research attempted to focus on the factors responsible for incompatible land use and to provide guidelines to preserve the appeal of these two heritage sites. In analyzing the transformation of both the ‘locales’, it appears to fit the notion of ‘negotiation’ and ‘contestation’ (Shakur, 2005). In cultural terms there are aspects of ‘globalization’ reflected in ‘commercialization’ of traditional residential land uses and rise of ‘consumerism’ at both the historic sites. At Lalbagh (Dhaka, Bangladesh) the commercialized spaces of housing, adjacent to the fort site, definitely seem to contest the historic conservation area while in Anarkali (Lahore, Pakistan), although much commercialized but still appear to be negotiating with its ‘Mughal’ and ‘colonial’ surroundings. With a bizarre mixture of ‘traditional’ and ‘modern’ cultures Anarkali has more bearings of a ‘post-modern cultural space’, bursting with energy while the transient ‘commercialized residential spaces’ of Lalbagh reflect more of a revival of ‘modernism’, not necessarily interrogating the global and post-colonial cultures and their impact on the built environment (King, 2004). Here the distinction between ‘Mughal’ and the ‘modern’ period is much sharper providing very little evidence of the transient ‘Colonial’ culture. The emerging ‘culture-space relationship’ is complicated by both the subtle and aggressive use of the technologies in both built environments. Use of traditional/ archaic and cutting edge technologies (from donkey carts to split air-conditioners) go side by side in Anarkali while Lalbagh have embraced a curious mixture of local and modern derivations of the built environment (e.g. use of Thai aluminium for doors and window frames to iron bar fencing).

Although with the challenging prevailing socio-political conditions in both Dhaka and Lahore it is difficult to implement progressive user friendly ‘sustainable environmental /developmental policies’, the recommendations suggested are similar to those global solutions in the rest of the world. These include immediate preservations of the old buildings, formulation and implementation of ‘conservation policies’. There are strong suggestions for more public interactive spaces with facilities like seating, public toilets, drinking water and shades. Antalkali has the potential to be turned into a pedestrian only strip/ branching strips. Proper parking facilities would benefit both the shoppers and the owners. It is obvious that should such recommendations be implemented, it will not only reduce the carbon footprint, benefit the environment and promote sustainability but will also reclaim public spaces initiating more activities, more interaction among people of different social standards. Finally, it still remains a debating issue whether ‘the acceptance of new and modern/post-modern features’ could
be a very positive stance provided they are applied in a rationalized way.

References


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Tasleem Shakur

Tasleem Shakur is an academic architect planner and had been teaching and researching intensively in England for more than 20 years in Architecture, Urban Planning, Human Geographies and South Asian Studies. Having taught and researched at University of Liverpool, Oxford Polytechnic, School of Oriental and African Studies (SOAS), University of London and University of Sheffield. Dr Shakur is a senior academic at Edge Hill University in Lancashire, UK. He had been the Director of International Centre for Development & Environmental Studies (ICDES) between 1992-2007 and is the founder editor of two international refereed journals: Global Built Environment Studies (GBER) www.edgehill.ac.uk.gber and South Asian Cultural Studies www.edgehill.ac.uk/sacs He has written more than 100 academic articles published in various journals and volumes and some of his articles are translated in Chinese, French, Spanish, Arabic, Turkish and Bengali. He has written five volumes including the edited volume entitled ‘Cities in Transition: Transforming the Global Built Environment’ (2005) published by the Open House Press, Cheshire. He was elected as a fellow of the Royal Society of Arts (FRSA) in 1996.

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**Javeria Masood**

Javeria Masood is from Pakistan, born in 1985. Graduated with Bachelor of Architecture from National College of Arts, Lahore - Pakistan in 2009. Was awarded Honors for her final year thesis called ‘Minus Friction – making the city more habitable for its inhabitants’. The project was a study of the transformation and growth of the physical, programmatic and spatial aspects of Lahore, a city with uncontrolled commercialization leading to undesirable living conditions for the residing. By focusing on an active commercial strip, the thesis proposed strategies to overcome existing friction zones and to facilitate and accommodate the foreseeable programmatic development of the area. She also has an undergrad degree in Fine Arts and Psychology. Masood is currently working as an architect/designer with Asia’s largest real estate and housing corporation firm, ‘Bahria Town [pvt] limited’. Designing projects ranging from private to public including a teaching hospital. Maintains an active association with architectural fraternities, social work groups, environment awareness campaigns and education realm. Participates in intellectual symposiums and workshops. Has interest in art, theater, travelling, photography, reading, writing and painting. Aims to make positive contribution to the native urban fabric.
ECONOMY, ENVIRONMENT, CULTURE: GLOBAL DREAMS BY TWO ASIAN CITIES

Mahbubur Rahman

Abstract
Global cities have been characterized as networked nodes, with multiple and intensive global flows of people, goods, services, ideas, and images. These often share more in common, and identify more with other such cities than with urban hinterlands in their own countries. Given the myriad external linkages and orientation, this paper will argue that some Asian cities progress is not only aimed at economic and social emancipation, which are only tools to attain global city status. It will particularly examine the cultural production of new urban spaces due to economic growth, and compare between two Asian cities of Hong Kong and Singapore.

Keywords
Culture; city; economy; global; Hong Kong; Singapore

Introduction
The global economy spatially impresses urban spaces as expressed in mixed infrastructure, retail, industrial, leisure and residential facilities. Yet, cultural and iconic spaces as part of imaging strategies have been used to attract and sustain global human and economic flows (Chang, 1997); these created exciting cities in the global urban hierarchy. Cities with global aspirations are now recognising the need to create new cultural spaces and structures, often monumental, to support a vibrant cultural life and attract and sustain global flows. Besides economy, government vision, local aspirations, planning and development efforts are geared towards achieving the above. The paper shall examine and compare the economic strategies to attract international finance and flow of tourists, and building up cultural assets by two Asian cities: Singapore and Hong Kong in this paper.

The Concept of Global City
The concept of global city explains globalisation created, facilitated and enacted in strategic locales in hierarchical importance in the world of finance and trade. It is a complex entity that exerts a direct and tangible effect on the global affairs through socio-economic means. The terminology was first used by Sassen (1991) in reference to London, New York and Tokyo, three undisputed world cities.
Role of Economics
Many research groups and authors have tried to classify and rank cities; the criteria based on a ‘yardstick value’ or on an ‘imminent determination’ can affect cities other than few top ones. The common criteria are: name familiarity; influence on world affairs; population; major airport; advanced highways and multi-modal network; international cultures/communities; foreign businesses/expatriate communities; international financial institutions, law firms, headquarters (HQs) and stock exchanges; advanced high-speed communication; world-renowned cultural institutions; lively cultural scene (film festivals, thriving music/theatre); orchestra, opera, galleries, street performers; influential media with international reach; a strong sporting community and major facilities; and the experience to host international sporting events.

The Globalisation and World Cities Study Group and Network (GaWC) made an attempt to define, categorise, and rank global cities in 1998, based on provision of ‘advanced producer services’ (accountancy, advertising, finance, law) into three levels and few sub-levels. The roster generally notes cities in which multinational companies (MNCs) provide financial and consulting services rather than noting cultural,

<table>
<thead>
<tr>
<th>Alpha</th>
<th>++:</th>
<th>London, New York City</th>
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<tbody>
<tr>
<td>+:</td>
<td>Paris, Sydney, Hong Kong, Singapore, Tokyo, Shanghai, Beijing</td>
<td></td>
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<tr>
<td>:</td>
<td>Milan, Madrid, Moscow, Brussels, Toronto, Buenos Aires, Seoul, Mumbai, Kuala Lumpur</td>
<td></td>
</tr>
<tr>
<td>-:</td>
<td>Warsaw, Sao Paulo, Zurich, Mexico City, Dublin, Rome, Amsterdam, Istanbul, Lisbon, Vienna, Chicago, Frankfurt, Stockholm, Budapest, Athens, Prague, Caracas, Auckland, Santiago, Jakarta, Bangkok, Taipei</td>
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<tr>
<th>Beta</th>
<th>+:</th>
<th>Melbourne, Barcelona, Los Angeles, Johannesburg, Bogotá, Washington D.C., Atlanta, Bucharest, San Francisco, Helsinki, Berlin, Oslo, Geneva, Cairo, Copenhagen, Hamburg, Manila, New Delhi, Tel Aviv, Dubai, Riyadh</th>
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<tr>
<td>:</td>
<td>Luxembourg, Munich, Kiev, Dallas, Lima, Boston, Miami, Bangalore, Jeddah, Kuwait</td>
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<tr>
<td>-:</td>
<td>Sofia, Rio, Düsseldorf, Houston, Nicosia, Montevideo, Nairobi, Bratislava, Montreal, Beirut, Guangzhou, Karachi, Ho Chi Minh City</td>
<td></td>
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<table>
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<tr>
<th>Gama</th>
<th>+:</th>
<th>Panama City, Casablanca, Brisbane, Quito, Stuttgart, Vancouver, Denver, Seattle, Zagreb, Guatemala City, Cape Town, San Jose, Ljubljana, Minneapolis, Santa Domingo, Chennai, Manama, Shenzhen</th>
</tr>
</thead>
<tbody>
<tr>
<td>-:</td>
<td>Edinburgh, Porto, Tallinn, San Salvador, St. Petersburg, Port Louis, San Diego, Calgary, Almaty, Birmingham, Vilnius, Islamabad, Doha, Colombo</td>
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Table 1: The GaWC’s 2008 Roster of Leading World Cities.
political, and economic centres. It repeated the exercised in 2004, adding few new indicators but put economics ahead of political or cultural aspects. In 2008 it re-sorted the roster through categories of ‘Alpha’, ‘Beta’, ‘Gamma’, ‘high sufficiency’ and ‘sufficiency’ (Table 1), which may exclude other cities of global significance or elsewhere on the spectrum due to specific criteria.

Other categorisations like Well rounded cities (very large contribution, smaller contribution and with cultural bias, and incipient global cities), Niche cities (specialised financial or socio-political contributions), Subnet articulator cities (cultural, political, social) and Worldwide leading cities (economic or non-economic contributions), were based on world city formation (strong, some, minimal) (Wikipedia). In 2008, the Foreign Policy journal and the Chicago Council on Global Affairs jointly ranked cities by consulting expert. It noted that the world’s biggest, most interconnected cities help set global agendas, weather trans-

<table>
<thead>
<tr>
<th>City</th>
<th>Best in Category</th>
<th>City</th>
<th>Best in Category</th>
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<tbody>
<tr>
<td>New York City</td>
<td>Business Activity, Human Capital (1)</td>
<td>Sydney</td>
<td>Human Capital (8)</td>
</tr>
<tr>
<td>London</td>
<td>Cultural Experience (1)</td>
<td>Berlin</td>
<td>Cultural Experience (8)</td>
</tr>
<tr>
<td>Paris</td>
<td>Information Exchange (1)</td>
<td>Vienna</td>
<td>Political Engagement (9)</td>
</tr>
<tr>
<td>Tokyo</td>
<td>Business Activity (2)</td>
<td>Moscow</td>
<td>Cultural Experience (6)</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>Business Activity, Human Capital (5)</td>
<td>Shanghai</td>
<td>Business Activity (8)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Human Capital (4)</td>
<td>Frankfurt</td>
<td>Business Activity (11)</td>
</tr>
<tr>
<td>Singapore</td>
<td>Business Activity (6)</td>
<td>Bangkok</td>
<td>Political Engagement (13)</td>
</tr>
<tr>
<td>Chicago</td>
<td>Human Capital (3)</td>
<td>Amsterdam</td>
<td>Business Activity (10)</td>
</tr>
<tr>
<td>Seoul</td>
<td>Information Exchange (5)</td>
<td>Stockholm</td>
<td>Information Exchange (13)</td>
</tr>
<tr>
<td>Toronto</td>
<td>Cultural Experience (4)</td>
<td>Mexico City</td>
<td>Cultural Experience (9)</td>
</tr>
<tr>
<td>Washington DC</td>
<td>Political Engagement (1)</td>
<td>Zürich</td>
<td>Information Exchange (8)</td>
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<tr>
<td>Beijing</td>
<td>Political Engagement (7)</td>
<td>Dubai</td>
<td>Information Exchange (14)</td>
</tr>
<tr>
<td>Brussels</td>
<td>Information Exchange (2)</td>
<td>Istanbul</td>
<td>Political Engagement (8)</td>
</tr>
<tr>
<td>Madrid</td>
<td>Information Exchange (9)</td>
<td>Boston</td>
<td>Human Capital (9)</td>
</tr>
<tr>
<td>San Francisco</td>
<td>Human Capital (12)</td>
<td>Rome</td>
<td>Cultural Experience (15)</td>
</tr>
</tbody>
</table>

Table 2: The Top Thirty World Cities according to the Foreign Policy Journal.
national dangers, and serve as the hubs of global integration; they are the engines of growth for their countries and the gateways to the resources of their regions. It used 24 metrics in business activity, human capital, information exchange, cultural experience, and political engagement (Table 2).

Global city concepts are dominated by the HQ of MNCs, and a locus of advanced services and information-processing activities. Sassen (1991) showed these as the locus for the critical servicing of global capital. She put them in hierarchy using professional services as the main basis. New York, London and Tokyo were commanding the world economy most, as locations for finance and specialist services, and also innovations. Frost and Spence (1993) confirmed them who also acted as markets for the products and innovations. Castells (1996) advanced the theories of the world city network. Taylor (1997) noted their hierarchical tendency, engaged in complementary activities in a network while competing to attract investments. Reed (1981) identified a 5-level hierarchical structure of financial centres. Friedman (1986) showed that world cities act as control centres for world capital accumulation, and acquire certain economic and social structures; many followed him to measure and rank world cities.

**Investment and Institutions**

The global cities competing for investment is set by structural changes, globalisation and IT. Ambience affects the competitiveness (inter-firm competition based on global competitive environment, competitive strategy and organisational structure) as creation and sustenance of its advantages depends on the role of a nation (Porter, 1998). Kresl (1995) identified a dichotomy between economic (factors of production, infrastructure) and strategic (policy factors, institutional design) determinants. Thus individual city authority and private sector entities can enhance its competitiveness and enable it to achieve the most desirable economic outputs. However, the actors have to ensure coordination and sector interests (Duffy, 1995). Foreign direct investment (FDI) flow is related to the stage and structure of a country’s economic development (Dunning, 1993). Dicken et al (1994) stated that though governments should strive to provide an attractive ‘business environment’ to enable international companies to operate and attract investment.

Organisations behave and perform within both formal (laws, regulations) and informal rules (norms, conventions, traditions, customs) set by the political, legal and social institutions, and creating diverse economy in various localities (North, 1990). The performance of local economies in a globalising world depends on the presence of such institutions to provide the basis for the growth of local practices and collective representations, high levels of interaction, development of dominating structures or patterns of coalition resulting in the collective representation, and a set of institutions with common agenda (Amin & Thrift, 1994; Powell & DiMaggio, 1991). By establishing legitimacy and trust, this will continue to encourage and foster entrepreneurship and consolidate an embeddedness of industry. Places can reach the global status by constructing and adapting ‘right’ institutional mixes (Amin & Thrift, 1994).
Global City and Culture

Global city status is not gained solely by economic advances; it also needs certain cultural capital developed in a people (e.g. human development for cultural producers and consumers), product (creation of cultural products) and place-oriented strategy (e.g. infrastructure and property development for cultural activities, ambience and ballast) (Kim, 2001; Kong, 2007). Cultural institutions should sustain global flows by drawing investments and tourists through contributing to an enriched lifestyle befitting of a global image. ‘The power of cities’ and their connectivity show Tokyo as a global command centre, and Tokyo and Hong Kong as dominant centres (Taylor et al, 2002).

Iconic Architecture

Cities with monumental projects and architectural icons can attract investors, professionals and executives. “It is always the image of the building, rarely the diffuse and ungraspable city, and even less, the imagined community, which is used to fix our gaze” (King, 1996). Thus a prospective global city has imageable and striking buildings by international architects, distinctive heritage structures, world-reputed performances and exhibitions, a lively entertainment scene, a creative buzz in a highly liveable space, populated by a global population, branded for world’s consumption, a vibrant city for living, working and playing (Kong, 2007).

The skyscraper has dominated the imaginations of city-planners, ensuring that their cities are at centre of attention. “The massive high rise tower is used by Asian countries as a magic wand, stuck metaphorically into the terrestrial globe, to transform the Third World into the First” (King, 1996). Such giants like Burj-al-Arab or Petronas Twin Towers have for long been used to symbolise corporate power, personal ambition and eminence (King, 1996). They alone cannot bring global status, but “capture the public’s imagination and a shared historical sentiment through novelty and size” (Tuan, 1974), and play a key role in making a city known.

“Significant, high profile and prestigious developments play an influential and catalytic role in urban regeneration” (Temelova, 2005). A flagship development mark out ‘change’ for the city to extend “beyond the physical boundaries and contribute to the development and the economic and policy base” (Smyth, 1995). It essentially is “a development in its own right”, “a marshalling point for further investment” and “a marketing tool” (Smyth, 1995). Such developments are often associated with ‘culture-led’ regeneration efforts as cultural policy has an impact on place image and thus attracts visitors and businesses to their shores (OECD 2005). For example, Gehry’s Guggenheim Museum, a cultural flagship boasting a high profile innovative design, shifted from structures that ‘scrape’ the sky to other kinds of urban symbols and monuments. The architectural design privileging iconic status boosts city competitiveness, contributes to economic regeneration, and offers a source of civic pride and social cohesion (De Frantz, 2005).

Dynamic Asian cities like Hong Kong and Singapore aspire to achieve global city status, competing to increase their ‘soft power’, “in which success depends on their ability to draw capital from the region and the world, attract corporations to set up offices, bring in visitors,
business travellers, conference participants, and tourists” (Tamotsu, 2002). Hence they have constructed icons –Esplanade or West Kowloon Cultural District (WKCD), amidst varied economic trajectories and different nation-building imperatives. Due to the visibility and materiality, the development of monuments offering tangible evidence of cultural capital was a strategy favoured by all these cities in the competition for global status (Kong, 2007).

Asian Cities

Tokyo has long been recognised one of the top global cities even before the concept emerged. By several measures Hong Kong, Singapore and Seoul have been regarded in the top category too. Other cities frequently making to the top in different counts, but not yet in overall consideration are Beijing, Bangkok, Jakarta, Taipei, Shanghai, Dubai and Mumbai. More cities with potential and the aspiration to become a world city are Kuala Lumpur, Manila, Osaka, Delhi, Tel Aviv and Riyadh, followed by Bangalore, Guangzhou, Shenzhen, Colombo, Beirut and Abu Dhabi.

Mumbai, Shanghai, Karachi, Delhi, Seoul, Tokyo, Jakarta are in the same bracket along with 5 other world cities that have large population living either in the city proper or within the metropolitan area. In terms of percentage of foreigners, 7 Asian cities occupy the top 10 spots with all but Macau and Hong Kong from the middle-east (Dubai, Kuwait, Doha, Manama and Muscat). The Chinese cities became multi-cultural under the Europeans, and then as manufacturing and financials hubs. The increasingly prosperous gulf cities made up the manpower shortage with foreigners.

Hong Kong, Mumbai and Tokyo make to the top 10 of cities in terms of number of billionaires; this shows gradual strength of investment, technology and living standard of the Asian cities. In terms of per capita gross product, Tokyo and Osaka made it to the top 10, indicating innovative and industrious nature of the Japanese people. In terms of air and multi-modal mass rapid transit, Tokyo, Osaka, Seoul, Hong Kong, Shanghai, Beijing made the top list along with 14 other developed world’s cities. Singapore did not feature in the league despite having a well-developed MRT and busy modern airport because of a smaller population and area.

Mega cities with colourful cultural scenes are common in China and India. Yet poverty, lack of infrastructure including transport and IT, technological backwardness, poor economy, low investment, and underdeveloped tertiary sector have precluded many Asian cities from entering the top list. Asian mega-cities like Dhaka, Karachi, Lahore, Kolkata and Tehran fall behind in many areas. The reason for many middle-eastern or south-east or eastern Asian cities gradually making the list is their continuous high economic growth enabling them to improve upon infrastructure, basic welfare, human resource, and often in governance and socio-cultural scene.

Hong Kong

The autonomous Special Administrative Region (SAR) of Hong Kong, constitutionally and territorially a part of China, is shaking off recent economic problems. Apprehensions were made even before its merger with China that “unless it maintains its special international status and
global linkages, HK could become just another city in South China” (Postiglione & Tang, 1997), risking survival if ending up so (Wang & Wang, 1999). To reinvent itself as a city with a positive and unique identity, Hong Kong is seeking to become ‘Asia’s world city’: it created a new logo and engaged in media campaign on a new brand platform and visual identity.

The Commission on Strategic Development (CSD, 2000) realised that “Hong Kong needs to promote its unique position as one of the most cosmopolitan and vibrant cities in Asia to a range of international audiences. A successful external promotion program can have a significant positive impact on its ability to achieve a number of key economic, social, and cultural objectives.” In a country obsessed with brands, the government effort is not surprising. However, the campaign has led to debates on a world city’s reaction to such things as the environment, democracy, language ability, internationalisation, etc.

Economy

The Hong Kongers are money-obsessed; Rabushka (1979) observed that “Hong Kong has no public, moral, intellectual, artistic, cultural or ethical purpose as a society. It is just one big bazaar”. Ng and Hills (2000) furthered the view by labeling Hong Kong as “a city of workers, more than for citizens; security is built on monetary wealth rather than social relationships”. The stock market index and the property value
are the topics of constant media and mass attention in Honk Kong, which leads the Asian economies in purchasing power. It also has the ninth largest trade dependent economies in the world (US$ 415 billion or 25% of its GDP in 2000) (HKTDC, 2002). Yet a 0.53 Gini coefficient means income disparity and growing poverty exist (SCMP, 2000).

Sophisticated services, stable society and reliable legal process give HK an edge as a commercial centre. Its banks do not have the problems that burden Asian countries, administrative process is transparent, the press was voted the “freest” in Asia by Paris-based Reporters without Borders (SCMP, 2002), and corruption is low. It is the world's tenth largest banking centre, and Asia’s second largest stock market (GIS 2002). Hong Kong's economy has for long been in the top five ‘freest’ in the world (Cullinane & Cullinane, 2003). It’s per capita GDP doubled between 1990 and 2000, with economy recovering from the 1997-98 Asian financial crises.

Hong Kong with the busiest container port in the world, and efficient passenger and freight transport competes with Singapore (Dorfman, nd; Cullinane, 2002, 2003). Large cartels dominate its international services, while the domestic sector is led by small and medium enterprises with not much international competition; though during the 1980s, manufacturing contributed highly to its economy (Sparrow 1988), it was weaken by high price and not so good quality (Maruya, 1998). Manufacturing, construction and utility supply accounted for 31.6% of GDP in 1980, compared to only 14.3% in 2000 (CSD, 2002). However, by 2000, the economy gradually drifted towards the service sector that represented 85.6% of GDP and 83.4% of the workforce.

The fact that Hong Kong is surrounded by other economic heavyweights is affecting it. Cross-border migration to Pearl River Delta (PRD) Special Economic Zones due to the China’s ‘open door’ policy is affecting manufacturing in Hong Kong, and shifting it from being factory to showroom (Cullinane & Cullinane, 2003). However, Hong Kong and the PRD are an inseparable entity from an economic viewpoint (HKSAR, 2001; Sung & Wong, 2000), as the later was described as “an industrial region so huge as to transform global trading patterns and investment flows” (Anon, 2002). This was “the fastest-growing part of the fastest-growing province in the fastest-growing large economy in the world” (Enright & Scott, 2002) that in 1980-2000 grew at a rate of 16.9% annually, compared with 9.6% for China as a whole.

HK wages are 7 times higher than those in mainland (Guttmann & Frey, 2000). Government efforts to reduce wages of the civil servants met strong opposition. HK$ pegged to the US$ limits the scope of cost reduction. Cost and land constraints forced Hong Kong to relocate manufacturing activities to PRD. 40% (US$ 50 billion) of that was invested in industries in neighbouring Guangdong involving outward processing arrangements. About 5 million Chinese employees are working for nearly 36,000 Guangdong companies with huge HK interest (HKSAR, 2002). Guangdong surpassed mainland China’s phenomenal economic growth in the past decade. Its GDP increased at about 30% a year from 1991-95 and then at 10% rate for the rest of the decade.

About 64% of overseas buyers source products
made in mainland China via companies in Hong Kong; around 97% of their agents sit in Hong Kong to source products made in Guangdong. Hong Kong actualised 62.4% of US$ 275 million foreign investment in Shenzhen in 1999 (Shiu & Yang, 2002). The population of Shenzhen has increased from 314,000 (1979) to over 7 million now. “Downtown Shenzhen looks like the cityscapes in ‘Bladerunner’; its western suburbs look like Silicon Valley” (Anon, 2002). Its average annual GDP growth rate was 31% during 1979-99, or 15.7% per capita (Shiu & Yang, 2002). It has the highest average GDP per capita of all Chinese cities, 35,896 Yuan in 1999 (HKSAR, 2001).

“Property speculating is a favourite pastime of risk-loving Hong Kongers” (Phang, 2000). Construction and property development transforming the city’s skyline were pushing growth in the 1980s till prices reached the peak in 1997 and then declined (GIS, 2002), leaving 200,000 households with negative equity (Cullinane & Cullinane, 2003). As the government, the largest landowner, leases out all land through auction, it has the capability to influence land values and the property price.

The fall in property prices and stock value, and 8% unemployment rate led to a loss of faith in the economy among Hong Kongers after the merger; “the spectacular economic collapse, Hong Kong is undermined by a confidence crisis; things seem to be falling apart on many fronts” (Wang & Wang, 1999). The economic giant, superior in all respects to the mainland, is looking to its ‘mother country’ to help extricate it from its malaise (Cullinane & Cullinane, 2003). “Perceptible trend towards acculturation between Hong Kong and China” was caused partly by immigration from China (Hook, 2000). Even tourism, hitherto based on the world market, now aims to attract a greater number of mainlanders; of 13.7 million visitors in 2001, a third was from there (HKTDC, 2002).

**Society and Environment**

Hong Kong lacks in social cohesion, evident in little community space in the cityscape and people’s reluctance to be involved in local politics. Many traditional towns and villages destroyed to make way for high-rises dislocated the residents. The social capital got weakened further by “economic restructuring-induced social polarisation”, due to an influx of unskilled mainlanders who are considered a permanent underclass (Ng & Hills, 2000). Hong Kong’s joining the mainland amidst financial crisis and endemic unemployment increased the pressure on the dole system. Moreover, in an economy striving to become knowledge-based, a ‘digital divide’ emerged among the workforce that further exacerbated the problems and inhibited the less educated, less skilled, elderly and disabled (Degolyer, 2001; Fung, 2001).

In 2003, the government cut welfare by 11.1% due to the deflation and an ‘overwhelming’ demand to limit the number of immigrant claimants (SCMP, 2003). Following a 10% cut for the funding triennium since 1998, tertiary institutions received a $1.9 billion cut in funds for 2001–04 and more lately. Schools were required to reduce staff by 10% and the whole education system was reviewed to make that more cost effective. In a similar rationalisation, the health service was privatised. The government froze the property values to cap appreciation as home ownership was already high. In light of about HK$70 billion budget deficit and low position in
opinion polls, it may retrench its housing policy to improve the negative equity of numerous homeowners (Taylor, 2002).

Hong Kong has an appalling environmental record. Nearly 80% of its water is bought from mainland and has to be sterilised. The sewage discharged into the harbour goes through preliminary screening only. Garbage disposal is also unsatisfactory; public places are often strewn with rubbish, enhanced by the cleaners. Pollutants exceeding WHO standards killed about 2000 people a year, and caused HK$ 4 billion a year in medical costs and loss of productivity (GIS, 2002). But it is only seen as an adverse impact on tourism or investment, ignoring its threat on life quality. The eminence of economic rationale to confront serious pollution threats and deteriorating environmental quality is evident in the way government sees the link of environmental protection with economic prosperity (Chan & Loh, 2002). The outcomes of Environmental Impact Assessment are hardly complied with due to inadequate resources, limited enforcement and lack of co-operation from authorities; thus the “environmental governance stops at the rhetoric” (Lo & Yip, 1999).

Culture

Hong Kong’s Chief Administrative Officer explicitly aspired for a long-term development plan to make it a ‘world class’ city in his 1999 Policy Address. Bringing the Vision to Life –Hong Kong’s Development Needs and Goals (2000), a report produced by the CSD, shaped the vision further and set strategies to realise that; the city had to strengthen its position in China within the PRD on way to become ‘Asia’s World City’ (CSD, 2000). Other strategies aimed to enhance the city’s competitiveness, improve the quality of life, and establish and reinforce its identity and image. Though the link with the mainland is crucial for reaching the world status, some feared that cities like Shanghai or Beijing could subdue HK as part of PRD (Forrest et al., 2004), making it another provincial city (Skeldon, 1997). The delta contains 50 million urbanites in few mega-cities like Guangzhou and Shenzhen.
with global aspirations, and Dongguan, Foshan and Zuhai.

Hong Kong has hitherto been known as an economic centre; yet following the Address that emphasised on exploiting the potential of art, studies advocated creative industries to facilitate the building of a world city, trigger economic development, enhance quality of living, and thus promote tourism and attract investment, as a “cohesive agent in building community identity”, “allow[ing] local citizens as well as visitors a deeper understanding of the Hong Kong spirit” (HKADC, 2000).

Hong Kong’s colonial past meant it grew as a well-placed international cosmopolite (Kong, 2007), excelling in financial services, infrastructure, IT and tourism (Tsang, 2005), garnering a reputation where deals are made (Fung, 1999). It also worked towards higher value-added outputs by innovating and increasing the knowledge content of its economy to sustain development (Tung, 2005). It still needs to do more to attract world-renowned tertiary institutions, improve environmental quality, enhance entertainment facilities and revise immigration laws, to attract and retain best talents in Hong Kong (Dorfman, nd).

Hong Kong’s urban development strategies recognise this; the WKCD was part of an aggressive socio-economic policy aiming to stimulate its lack-lustre economy, and assure HK’s position as a global city (Kong et al, 2006). The global ambition was articulated as: a “cultural oasis to enrich lives”, a landmark development to “enhance Hong Kong’s position as a world city of culture; enrich cultural life by attracting internationally acclaimed performances and exhibitions; nurture local arts talent and create more opportunities for groups; enhance international cultural exchange; put Hong Kong on the world culture map; provide state-of-the-art performance venues and museums; offer more choices to patrons; encourage creativity; enhance the harbour front; attract overseas visitors; and create jobs” (http://www.hplb.gov.hk/wkcd/eng/public_consultation/intro.htm).

However, the International Association of Art Critics debated WKCD’s role as a cultural hub (SCMP 2004); a prominent civic group ‘Project Hong Kong’ called for developing talent rather than hardware. Concern was also raised regarding the citizens having no say in its planning (AFP 2004). The ‘Citizen Envisioning a Harbour’ accused that community needs were not considered. Artists and professionals showed concern at the lack of consultation, fearing that it might benefit developers who care less about culture (SCMP, 2004). The need for a new cultural district in the harbour area already crowded with 90% of all entertainment, arts, cultural, financial and commercial facilities was questioned too (SCMP, 2004); clustering activities in a small place made no sense (Kong, 2005).

However, the frame of reference for WKCD was not the national identity, as would be in the mainland. The city’s global inter-connections were consistently negotiating with its insistently local identity (Fung, 2001) that underscores a political culture where the city’s cultural-global strategy divorced ‘nation’ and ‘national’. This was compatible to ‘unpatriotic’ antinationalistic orientation of the ‘exceptionally outward’ Hong Kongers who were “citizens of the world, first; then of the SAR; and finally of the PRC” (Degolyer, 2001).
Singapore

Taylor et al (2002) identified Singapore, a young nation of mainly second and third generation migrants, as the most important world city in SE Asia, a “linchpin of the new global capitalism” (Chua 1993), and “efficient transport system and telecommunications network, modern and efficient air and sea terminals, efficient business districts and good public housing, strengthening its global competitiveness” (Baum 1999). Its strategic geo-political location and good harbour facilities have enabled Singapore to remain one of the busiest shipping hubs of the world, backed by required services (Dorfman, nd). Its “international presence as a major commercial and financial centre as well as a significant location for the regional headquarters (RHQs) of major MNCs (Lim & Choo, 1995), or increasingly “global reach of both the economy and society”, evidenced in the “numbers of foreign-controlled companies, the amount of foreign capital invested and the extent of international cargo and passenger flows” (Baum, 1999), made it a top city.

Economy

Singapore transformed into an intelligent society through the classical path of developing primary to secondary to tertiary sector activities. Based on value addition and export oriented growth, it shifted from industries to soft factories in the 1970s, moved into high technology the next decade, and then to knowledge intensive companies to face globalisation and regional challenges. Infrastructure driven by high value added production, business and IT services attracted the RHQs continuously over three decades (Ho 2000). Singapore built a modern city centre, industrial estates, business parks and infrastructure to facilitate the MNCs. In the 1980s, the government launched a series of pro-IT plans to enhance its status to that of a world city, and liberalised telecommunication market to gain extra edge that made it a secure and preferred destination (Sim et al, 2003).

Singapore experienced 10%+ growth since the late 1980s; the economy recovered from the 1997-98 Asian financial crisis, as focus group studies recommended the best approach to weather future slumps and sustain the socio-economic development. In 1997, the Committee on Singapore’s Competitiveness set its drive towards a globally competitive knowledge based economy. These underscore the importance of a resilient development, political stability, and thwart the threat by China’s rise as a global power.

The Prime Minister’s 2001 New Year’s Speech outlined the vision and strategy for Singapore. Following it, the Economic Review Committee (ERC) was set to address the emerging issues that could affect Singapore’s development. Assisted by the Economic Development Board and the Trade Development Board for direct marketing, over 5000 international companies operate in Singapore, about half of them also regionally (Sim et al, 2003). With the manufacturing and service sectors, Singapore’s economy has transformed in terms of the types of business including higher value-adding activities. This reveals a built-in process revolving around development vision, institutions and competitive business environment in a global city’s institutional milieu.

Environment and Society

The city-state of Singapore has created a high quality urban environment, managing many of the problems of rapid globalisation driven
development (Marcotullio, 2001). Yeoh and Chang (2001) profiled Singapore as a meeting-place of trans-national groups of high-skilled managerial elites, low-waged immigrant labour, creative talents in the arts, and tourists, attributed to a policy of attracting the world (both money and people) to Singapore. Dubbed as ‘garden city’ and the ‘cleanest city’, Singapore has progressed tremendously in terms of urban and social amenities and street furniture. It provides housing to every citizen. Its transport facilities, intelligent traffic management, and efficient multi-modal transportation system are exceptional.

Singapore’s cohesive political structure for decades ensured a transparent and path detailed vision; transparency and efficiency put it at the top (MOTI, 2001). It also has a high tolerance towards multiculturalism (Kratke, 2001). With over 4.5 million (25% foreigners) multi-racial population, the institutions have cautiously created a multicultural social framework. Yet, the foreign talent is seen as a must for driving different businesses (Sim et al, 2003), who generate over a third to its GDP (MOTI, 2001); the foreign-controlled companies account for 42% of GDP (SDS, 2001). Thus Singapore’s socio-spatial structure reflects its high racial tolerance and the development initiatives to transform its local environment to attract the MNCs. Singaporeans do not want any religious polarisation that could breed an unhealthy environment, and want to maintain the moderate and secure environment (Sim et al, 2003). As part of its long-term human resource development strategies, Singapore built two world level universities, besides sending the Singaporeans to abroad.

Culture
As a city-state, the global orientation implicates the ways Singaporeans understand ‘nation’ and how the government is building its identity since independence through various projects and social and spatial strategies on housing, education, language, race, religion and community development for a good society (Hill & Lian, 1995; Kong & Yeoh, 2003). Thus the intertwined urban, national and global ambitions meant cultural policy and infrastructure have continued to build an identity striving for the global status (Kong, 2007). In Singapore, cultural monuments are national monuments, also monuments to a global city. Both government-led efforts and civic and artistic community activity seek local identity to define Singapore in the global arena.

Singapore aims to become a ‘Renaissance city’ and a ‘global city for the arts’. Despite shunning ‘yellow culture’ of the ‘decadent West’ in the past, it now aims to harness economic potential of arts and culture (Kong, 2000; Kong et al, 2006), for ‘personal enrichment’ and to “broaden minds, deepen senses, improve the life quality, strengthen social bond, and contribute to tourist and entertainment sectors” (Council, 1989). The National Arts Council and the National Heritage Board were established in the mid 1990s, and Singapore burst into creative economy, producing the Renaissance City Report, and Investing in Singapore’s Cultural Capital by the Ministry of Information and the Arts and Creative Industries Development Strategy by the ERC to define the path. Studies were undertaken to develop the economic potential of the arts and culture, media, and design, by developing and enhancing cultural edifices.
The Singapore government recognised the economic value of ‘creativity’ in arts, culture and heritage, and the role of architecture to develop them. The local artists were aware that building the hardware without compatible software cannot help to develop arts (Kong 2000). A global city should showcase international art works, as well as local works expressing local flavours and identities where Singapore failed. Its label as ‘an arts emporium’, with more retail spaces for international expositions, stymies the blossoming of local styles and the maturing of national identities (Kong, 2000). The Esplanade inhibited the development of the small performing spaces in favour of the large facilities as the huge investment needs to “go for sure-fire successes”. Thus few local groups will be able to afford to use the spaces when “profit-making theatre” will be favoured above “exploratory, indigenous forms”.

As a negative result, those creative artists willing to explore new forms may feel the pressure to abandon more of those projects and produce more audience-determined plays to justify their work. Unable to match the foreign artists in crowd and money, the local artists are seeking a distinct Singapore idiom (Kong, 2007). With interest and the identification of arts and culture in the ‘creative economy’, existing spaces converted to cultural use add to iconic urban spaces that embraces the city’s global ambition.

The Esplanade endeavoured to become a distinct icon for the Singaporeans. Criticisms during its planning subsided to tacit approval as the sunshades were added, and it was fondly identified as the ‘Durian’. But reactions to the demolition of an uninteresting National Library building show how big cultural edifice only cannot catch national imagination and attain global aspirations (Kong, 2007). Cultural infrastructures representing iconic symbols to support such ambitions are not enough or necessary without developing local arts. The
promise of new state-of-the-art premises could not overcome passion for the old Library; it points to the search for cultural roots amidst rapid globalisation in a “time of continuing and heightening nation-state building processes” (Glick et al, 1995). The search amounted to a ‘reassertion’ and ‘celebration’ of the nation (Pieterse, 1994).

The Tale of Two Cities

The integration of national economies into the international through trade, capital flows, migration, and IT (Bhagwati, 2004) is a combination of economic, technological, socio-cultural and political forces (Croucher, 2004). “It consists of an enormous variety of micro processes that begin to denationalise what had been constructed as national – whether policies, capital, political subjectivities, urban spaces, temporal frames, or any other of a variety of dynamics and domains” (Sassen, 2006). Protective industrial policies of several countries slowed down the globalisation process after the WWI. As the growth of population and civilisation accelerated dramatically in the past 50 years, world powers used globalisation to breakdown trade barriers, laying down the framework of institutions like the IMF or GATT. The process speeded up after the demise of cold war as technological advances made travel and international business using high-speed communications easier.

The cities foster creative productions and boast impressive cultural infrastructure and vibrant cultural life. Cultural globalisation (growth of cross-cultural contacts, advent of new forms of consciousness and identities diffusing culture, desire to increase living standard and enjoy foreign products and ideas, adopt new technology and practices, participate in a ‘world culture’), driven by IT and the worldwide marketing of things western, was a form of domination by American culture at the expense of traditional diversity. The internet broke down cultural boundaries by enabling instant communication among people anywhere. It allows interaction and communication between people of various lifestyles and cultures. McDonalds is a global enterprise. Meditation, a sacred practice in Asian culture, now is a chic way to keep body shape. Chinese tattoos, hit with the young, are result of globalisation. Thus activists protest against globalisation to defend local uniqueness, individuality, and identity, considering ‘imported’ culture a danger, since it may supplant the local culture, causing reduction in diversity or assimilation. They also argue that resource-starved people cannot compete on level ground. These include churches, national liberation factions, peasant unions, intellectuals, conservationists, artists, and anarchists; some are reformist, while others are more revolutionary or reactionary, believing globalisation destroys national industry and jobs, identify corporate interests to mediate globalisation against the poor and working classes, loading environment in an inequitable way.

The KOF devised a multivariate approach to measure economic, social, and political phenomenon of globalisation. Macro factors like overall planning, infrastructure, info-structure, affordability of space, innovation, investment and quality of life, all complementary to each other, can help to better understand the potentials and the drawbacks of a global city. The
Asian cities whose economy was not noticeable until the 1970s made remarkable stride in global rankings. Economic development there brought improved infrastructure providing people with beyond basic welfare. Production system grew from primary to secondary, and then in some of these to tertiary. Driven by self-actualisation, they indulged into identity construction and global aspiration. Sim et al (2003) saw the arts, leisure and cultural lifestyle and city vibrancy to be lacking in Singapore. But the Foreign Policy Magazine published Index shows Singapore as the only Asian country among the top six global countries. It is also among the top 15 most globalising countries of the world, ahead of France, Germany, Australia, UK, and even USA.

The planners do best to use cultural icons to fulfil economic imperatives, serve national identity and pride, and shore up global city ambitions. Only grand infrastructure is inadequate for any city, national or global ambition. A range of place meanings, often discontinuous and fragmented, suggests that the cultural capital desired by state and city agencies may have little meaning to the population. Yet architectural symbols, urban flagships and mega-projects, with their underlying political and economic imperatives, help to create cultural assets in cities aspiring to become global city. Their roles in marketing the cities they are in, as well as the confluences and contradictions between global aspirations, national imperatives, and local daily lives, were apparent in this paper.

Both Hong Kong and Singapore command the region as highly connected gateways and international financial centres (Taylor et al, 2002). Preferred locations for the RHQs (Yeung et al, 2001), they were strategically located on the global transport and communication network with high quality producer services, skilled labour, and rich socio-cultural amenities. But laissez-faire in Hong Kong and interventionist economic strategies in Singapore were adopted to attain them (Lam, 2000). They have become global complexes not only of economic power, but also of socio-cultural influences in the world (McDowell, 1997; Thrift, 1994).

Internal problems and regional competitions, e.g. from China, shape Singapore’s global aspiration and development strategies. With institutional structure creating an entrepreneurial ambience- a launching pad to enter the Chinese market (Sim et al, 2003), Hong Kong has been a competitor too. Singapore’s global city aspiration having economic imperatives is matched by rallying the citizens around icons with a common global, national and local identity. Hong Kong’s outward global aspirations with such imperatives are not tagged with China. It is aware that to remain useful, it must stay ahead of China, rather than become ‘just another Chinese city’ (SCMP, 1999). Their cultural-global strategies relate differently to the nation—congruent (Singapore), and conflicting (Hong Kong) (Kong, 2007).

In Singapore, the ambitions and identity of city and nation are intertwined in its global aim; cultural icons capture the national imagination, and cultivate a sense of identity and global city-ness. However, it needs to develop local idioms, rather than giving in to internationalisation. The interlocking perspective of personality, identity and ambition result from being a city-state relied on global interconnections for economic survival (Kong, 2007). HK’s approach to cultural icons free of national agenda has economic
focus and the global ambition. Its civil society has championed social goals, participation, and cultural identity, underscoring the multivalent meanings of cultural icons (Kong, 2007).

Singapore had to suit its strategies to rapid development in the region, currency devaluations, and regional and global economic changes. Its strong institutional framework is able to meet increased competition from China, India or ASEAN neighbours. Due to the institutional participation in business facilitation and efficient servicing, there is business security in Singapore, substantiated by a pragmatic and efficient legal sector. It earns high points in the majority of the attributes of a good business community, e.g. overall planning, infrastructure and info-structure, quality of developments, investment capabilities and the quality of life. Kong (2007) branded it as 'a safe and secure city', 'a favourable place to do business in', and 'a city where things work'.

Skyscrapers, urban flagships and mega-projects have been used to boost the development and global prominence of both the cities, to "become important symbols instantiating global status" (Cartier, 1999). However, the respective cities' motivations for cultural development differ; various degrees of importance is given to local and national ambitions, and differing intersections of local, national and global, reflecting their different geopolitical situations. The political cultures of both affected the ways public respond. In Singapore, the one-party government could ignore public opinion; in more democratic Hong Kong, the public could ask the government to stop projects.

Hong Kong has been looking for a distinct identity since merger with China raised a few spectres. It is challenged with unemployment, deflation, budget deficit, and depressed stock market and real-estate; practice of democracy and participation without enraging the PRC; dealing of environmental concerns and improve the sustainability of new developments; tackling increasing population with higher expectations; improving education to produce a more creative, intelligent workforce; and enhancing life quality (Cullinane & Cullinane, 2003). External economic phenomena degraded its economy, created social confusion, and questioned the government's competence.

These precipitated into HK's increasing economic, social and cultural linkages with the mainland that has surged ahead in economic growth and socio-cultural changes. Given the relative cross-border positions, land and labour prices in Hong Kong declined due to the purchasing power parity, and it failed to restore the high land and property values. Thus the scope for making fortunes from property investment is no more there, and salaries are stabilising (Cullinane & Cullinane, 2003). The stark contrast has called for greater integration than contest to make HK prosperous, confident and self-assured.

Unlike Hong Kong, Singapore is both a city and a nation. To realise its vision as an intelligent economy, it not only needs to transform from a capital-intensive, investment-driven growth model to one that entails innovation, value creation and business spread, but also needs to maintain political stability, cordiality with neighbours, and synergistic working agreements. Such a transition already taking place in Singapore, will see changes in the
institutions and the business environment. The evolution into a new economy in the light of greater competition will pose new challenges for Singapore in its bid to remain global.

The government’s reluctance to undertake the remedies needed to increase integration with the PRD as a strategy to respond to market forces and meet objectives lacks strategic thinking. This could enhance Hong Kong’s intermediary role in trade between the mainland and the West, and make production facilities there easy to control by the HK investors. It could also help solve its housing, pollution and skills shortage problems. The HK entrepreneurs will continue investment in the PRD bringing greater efficiency. There is a recent trend towards the joint marketing of South China as the most suitable destination for business, overseas investment, joint venturing or simply trading. Whether Hong Kong then becomes ‘just another mega-city in China’ depends upon the relative economic success achieved by the emergent entity.

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Economy, Environment, Culture: Global Dreams by Two Asian Cities


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PARTICIPATORY PLANNING AT MESA-KORU:
TOWARD A MORE SUSTAINABLE FUTURE

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Abstract
This case study examines the process of a landscape renovation project of a public housing development in Ankara, Mesa Koru site. The Mesa Koru study discusses and explores new trajectories in the development of sustainable landscape development via a participatory approach. Through focus group discussions, design workshops and personal interviews, groups of residents and property managers were included in plan development. Results show that the community is ready to engage in building a more sustainable model for the future of the site with predictable costs shared by the community members. It is assumed that this new model, which involves a customized participatory design process, designed through collaboration between researchers, designers, and resident and management groups, will be a role model for all other public housing sites in Turkey.

Keywords
Public housing; sustainability; community participation; landscape design

Introduction
Rapid urbanization and migration from rural to urban settings since the 1950s, along with the high-density housing programs built after the 1980s have given rise to numerous urban environmental problems in Turkish urban settings (Erkan, 2002; Mengi, 2007), some of which could be addressed in a cost effective and sustainable manner through urban planning (Bademli, 1986). Although Turkey recognizes housing as a basic human need and the provision of housing as one of its fundamental responsibilities, healthy housing is limited in urban areas with large populations. Mass housing projects, which are usually developed by local governments with the support from the TOKİ (Housing Development Administration of Turkey), are intended to provide low cost housing developments for large populations and target low- and mid-income groups. These housing developments generally lack planned open and green spaces, and policies such as the Mass Housing Law, approved in March 1984, have no provisions of landscape installations in mass housing projects. The environmental impact of high density public housing in urban areas that lack essential open and green spaces includes high levels of air pollution and dust, pollution of natural resources, damage to natural topography, waste dumps and landfills, unsustainable resource use, and...
loss of access to natural areas and open spaces (Çalıș, 2002; Sarsözen, 1984; Yeğin, 1993; Özdemir, 2007). Landscape issues are primarily in the hands of private developers who have not had much interest in long term sustainability because they are primarily in business to make profits (Çalıș 2002; Altaban, 1996); thus, most practices adopt only simple landscape installations on limited parcels (Tapan, 1996), and most housing developments do not provide adequate, long term maintenance plans for outdoor spaces. Successful long term plans should stipulate financial support programs which will contribute to building and maintaining the site in terms of sustainability and affordability (Chougill, 2007).

Urban open and green spaces can have marked effects on many aspects of the quality of the urban environment; nature in urban settings improves the quality of life in many ways, beautifying cities and improving human comfort, health and economic well-being (Kaplan & Kaplan, 1989; Milvard & Mostyn, 1989; Wohlwill, 1983). These spaces, which have significant ecological, social and economic functions, are vital components of complex urban ecosystems (Bradley, 1995; Shafer, 1999; Tyrvainen, 2001; Lutz & Bastian, 2002). Good quality outdoor environments make people feel good about themselves and where they live and perhaps even foster more of an appreciation for the landscape than poor quality landscapes.

Furthermore, research supports the contention that nearby nature and designed green spaces, such as urban parks, add economic value to the residences (Gold, 1977; Orland, Vining, & Ebreo, 1992; Ulrich, 1986; Anderson & Cordell, 1988; Morales, Boyce, & Favretti, 1976; Smardon, 1988; Anderson & Cordell, 1985; Sheets & Manzer, 1991). Based on these benefits, the planning and management of residential landscape is essential to urban sustainable development (Miller, 1988; Grey, 1996; Teal et al., 1998). Additionally, sustainable approaches in the planning and design of outdoor environments could address some of the environmental problems in public housing sites; landscaping these sites not only provides an aesthetic appeal, but rather is part of a much larger natural ecosystem in urban environments (Ahern, 1991; Forman & Godron, 1986; Linehan, Gross, & Finn, 1995; Cook, 2000, 2002; Özdemir, 2007). These efforts are intended to promote and extend biodiversity within urban areas (Pickett et al., 1997; Jackson, 2003; Allenby & Fink, 2005). The challenge is to find a new vision where social and environmental benefits go hand in hand with lower costs and higher profits through a more sustainable approach (Hopkins, 2005).

In several reviews and research articles, sustainable housing development is mentioned in context of cultural perspectives in developed and developing societies (Anderson, 2006; Giuliani, & Wiesenfeld, 2003; He & Jia, 2007; Crabtree, 2005; Islam, 1996; Sunnika & Boon, 2003; Rousseau & Chen, 2001; Asadi-Lari et al., 2005; Hoversten & Hashem, 2000; Holden, 2004), including Turkey (Çalıș, 2002; Sarsözen, 1984; Yeğin, 1993). Chougill (2007) discusses the need to achieve sustainable housing in the future that is designed to meet three primary objectives: (1) policies that provide improvement of the outdoor environment, (2) empowerment of poor people, and (3) resident participation in the decision making and design processes. The third objective is the most influential in achieving sustainable housing development; residents’ participation in neighborhood decisions is considered a favorable method of forming an interactive relationship between the policy-maker and the locality, the living environment and the resident individual (Selman & Parker, 1997;
Taylor, 2000; Raco, 2007). None of these studies, however, focus on the importance of open and green space on the formation of healthy housing environments; they are more concentrated on policy development than on design implications.

The private sector has a major role in determining the nature of our cities and contributes to the formation of communities; some construction companies in Turkey have already changed from their traditional fragmented processes toward more client and environmentally oriented approaches, which recognize the importance of innovation, research, participation and ecological sensitivity (Myers, 2005; Schroepfer & Hee, 2007). The subject of this paper, Mesa Koru, is one of the most well known and regarded mass housing projects in Turkey, with its emphasis on environmental awareness and participatory programs. This case study introduces the successful efforts of a private company, Mesa Company, to build a sustainable and green housing environment along with a team of designers.

**Mesa Koru Site**

Over the last twenty years, a public housing community has been created at the Mesa-Koru Site, a mid- and high-income public housing development in Ankara, Turkey (Figure 1). This housing project, which would eventually become a community of 1600 dwellings constructed and operated by the Mesa Construction Company, is based on environmental and social aspects that highlight emergent forms of sustainable urbanism trends such as planning a walkable community and mixed-use development with a range of housing choices. Mesa Koru site was chosen by the authors of this study because it is a new city quarter in Ankara, eighteen kilometers from the city center that has the facilities to deal with waste and waste water on site, as well as retaining rain water within the locale. This housing project aims to be on the cutting edge of architectural and landscape design and is stellar example of public-private partnership in achieving the goals of sustainable planning, design and construction. The site has mixed housing types, rich landscape features and self-sustaining practices. The company housing policy aspired to design and construct the buildings in relation to their outdoor environments, develop a long-term management plan and provide maintenance processes after marketing. Several other housing developments in Ankara, such as Batikent co-op, Angora Houses and Konutkent Estates, attempted similar schemes; however, these organizations failed due to limited community participation and funding difficulties.

![Figure 1: The location of Mesa Koru in Ankara city and Turkey (Source: Authors).](image-url)
Outdoor environmental quality is an important concept in the Mesa Koru site; the goal is to create spaces for social interaction with an aesthetic appeal (Dülgeroğlu et al., 1996). Dr. Alaattin Egemen, the landscape designer, developed his design based on careful analysis of the site, which presents the characteristics of a dry climate and harsh land. Three years prior to the first phase construction in 1982, mature trees were planted to create a green environment. In order to form mass greenery, rapidly growing trees such as poplar (Populus sp.) and willow (Salix sp.) were planted. A total of twelve hectares of green space, more than 50% of the land, was planned as green space. A temporary nursery, which now operates as a permanent facility, was established to store plants and to organize planting processes. Major leading environmental processes included the construction of a waste water treatment center and water supply from three wells. Based on these practices and principles, Mesa Koru site has the potential to be a role model for similar planned communities with the goals of balancing buildings and environment in accord (Egemen, 2007). Building a site with such green landscape features on dry land and calling it koru—the Turkish word for grove—is a forward-looking and an optimistic approach (Figure 2).

Establishment of a Private Service Organization: KOSAŞ (Koru Management Company)

During the first years of occupancy, Mesa Koru lacked necessary environmental services such as public transportation, electricity and drinking water, due to lack of support from the surrounding municipalities. In order to provide these services to its residents, Mesa Koru management established a self-sustaining and self-supporting non-profit service organization called Kosaş (Koru Management Company) in 1987. The residents themselves pay for these services; Kosaş merely organizes the services for the residents.

This organization has been responsible for all required environmental and social services such as landscape maintenance and regeneration, cleaning, infrastructure development, maintaining public transportation and security, developing plans for water recycling, and organizing social activities. Kosaş operates as a private company that employs its own maintenance team, uses the site’s own resources and controls the financial system of maintenance without using any outside sources. The system is based on bridging the link...
between the residents and management—a participatory approach. Mesa Koru is one distinct example that has developed this model based on the principles of “gentlemanliness” or “trust” rather than written laws; currently, there is no law regarding the creation of building a community organization in housing developments. Residents of Mesa Koru actually trust the Kosaş—the managers and staff are residents of Mesa Koru—and pay for the proposed works of maintenance. The establishment of such models in other planned communities could prove to be quite difficult without written laws that define the process, duties and areas of work; other housing developments might not have the necessary social character to form an organization like Kosaş.

In short, the Mesa Koru community has already built a sustainable management model for ecological living and it has been successful for over twenty years. These practices, however, are now in question in terms of sustainability and long term support. This argument can be linked to the maturity and deterioration of the green areas. An expeditious maintenance plan should be adopted to sustain the current status of the development. Our attempt to propose a landscape renovation plan, which will be defined in the next section, is only one part of the whole desired planning approaches. This will inevitably be a role model for other developments.

**Landscape Renovation Plan**

Over the past twenty years, the landscape of Mesa Koru has matured and deteriorated by overuse. The needs of a new generation, more parking and aesthetic requirements should be sustained. These in turn require the planning of a renovation project which will be funded by the community; the community demand to participate in the process as well. The management established a maintenance protocol for the site with the supervision of a landscape team, which is responsible for improving the overall environmental quality, developing maintenance plans and proposing adaptation principles of landscape installations. Resident interest and participation in the plan, demand for the services that the project can provide, and willingness to contribute to the smooth functioning of the site are all critical factors in the ongoing success of this plan development.

In the design development, the landscape team worked extensively to define the problems and find solutions together with the residents and the management. The team, comprising researchers from a major university and practicing landscape architects, assumed the role of a catalyst designing a participatory process. The plan clearly states that resident participation and the collaboration of the designers and the management cannot be neglected. We, the landscape team, proposed a sustainable landscape maintenance and regeneration project, the object being the renewal of urban structures of the development leading to higher standards—improvement of attractiveness and value of the landscape features with soft and hard landscaping practices, concentrating on the value to the overall quality of the landscape with lower costs over the next five years. The project includes a comprehensive intersectional master planning stage and pilot projects in small scales, which were designed to address local needs and expectations. The criteria that composed this project included the following: (1) regeneration of the entire lawn areas, (2) renovation of the sport facilities including basketball and tennis courts, (3) developing recreation centers where residents can gather outdoors, (4) maintaining the running
and walking paths, (5) renovating and enlarging children’s play areas, and (6) proposing a waste management (Figure 3).

The Landscape Plan proposes a mechanism for the recycling of gray water, reuse of the organic material and a cost-effective financial plan for implementation. It also includes an organic material collection system to produce organic fertilizer, which will lower the costs of purchasing plant fertilizers. For this process, the landscape team proposed purchasing equipment such as compost converters, which were included in the proposed budget plan.

The first phase of the project, which is to be implemented in 2008, includes the design and application of a park with a rose garden, a flower terrace, a jogging path, fitness equipment, an irrigation system and site furniture (Figure 4). The proposed budget of the project is approximately 153,000 Turkish Liras (TL) ($127,000), which is funded primarily by the residents, who pay 37 TL (app. $30) per month for all public services. This first phase of the project will add 18 TL ($14) to their monthly bills. It is assumed that with a well illustrated and presented landscape plan with major benefits to the community, all residents will agree to pay this added cost. In order to gain resident approval and management support, a series of focus groups and design workshops, intended to promote and discuss the project, were conducted. The process included specifying the design and regeneration proposals on an annual basis. Each year, after residents allocate the funds, projects will be completed.
Methodology

The main purpose of this study is to help residents relate their daily life experiences to the design team’s proposals. In order for residents to participate in the discussion as active participants and in a meaningful way, they first must understand that the project proposals are conceptual ideas that can be altered. Focus groups, in this context, are an established and accepted research technique for qualitative explorations of attitudes, opinions, perceptions, motivations, constraints, participation, and behaviors. Focus groups are group-depth interviews in which a small group of participants (8 to 12) are interviewed at length about selected subjects. The use of
Focus group research provides researchers with insights, new hypotheses, and understanding through the process of interaction. Focus groups allow analyses of thoughts, attitudes, behaviors, and opinions that have a high level of content validity (Babbie, 2006).

Focus group research is considered qualitative research, which sacrifices reliability for increased validity; this means that although focus group findings cannot be replicated statistically as can sample surveys (high reliability), they often give researchers a more valid understanding of issues at the heart of a study (high validity) (Babbie, 2006). Methodological enhancements in planning and conducting the focus group sessions include development of a sampling frame to derive a representative group of participants, standardization of procedures through the use of a moderator’s training manual tailored to each group, identification of topics to broaden content areas and stimulate discussion, and creation of a comfortable environment in which participants could express issues (Debus, 1990; Engelbrektxson, 2002; Krueger & King, 1998; Krueger & Casey, 2000).

Focus group discussions enabled participants to understand the complex landscape design process and then discuss its consequences and advantages to everyday life experience. These discussions focused on individual residents’ perceptions of their housing site and their personal stories (Krueger, 1998). The discussions were moderated with questions regarding why each individual choose Mesa Koru for a permanent residence. We used open ended questions so as to encourage residents to share personal stories—why each chose Mesa Koru, what each found attractive about the outdoor environment, and how they would like to participate in the regeneration process of the site for the next five years. These discussions focused on individuals’ perceptions of site and their real-life stories. The management had canceled some design proposals during the first construction phase because of environmental concerns, and a number of high-rise buildings were never completed because they would have blocked the view along the main entrance. We asked the residents about these canceled phases of construction. On the basis of a concern with social and institutional facets of sustainability, focus group discussions centered on the development process, and the relationships and social dynamics revealed by these.

In a participatory planning process, it is important to develop a representative sample of resident and stakeholder groups within the development. In order to better understand the spectrum of needs and desires for sustainable features, we chose various types of participants for the group: (1) residents, (2) building managers, (3) company management, and (4) members of the design team. In May and June 2007, two meetings with twelve participants were held to accommodate the selected participants. We sought to identify the background of the site, potential for participation of the different groups and conditions that would help facilitate the accomplishment of such a project. Individual interviews with selected members of the community and Mesa Company served as yet another method to garner management input.

In developing the content of the discussions, the team had several initial concerns: first was the topic of sustainability appropriate in the context of a participatory process for the development’s
future. The agenda was developed to include the following sequential elements and goals: presenting landscape design proposals; understanding the site’s needs; identifying the future of the site; maintaining financial support for the renewal projects; identifying the site’s core values and visions; the opportunities and constraints to sustainable development; the possible future of the site and the type of reflections that users make; and the possibility of participating in future planning for sustainable development. The primary objective of the participatory planning process, gathering first-hand information about residents’ and management’s attitudes toward the site, was important to specify the site’s value. The analysis of these focus groups and interviews was an iterative process. The moderator took notes and observations at the time of the focus group. Discussions were videotaped and these recordings were reviewed. Detailed notes were taken during the sessions, including quotes that would be incorporated into the focus group report.

In November 2007, the design team participated in a general assembly meeting, Koru-Gen (Koru General Meeting) in which more than fifty residents and representatives of the management participated. The goal was first to present to a larger audience the landscape project and then to introduce the outcomes of the focus group discussions and personal interviews regarding the project. After a brief presentation of the plan objectives with a set of goals and a budget plan, participants were asked to express their ideas regarding the plan and then their willingness to participate in and fund the plan development and implementation.

Results

Focus groups and discussions during the general assembly meeting enabled participants to anticipate problems and opportunities in the new landscape design by identifying participants’ perception of positive and negative environmental factors. During these discussions, participants introduced different scenarios of site living problems and landscape implementations for the previous two decades. The result was that participants were actively involved in the decision making process and many useful dialogues about environmental issues transpired. The residents, who generally appreciated the existing landscape, not only approved of a long term plan, they also requested a plan for the interim because they were very much aware of the current deterioration.

Focus group participants were asked which environmental features and measures they would consider in sustaining the current status of the site; plants and material quality along with the improvement of the existing outdoor facilities were the most frequently desired measures to be implemented both in new and existing sites. Improvement of accessibility to facilities, along with safety and maintenance were mentioned during discussions. Participants all agreed on the need for a renovation landscape project due to the deterioration of the existing green spaces; this fact particularly indicates the residents’ awareness of environment and the value they place on green space. All participants also agreed that Kosaş is an important part of the current maintenance system, as well as a competent manager of costs; therefore, this voluntary non-profit service organization should continue in its role for the benefit of the community, including the aesthetic quality of the site.
Another major outcome is the recognition of the need to present and promote the proposed landscape plan during other general meetings. The need for renovation of common green and open spaces, and cost management based on the public and private spaces were also specified by the participants of focus group discussions. During scheduled meetings and in the general assembly, the landscape team presented the content and benefits of the plan. The prevailing conclusion of the general assembly was to promote the advantages of the plan to all residents via publications such as local newspapers and magazines. Participants agreed to launch the implementation of the first phase and to pay for the extra cost. One participant, who had experience as a counsel man for a local municipality—and hence, knowledge of that municipality’s perspective with regard to building projects—proposed coming to an agreement with that municipality and requested that the municipality approve and apply the project. The team decided to invite the municipalities and the Mesa Company to take part in the renovation process to share the costs. All participants spoke favorably of preserving the rich environmental features of the site, and all agreed to implement the plan. Although the plan is in its preliminary phases, the landscape team has received several positive feedbacks from the residents and the management. These methods were quite successful for presenting and promoting the renovation project.

Conclusions

In Turkey, lack of financial support and people’s attitudes toward the environment, limited social participation and support for development plans remain major obstacles to achieving a sustainable development for residential landscapes. Companies build the developments based on standards that usually exclude landscape installations because these features add to construction costs. Landscaping the mass housing sites in Turkey is often perceived as being a luxury, elitist, and even sometimes anti-development. Simple landscape installations in state owned projects are not satisfactory and these projects fall short in developing long-term landscape maintenance plans. The focus should be more on the maintenance of the existing green areas rather than on including them in the provision plans. A system of participatory decision support is therefore required to reconcile the greening requirements of the community, and the ecological benefits of urban biodiversity. We emphasize the importance of local community participation to the success of urban greening.

In the past, private builders were prone to excluding any plans for landscape and environment, but the current business culture now views such features as profitable endeavors due to consumer demand. In order to attract potential buyers, companies advertise their projects with their planned landscapes and gardens. Hundreds of future residential developments will benefit from similar plans and organizations as seen in Mesa Koru and these models will increase the long-term success of landscape installations. With a management system like Kosaş and the inclusion of the community to the decision-making process, landscape of large scale housing developments will be kept self-sustained.

The results of this case study indicate resident awareness of outdoor space and strong support from residents and the management for improvement of the green space. Building aesthetically pleasing outdoor environments,
however, is not sufficient; builders should ideally develop a system to sustain the future of the environmental aesthetics of their housing sites. Mesa Company has led a sustainable approach that utilized maintenance issues after marketing the development. The early established organization now serves as a non-profit service provider maintaining the overall quality of the outdoor environment. Mesa Koru has also applied productive approaches to encourage effective community participation with a strong management system. It is believed that the proposed landscape plan for the Mesa Koru will achieve great success in pursuing sustainable landscape practices. However, Mesa Koru is only one example and more planned communities should adopt similar models for the overall environmental quality of our cities. The policymakers, municipalities and private companies should include similar plans in their development approaches; new policies and standards should be included in development plans for more sustainable residential landscapes.

**Expectations for the Future**

The replacement of a housing program with planned strategies of renovation, maintenance and regeneration will benefit both the public and the environment. In this context, developers, managers, residents and planners should adopt sustainable planning practices. Unfortunately, the pressure to meet mass low-cost housing targets, coupled with the high cost of implementing services (water, sanitation, roads, electricity) within limited budgets, has relegated environmental impact concerns to a low order of priority, which is the general limitation and problem in developing countries. The provision of easy access to realistic building standards and to affordable building materials along with environmental sensitivity are some of the options toward achieving sustainable housing sites in Turkey.

Sustainable development is a concept adopted in recent years in order to orient societies’ development so as to create a promising future for the coming generations. Housing sites integrated successfully with the natural environment, employing sustainable practices through a participatory approach, may provide a solution for our urban environments. We have illustrated these benefits with the results of a qualitative research project analyzing an experience based on the landscape renovation of a mass housing site. This experience of collaboration between managers, designers and residents constitutes an example of a successful community initiative that integrates sustainability criteria through a participatory approach.

The project is a pioneer in Ankara’s housing development, which has opened the channel for the residents to participate in the regeneration and design process of their own sites. In fact, this is not the conclusion but rather the beginning of a long-term process. The next step is to promote the plan and explore its characteristics and consequences in various arenas. This paper presented the experience of a design team engaged in the current conventional practice of public housing design in Ankara. The participatory approach is a crucial element in the process of creating a more reflective design process. The process and methods used in this project will be documented and presented to provide an example that has the potential to positively influence the way future public housing projects are designed and maintained in Turkey.

Research should direct designers to define the
overall characteristics of a housing site. We are looking for an environmentally friendly living situation that helps reduce negative impacts on the environment. Sustainability in the context of a community network is a complex concept and one that must be able to embrace change and flexibility. The process reported in this study should encourage other similar public housing sites in developing countries to adopt this approach. It is not capable of resolving all of the problems but it can help to renovate existing sites with public participation.

Notes

1 The constitution of the Republic of Turkey clearly states that “The State shall take measures to meet the needs of housing within the framework of a plan ... and environmental conditions shall support mass housing projects.” (Article:57). In a similar manner, Article 56 of the Constitution states that “every citizen has the right to live in a healthy and balanced environment.”

2 Environmental sustainability is the ability to maintain the qualities that are valued in the physical environment. Threats to the aspects of the environment mean that there is a risk that these things will not be maintained. A sustainable community should provide adequate access to green spaces for its residents. One of the goals in creating a sustainable landscape is the maintenance of the vital resources. The basis of adequate maintenance is two-fold: additional funding and expanded public participation. Mesa Koru expands the civic commitment to public participation in supporting the green resources and recreational facilities. A living resource requires consistent funding for regular, long-term management planning. It also requires a reliable, skilled and experienced work force to observe the landscape over time and to recommend maintenance based on these observations.

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THE ROLE OF THE LIVEABLE PROMENADE IN REVITALIZING AN ENTERTAINMENT TOURISM CITY: THE CASE OF SHARM EL-SHAIKH, EGYPT

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Abstract
Promenades are major constituents of entertainment tourism cities and their contribution to liveability adds value to the entertainment qualities these cities have. Sharm El-Shaikh is one of these leading entertainment tourism cities. Its fame as a city of peace makes it attractive for a large number of tourists. Naama Bay is the major natural/urban feature for the city’s entertainment zone. A large part of the city’s reputation for liveability is directly related to the qualities of Naama Bay’s promenades.

This paper tackles the relationship between the typological structures of these promenades and the liveability of Naama Bay. It analyzes the environmental and urban contexts that control their role, and investigates their morphological analyses, spatial configurations, activities, and different architectural and urban treatments. This paper uses these analyses to identify a set of parameters that controls the liveability scale of these promenades, and consequently the liveability of their wider context.

Keywords
Tourism city; recreation, liveable promenade, Sharm El Sheikh.

Introduction
The importance of liveability has lately been discussed frequently (AARP, 2005). The variety of approaches that tackle ‘liveability’ reflects the wide range of its related practices and application requirements. This is a direct function of community typology and the specific role played by ‘liveability’ at different community scales.

This paper follows the ‘Place Making’ approach as being relevant to understanding of liveability in recreational and entertainment tourism communities. This approach takes into account the vital role of ‘place’ as a media of community interactions (people/people – people/place). The typology of recreational and entertainment activities takes the quality of these interactions as a parameter of their success. This is based on the hypothesis that the prosperity of these communities is related to their qualities as ‘places’ that have potential to meet their people’s needs.

The physical planning of Naama Bay is similar to that of many other tourism centres spread
along the coastal highway by the Red Sea in Egypt; its ability to attract an increasing number of tourists cannot be denied. Its reputation as a distinguished tourism centre is based on its ability to configure both natural and spatial potentials to allow for a better interaction between people and place. These potentials are utilized to meet the needs of this recreation and entertainment community.

Promenades, spread along Naama Bay, are among the most vital aspects of its physical structure. They are the domain through which people experience Naama Bay as a ‘place’. In addition, they are the medium within which the entertainment and recreational community is formulated. This paper investigates the potential of these promenades to play their assigned role in meeting the needs of the tourism community in Naama Bay. To achieve its goals, this paper classifies these promenades into four main types. It studies the needs of the recreational and entertainment tourism communities, and it analyzes the role of these promenades in meeting those needs.

The Recreational Tourism Community in Sharm El-Shaikh

Sharm El-Shaikh is a major recreational tourism centre by the Red Sea. It is situated on the southern tip of the Sinai Peninsula in Egypt, on the coastal strip between the Red Sea and Mount Sinai (figure 1). Its natural resources, particularly its long stretches of natural beaches, together with its proximity to European tourism markets, have stimulated the rapid growth of its tourism industry. Guest nights increased from 16,000 in 1982 to 5.1 million in 2000. The total number of resorts increased in that period from 3 to 91 (TDA, 1998).

Naama Bay is the central resort area of Sharm el Sheikh. It comprises a stylish strip of hotels, with an attractive pedestrian promenade along its sandy beachfront. The promenades at Naama Bay are the central attraction of the community of resorts and tourist facilities that make up Naama Bay. Through their quality of design, the promenades’ attractiveness for tourists is utilized as a catalyst for the flourishing of the sense of entertainment along this area (TDA, 1998).

Figure 1: Naama Bay’s location on the coast of Rea Sea (Source: http://www.onasdivers.com/maps_naamabay.shtml).

Morphological Analysis of Naama Bay

The planning morphology of Naama Bay is shaped by two main physical constraints: the coastal highway system and the setbacks. The first of these is a significant feature shaping development along the Red Sea. It is the spine around which each tourism centre grows and splits the tourism centre into two zones. Accordingly, the development of tourism centres follows two consecutive stages; the first is confined between the coastal line and the highway, and the second is spread on
the upland side. Another typical planning constraint is the existence of the setbacks from the high water mark to the building front lines (at seafront properties) and other open spaces in each of the tourism centres (figure 2). They represent important opportunities to ensure attractive and accessible pedestrian, bicycle and horseback-riding use (TDA, 1998).

The tourism centre in Naama Bay has been developed in two consecutive stages, like all the tourism centres along the coastal highway. Its subdivisions are planned with parcels on both sides of the highway, i.e., a row of properties on the waterfront side and a row on the upland side. Adjustments are made to minimize the negative impact of the coastal highway going through the Naama Bay tourism centre. These give priority to pedestrians at a number of key points that link the upland resort properties to coastal amenities. Moreover, the careful planning of commercial centres, secondary circulation throughout the tourism centre, and vehicular / pedestrian access to coastal amenities (beaches, marinas, drive sites, and so on) minimize this negative impact (TDA, 1998).

In spite of all of these adjustments, the tourism centre is physically split into two parts, which negatively affects its unity and cohesion.

The waterfront side is shaped based on a pattern of non-contradicted motor and pedestrian circulation routes. This permits the accessibility of all parcels of the tourism centre and facilitates pedestrian movement along its different promenades.
Four types of promenades can be identified when analyzing the spatial morphology of the waterfront side of Naama Bay. They are organized in a hierarchy starting at the coast highway (road) and ending at the beach. These categories are as follows (figure 3):

A) The first is a major promenade starting at El-Salam Road, going towards the beach. It is largely a pedestrian route except for a small portion of it where vehicles and pedestrians meet without connecting. A large number of light-structured cafeterias and restaurants are spread along one side of the promenade. Moreover, a number of franchises, nightclubs and restaurants are grouped near the final portion of it. They greatly contribute to the lifestyle of this part of the city.

B) The second is located at the heart of Naama Bay. It runs parallel to the beach line. It is a completely pedestrian route starting at the end of the first promenade. Different pedestrian amenities and cafeterias are continuously spread along the promenade. They define an attractive space. Additionally, they act as a magnet for a very large number of tourists, creating a vibrant street life, especially at night. Beyond the slight definition of the pedestrian circulation route, the promenade is physically well defined by tourist buildings and facilities (mainly hotels).

C) The third category contains a number of small pedestrian promenades that link the second type to the main beach promenade. They penetrate the tourist development parcels adjacent to the beach. They are mainly passageways for pedestrians to access the beach. A small number of shops, kiosks and beach amenities are spread along these promenades.

D) The fourth is a coastal trail (or corniche) traversing the setback along the entire coastline. It provides more than a path for pedestrians. It is a commercial and social centre for at least a portion of the resort community. Through its linear nature, it offers the opportunity to link all parts of the resort community using design elements such as paving, plantings, street furniture and lighting.

In addition to these key types of promenades, a number of platted walkways between different destination points (marinas, beaches, commercial areas, highways, and so on) have been developed to promote walking opportunities. They connect the coastal trail with a system of horseback trails, bicycle paths and walking trails along the wadis and across platted walkways. They present varied systems of circulation that connect the visitor with the mountains, the sea and to all points of interest throughout Naama Bay (IDA, 1998).

Place Making as an Approach to Liveability

Different 'Liveability' definitions show that a liveable community is something that everybody wants, but that does not mean the same thing to all people (TRB, 1997). This study discusses through which the physical characteristics of the community as 'liveability' indicators. Such approaches see that a liveable community has affordable and appropriate housing, supportive community features and a number of shops, kiosks, and beach amenities are spread along these promenades.
services, and adequate mobility options, which together facilitate personal independence and the engagement of residents in civic and social life” (AARP, 2005, p. 2). The second addresses the ability of community members to interact with these qualities to achieve liveability. This approach defines liveability as “the quality of life experienced by a member of a community and affected by a sense of belonging to a unique town, one’s health condition, and chances to enjoy public amenities.” (Scott et al, 2008, p. 5).

Figure 3.a: Promenade (A) (Source: http://www.flickr.com/photos/sunrisecalls/2424854393/

Figure 3.b: Promenade (B) (Source: Author).

Figure 3.c: Promenade (C) (Source: (http://www.touregyptphotos.com/showphoto.php?photo=1821&password=).

Figure 3.d: Promenade (D) (Source: (http://www.touregyptphotos.com/showphoto.php?photo=1819&password=&).

Figure 3: Four Types of promenades at the waterfront side of Naama Bay. (Source: Author).
These compatible points of view and their related definitions highlight the mutual relationship between the physical characteristics of a community, and the way community members interact with these qualities to achieve liveability. This relationship is a function of both its two variables; people and places. However, Donovan Rypkema defines ‘place’ as the vessel within which the ‘spirit’ of community is stored, and ‘community’ as the catalyst that imbues a location with a ‘sense’ of place. He asserts that “The two are not divisible. You cannot have community without place; and a place without community is a location. A group of people with a shared concern but not a shared place is an interest group, not a community” (Rypkema, 2004, p. 16).

Making communities liveable through the ‘Place-making approach’ tackles this inseparable relationship between ‘Community’, and ‘Place’ (figure 4). It connects understandings of liveability with the specific places used by people in communities. It begins at the scale that a community finds both manageable and relevant. This works in two parallel and compatible ways: the first is to assess the concerns and needs of the community and then using this assessment to make improvements to the places in that community. The second is to identify the specific places used by people.

Communities that are based on entertainment tourism activities have their own particular character. They are developed based on a direct relationship between people who are sharing the same interests – entertainment activities – and places that have to meet their recreational and entertainment needs. Time is another important aspect to be considered.

These communities are based on short time relationships between people and people, and people and place. Two levels of ‘liveability’ are to be addressed. The first is the micro level, ‘vitality’, which is more relevant to the short-term community formulation. It is concerned with meeting the needs of ‘people’. The second is the macro level, ‘liveability’, which supports long-term relationships related to the ‘place’ itself.

Figure 4: Place-Making approach to liveability (Source: Author).

The Role of Promenades in Meeting Community Needs in Naama Bay

Meeting community needs in public open spaces is the first line of attack for ‘place making’ as a liveability approach. An understanding of the purposes of these places and their use by people is essential for any speculation about
their qualities. People generally go to public open spaces for specific reasons. In recreational and entertainment communities, those reasons involve long-range purposes and are often less obvious, for example, than the need for a change or the opportunity to exercise.

The specific reasons drawing people to entertainment tourism areas reflect many aspects of life, especially urban life. One reason is the need to escape from the confusion, noise, crowds and “overload” (Milgram, 1970) in urban surroundings – notable features of complex, urban settings. In this instance these tourist communities are provide a contrast to the order of daily life. They satisfy the periodic need people have to regroup their resources. As such, users usually use such words as “relaxing and comfortable,” “tranquil, peaceful urban oasis, sanctuary” when giving reasons for coming to recreational and entertainment tourism centres (Nager & Wentworth, 1976).

Within the wide range of literature that discusses human needs in urban open spaces (Whyte, 1980; Lang, 1994; Francis C & Marcus, 1997; Francis M, 2003) stand the needs determined by Carr, Frances, Rivlin, & Stone, as particularly applicable to recreational and entertainment communities (Carr et al., 1992). They identify five types of needs people have in public spaces: comfort, relaxation, passive engagement with the environment, active engagement with the environment, and discovery. Any one encounter with a place may satisfy more than one purpose.

**Comfort**

Comfort is a basic need. Without comfort, it is difficult to perceive how other needs can be met. Relief from sun or access to sun are major factors in attaining physical comfort in urban open spaces. These factors directly influence the way public open places are used at Naama Bay. The high average temperature in Sharm El-Shaikh ranges from 15-35 Co (59-95°F) in winter, and from 20-45 Co (68-113°F) in summer)- especially in summer – causes the majority of community members to escape from the sun. This has direct impacts on when and how different promenades at Naama Bay are used. People usually use these promenades just to access the beach during the day, as they do not have sufficient protection against extreme weather conditions, but they become attractive places at noon and at night. On the beach, shade from trees and umbrellas, and some forms of shelter are used to meet the needs of people that may not value maximum exposure to sunlight.

The large variety of physically comfortable seating in promenades (A), (B), and (D) is an added value to the quality of these spaces in meeting the need for comfort (figure 5). This includes steps as a fixed seating option, seating that is movable, seating for individuals and groups, seating that enables eating, talking, resting and privacy, and seats with backs. Most of these types are offered in the street cafés and vernacular Bedouin tents—used as cafeterias—spread along these promenades. The pedestrian public amenities contribute less to meeting this need. They lack a number of important features of physically comfortable seating. This includes the orientation of the seating, and its proximity to areas of access. Promenade (C) doesn’t have any major seating facilities as it is used mainly as a beach access route.
Figure 5.a: Vernacular Bedouin seating at promenade (A) (Source: http://www.kontours.info/sharm_picture.htm)

Figure 5.b: ‘Sittable space’ – promenade (A) (Source: http://www.flickr.com).

Figure 5.c: Varieties of seating at street cafés – promenade (B) (Source: Author).

Figure 5.d: Seating orientation - attaining social and psychological comfort. (Source: http://www.holiday-beds-direct.com).

Figure 5: Comfort aspects along the promenades of Naama Bay. (Source: Author).
In addition to physical comfort, seating spread along the promenades offers a large degree of social and psychological comfort as well. The variety of types and themes meets the need for a “sittable space”, as William Whyte states: “it is particularly related to choice: sitting up front, in back, to the side, in the sun, in the shade, in groups, off alone” (Whyte, 1980, p. 28).

The layout of the seating orientation along the promenades at Naama Bay is another aspect that provides social and psychological comfort. They are generally organized to allow people to be seated facing pedestrian flow, so they can avoid sitting with their backs turned to all or part of this traffic. This is achieved, for example, in promenade (B) where the space proportions and the density of pedestrians create a vibrant promenade.

A sense of security is another important aspect of social and psychological comfort. It is a deep and pervasive need that extends to people’s experiences in public places. The features that reduce threats to safety are likely to increase comfort in public settings (Franck & Paxson, 1989). While this value is among the most critical aspects to be achieved in other types of communities, the nature of recreational and entertainment communities facilitates attaining this value. This is achieved in Naama Bay’s promenades mainly by separating the movement of vehicles and pedestrians. In addition to design features that enhance the area’s openness, providing visual access into the site, the large number of people in the space is a vital means of achieving natural surveillance.

**Relaxation**

Relaxation is distinguished from comfort by the level of release it describes. It is a more developed state with body and mind at ease. Relaxation is frequently cited by designers as their goal in planning space, and the description of a site as “relaxing” defines the experience possible in the place more than the physical setting, although the two are clearly interrelated (Carr et al., 1992).

Promenades at Naama Bay offer a brief pause from the routines and demands of city life. Their configurations, which offer respite from or contrast to the urban lifestyle, appear to be prominent among the factors that support relaxation. Separation of different traffic modes, and banning vehicular traffic in promenades (B), (C), and (D), makes it easier for users to be relaxed. This is supported by a complete sense of safety and security resulting from the large number of people usually using these promenades at night.

Natural features – particularly water and trees and other greenery – have been found to be the dominant factors in attaining a sense of relaxation (Carr et al., 1992). Regarding Naama Bay, water is seen as a key landscaping attribute (figure 6). In addition to the main water feature – the beach – there are a number of fountains spread along the promenades. Another major water element is the falling water located at the intersection of the promenades (A) and (B). It uses the natural features and the change of level to naturally accentuate the place. Furthermore, the natural features of promenade (D), its landscaping elements, proportions, and direct links to the beach increase its ability to meet this need.
The Role of the Liveable Promenade in Revitalizing an Entertainment Tourism City: The Case of Sharm El-Shaikh, Egypt

KHALID S. AL-HAGLA

Figure 6.a. Falling water located at the intersection of the promenades (A) and (B) (Source: Author).

Figure 6.b. Natural features at promenade (D) (Source: http://commons.wikimedia.org/wiki/File:Naama_Bay_Promenade_R01.jpg).

Figure 6: Relaxation aspects along the promenades of Naama Bay. (Source: Author).
Passive Engagement

Passive engagement with the environment could lead to a sense of relaxation, but it differs in that it requires an encounter with the setting, albeit without becoming actively involved. This category includes the frequently observed interest and enjoyment people derive from watching the passing scene (Carr et al., 1992). In Naama Bay, there are many examples of places – spread along its promenades – that serve this function, and their popularity testifies to this need.

According to Whyte (1980), “What attracts people most, it would appear, is other people” (13). When analyzing the behaviour of people in Naama Bay, it is found that the favourite seating places are adjacent to the pedestrian flow, in particular, near street corners. The open cafés along the promenades (A,B,D), and especially (B), are enjoyed as much for the opportunity to watch pedestrian traffic as for their refreshments. Moreover, the restaurants at promenade (A) have obtained permits to spill over onto the streets as this contributes positively to the vitality of the promenade.

In addition, both natural and physical characteristics of the site and the type of architecture used to define space facilitate visual contacts with people while they are physically separate. The upper balconies from which one may look down at the crowd allow the observer to “watch people while avoiding eye contact” (Marcus, 1978, p. 39). This is particularly important in observing performers and formal activities (figure 7).

The physical and aesthetic characteristics of Naama Bay are among the qualities that draw people to urban open spaces. The promenades' scenery and panoramic views are important aspects of the enjoyment of the public scene. They have a strong drawing power because of the vistas they offer, especially the waterfront at promenade (D). They give people the opportunity to observe games and sporting events that offer a kind of desirable passive engagement. Moreover, different landscaping elements spread along the promenades give people the strongly desired opportunity to be close to plants, trees, flowers, and water; there is some evidence that these elements have relaxing and “restorative” qualities (Hartig, Mang, & Evans, 1991; Kaplan, 1983, 1985; Kaplan & Kaplan, 1990).

Figure 7: “Watching people while avoiding eye contact” – promenade (B) (Source: http://www.flickr.com/photos/cheekablue/36696977/in/set-72157594495875763/).

Active Engagement

Active engagement represents a more direct experience with a place and the people within it. Although some people find satisfaction in people-watching, others desire more direct
contact with people—whether they are strangers in a site or members of their own group. (Carr et al., 1992).

Christopher Alexander addresses this need in discussing the role of promenades in creating communities. He states that “people with a shared way of life gather together to rub shoulders and confirm their community” (Alexander et al., 1977, p. 169). This behaviour is clearly noticeable on Naama Bay’s promenades, especially on promenade (B) (figure 8). Nodal spaces (promenades’ intersections especially (A) and (B)) facilitate contact between strangers. These hubs encourage a sense of social connection, increasing opportunities for interaction. In these places people are able to “make out the faces and half hear the talk” (Alexander et al., 1977, p. 313) in addition, dynamic encounters with physical elements of a setting represent another dimension of active engagement. This leads to direct physical contact rather than just being within or moving across a place. This is clear at some nodes where young people gather to join nightclubs and discos.

The quality and the diversity of the natural features shaping the face of Naama Bay inspire a sense of challenge and mastery. Consequently, they stimulate community interest and use. This, in addition to a number of traditional activities, results in what Alexander calls “triangulation” whereby these features “provide a linkage between people and prompt strangers to talk to each other” (Alexander et al., 1977, p. 94).

The activities practiced in Naama Bay – water sports in particular – add another opportunity for positive engagement (figure 8). They enable participants to exercise both their bodies and their competitive desires, which is an attractive challenge for young people. Moreover, for adults, particularly young adults, considerable socializing occurs in the context of recreation.
Ceremony, celebration, and festivity are imperative qualities that the promenades in Naama Bay facilitate. Their spatial configurations work together to achieve the required joyousness that the community needs. The complexity and diversity that promenades (A) and (B) have in particular are responsible for giving people the opportunity for positive engagement in multifaceted activities that encompass people - watching, socializing, being entertained, and consuming or buying food and other goods.

**Discovery**

Discovery represents a desire for stimulation and the delight people have in new, pleasurable experiences (Lynch, 1963). In the context of public open spaces, discovery has some specific meanings. It is the opportunity to observe the different things that people are doing when moving through a site (Carr et al., 1992). The major aspects of discovery in Naama Bay appear to be diversity in the physical design and the changing vistas. Changes in perspective offer a succession of vistas to enjoy. Lynch (1963) suggests that contrast and juxtaposition of elements can provide a pleasurable sense of surprise.

The natural change of level overlooking the promenades (promenade B in particular) has the potential to meet the requirements for this need (figure 9). People enthusiastically use the cafeterias located on these levels as they offer different views of the Bay. In addition to these physical qualities, for discovery to be part of the community experience, it is essential to have changing human activity. The place itself must provide the stimulation that enables users’ interests to endure. While a sense of discovery is enhanced by the design of these long, perpendicular promenades, it has the potential to be increased by the development of more activities and events.

In spite of richness in both natural variety and activities in Naama Bay, it has less ability to meet the `discovery’ need than ‘Safaris’, where tourists go on organized trips with Bedouins to the hinterland deserts. The experience of discovering these deserts includes a sense of mystery that tourists prefer. They go to new places to discover their special qualities, to meet new people, to find new challenges in landscapes that contrast with familiar ones.

![Figure 9: The natural change of level overlooking promenade (B) (Source: Author).](image-url)
The Liveability of Naama Bay Promenades

There is a general consensus on the characteristics of liveable streets. At a minimum, they seek to enhance the pedestrian character of the street by providing a continuous sidewalk network and by incorporating design features that minimize the negative impacts of motor vehicle use for pedestrians. (Duany et al., 2000; Ewing, 1996; Jacobs, 1961) However, the study of liveability in Naama Bay’s promenades extends beyond these initial liveability requirements. These promenades offer complete segregation of different types of movement. While all of the promenades (B, C, D) are for pedestrians only, promenade (A) permits a balanced coexistence of both vehicles and pedestrians. In this promenade, an important role is played by roadside features such as street trees and on-street parking, which serve to buffer the pedestrian realm from potentially hazardous oncoming traffic, and to provide spatial definition for the public right-of-way. While most would agree that the inclusion of trees and other streetscape features enhances the aesthetic quality of a roadway, there is substantive disagreement about their effect on safety. (Duany et al., 2000; Jacobs, 1993) However, the small number of palm trees and other trees spread along the promenades doesn’t create any threat to safety or security. In addition, the high density of pedestrians, especially at night, offers high degree of natural surveillance.

Walkability is at the heart of creating liveable promenades. It plays a key role in place making, leading to the creation of a sense of community identity and unity. In Naama Bay, unique structures that are compatible with the character of the community (e.g., streetscapes, facilities and trails, and public open spaces) are a source of distinctiveness. High pedestrian activity on the street is also an important factor in decreasing criminal activity, which is detrimental to any community’s sense of place and unity (Scott et al., 2008).

Among the approaches used to assess a community’s walkability, ‘NED’ is a simple and practical one (Scott et al., 2008). It examines three study areas, Network, Environment, and Destination, as a three-pronged parameter to assess a community’s walkability. Applying these parameters to Naama Bay shows the positive performance of the promenades’ network. This refers to the presence and completeness of the pedestrian network including sidewalks, paths, trails, crosswalk connections, and direct routes between destinations and origins. Moreover, these promenades offer a pleasing and aesthetically appealing environment. They are safe, secure, and barrier free, and adequately orient buildings and walking spaces. In addition to this, the promenade network is designed to promote access to the community’s major destinations, especially the beaches, with carefully studied distances between origins and destinations (short and direct routes). This assures the quality of Naama Bay as a ‘Walkable Community’. The promenades meet the majority of the items included in IPA ‘Implementation Checklist for Walkable Communities’: Continuity, Safety, Comfort, Convenience, and Visual appeal (Table 1).

The Role of Promenades in Naama Bay in Attaining Community’s Liveability

The following matrix (Table 1) correlates aspects that are responsible for meeting community
needs in recreational and entertainment communities with the different spatial and physical configurations of Naama Bay’s promenades. It shows the role played by different types of promenades in increasing the community’s vitality. Furthermore, it can be used to evaluate the performance of these promenades compared with the roles they are

| Table 1: The matrix of recreation and entertainment community needs (Correlating aspects responsible for meeting community needs with the different spatial and physical configurations of Naama Bay’s promenades. (// Direct positive influence / Indirect positive influence X Negative influence – No influence ). (Source: Author). |
assigned to achieve.

**Conclusions**

This paper follows the ‘place making’ approach to verify the parameters of ‘liveability’ in recreational and entertainment communities. This is based on a valid hypothesis that relates the success of these communities to their settings’ ability to accommodate recreational and entertainment-related behaviours. This paper places special emphasis on five major needs that are important to recreational and entertainment communities: comfort, relaxation, passive engagement with the environment, active engagement with the environment, and discovery.

With these findings, this study addresses the role of promenades in Naama Bay, Sharm El-Shaikh, Egypt in attaining a vital and vibrant recreational and entertainment community. However, it classifies the spatial morphology of Naama Bay into four main types of promenades. They are the domain through which these needs are met. This paper concludes with a matrix that correlates aspects responsible for meeting community needs with the different spatial and physical configurations of Naama Bay’s promenades. This matrix shows the positive role that the promenades in Naama Bay play – in general – in meeting community needs. They utilize all of their configurations (proportion and space definition, natural features, activities and events, amenities and landscaping elements, and pedestrian facilities) to create a liveable tourism community. A thorough analysis of this matrix shows that:

- The positive role that both (B) and (D) promenades play in meeting most of the needs of the recreation and entertainment community in Naama Bay. The proportions of promenade (B) (height and width), the activities (especially the street cafés spread along the promenade), and the distinguished pedestrian facilities are all responsible for meeting different community needs (‘passive engagement with the environment’ in particular) and providing walkability, thus creating a liveable environment. In addition, natural features and activities practiced along promenade (D) are responsible for meeting the needs of ‘active engagement with the environment’ and ‘relaxation’ as major needs for a recreational tourism community.

- The minor role played by promenades (C) in the Naama Bay community. Their role is limited to beach access. Their amenities, landscaping elements, and activities do not actively contribute to meeting community needs, especially the need for ‘discovery’.

- The proportions of promenade (A) and the coexistence of vehicles and pedestrians in the same space (regardless of their physical separation) produce a feeling of discomfort. In contrast to this, natural features, amenities and landscaping elements practiced along the promenade are responsible for meeting the needs of ‘active engagement with the environment’ and ‘discovery’.

**References**


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Sources of Photos


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CONTROLLABILITY OF TRADITIONAL NEIGHBORHOOD AND ITS SIMPLIFIED LAYOUT

M. Salim Ferwati

Abstract
Street hierarchy, as a way of presenting intended information, conforms to social rules that underlay architectural and urban designs to create public, semi-public, and semi-private. These social rules have the responsibility to convey necessary information about place to outsiders as well as to insiders. This research looks at urban spaces as physical structures that represent foci of attention of users and that are collectively a part of the social pattern framework. The argument of this study is that connectivity and forms of streets house certain social rules that intended to serve users, so that any changes in the street layout lead to changes in its social rules. As a case study, the complexity of a walled Arab neighborhood was examined through Sur Lawatyia, located in Muscat Governorate, Oman. By replacing the curvilinear and broken streets of this neighborhood with straight ones; a simplified street layout was derived. Then, a comparison of both street layouts was carried out through mapping, tabulation, charts, correlation test, and with reliance on the method of measurement of street control values introduced by Hillier and Hanson in 1984. The result was that the simple form is far short to be the representation of the space syntax of the traditional street layout.

Introduction
The study of street syntactic and the social logic embedded in urban space relatively is a new area of social science. It helps to examine exiting street network or a proposed one and highlight their syntax, hoping to explain some phenomena (Hillier, 2005) or predict one. Street syntactic is a semiotic component (Morris, 1938-71) that is a formal property of physical and social environments as they are construed by society (Broadbent, Bunt, Jencks, 1980). This formal property is a set of rules that governs the assemblage of outdoor units into a coherent spatial arrangement. Based on Hillier and Hanson’s concepts of the social logic of space (1984), these rules are developed as rules of privacy, security, segregation, non-interference, integration, control, and publicness. These culturally-socially based rules govern the use of spaces to maintain different degrees of inhabitant-inhabitant’s and inhabitant-stranger’s relationships.

In traditional cities, street layout is a mix of curvilinear, broken, and dead-end streets, as well as various width and sudden turn situation. The complication of the street syntactic emphasizes the segregation and other related social rules.

Keywords
Control value; given value; social rules; social environment; simplified street layout
(Ferwati, 1993). After all, the complication of the traditional neighborhood has evolved through time reflecting the social interaction of its participants and their various needs. As Harrison and Dourish (1996) explicitly stated, “space is the opportunity, place is the understood reality”. But what if the same street layout is presented in a simple layout, would it produces different space syntax? The answer for this question forwards the aim of this paper.

Before going ahead in this research, it is important to define related terms: space syntax, stranger, outsiders, connectivity, and spatial controllability, as used in this study. Syntax in linguistic terms refers to rules governing the formation of sentences to convey messages among people (American Heritage Dictionary); these urban social rules convey messages for both inhabitants and strangers (Hillier and Hanson, 1984). A narrow street with one entrance and no outlet to others, means that “this place is not for public use; it is for inhabitants and insiders to use”. “Space syntax then begins by studying the phenomenon of space as it is found in the real world, and from this works towards an understanding of the spatiality of human activity” (Hillier, 2005, p.4). The term “outsider” refers to the residence of different part of the neighborhood, and to visitors whether relatives or friends; while the term “stranger” means the outsider who has no business in the neighborhood or relation with the inhabitants, as a result, they are not expected to wander through the resident area.

Based on Hillier and Hanson’s work in 1984, the connectivity of urban spaces takes its community significance according to its degree of integration and controllability. Integration of a space is the overall integration of a space with every other space of the estate. Controlled spaces are those spaces with a high degree of inaccessibility. It is determined by the number of connections with neighboring spaces (Hillier and Hanson, 1984, p. 109). When a space is controlled (has minimum accessibility from neighboring spaces), inhabitants are secluded from strangers, and thus they can enjoy a high degree of privacy. Privacy was defined by Irwin Altman as a “selective control of access to the self or to one’s group” (cited in Gifford, 2002, p. 211). Also, a controlled space is secure as a result of segregation and protection from strangers’ interference. The term controlled space may not figure as social control similar to a policeman who monitors and sometime checks the ID of those who come in and out (Jacobs, 1993). It engenders the feeling of being in one’s own private place where one has the right to give a questioning look or to avoid unfamiliar faces (Krupat, 1985).

In order to measure the controllability of traditional urban spaces, Sur Lawatyia (walled Lawatiya), as an example of Arab traditional walled neighborhoods, is considered. With the size of 100 by 160 meters, Sur Lawatiya belongs to Muscat Governorate in Sultanate of Oman (Map 1) (Damluji, 1998). It has been evolved to ensure a high degree of security, privacy and isolation from surroundings estates while at the same time occupants feel togetherness and belonging. This walled neighborhood is protected by a main northern gate facing the sea.

It is worth mentioning that this neighborhood characterized by narrow streets (range from 1 - 3 meters), short, irregular width, and its circulations are used mainly by pedestrians. These urban characteristics have social interaction significance on the inhabitants. Jacobs (1995)
pointed out that inhabitants’ interaction within their space increases when they are familiar with each other. Of course, this results from frequent meetings and eye contact among inhabitants and the related absence of unfamiliar faces. Gehl (2008) elaborates on how the physical design of a neighborhood helps to create eye contact and socialization among people. The relationship among users of Sur Lawatyia may result from the personal distance in public space that is large enough so it does not permit people to ignore the presence of others or turning their side or back, especially where the personal distance is less than the front. Similar argument is supported by the works of Tuan, 1990 and Hall, 1990.

**Research Methodology**

The logic behind this measure relies on the proposition introduced by Hillier and Hanson (1984) that the higher the number of connected spaces with space X, the less control space X will have. The determination here is based on a route’s accessibility to immediate neighbor(s). For example, space X gives a full share to the space that is connected with it; this share is called the given value. If the space X is connected with “n” number of spaces, space X gives each neighboring space a share equal to 1/n. The degree of controllability of a space (C. value) is the summation of all given values (G. value) that are received by the space from its neighboring spaces.

For the estate of Sur Lawatyia, the space-layout is so complicated that the simple calculation becomes a laborious one. The first step requires the replacement of the streets’ layout with their axes. A curved space is represented by broken lines. Then, every line (or space) is assigned an ID.
Controllability of Traditional Neighborhood and its Simplified Layout

Map 2: Sur Lawatyia with the axial and ID numbers assigned for its street network (Source: Author).

Map 3: The simplified map of Sur Lawatyia and streets’ ID numbers (Source: Author).
number. The result is shown in Map 2.

Since the objective of this study is to determine the social representation of the curved and broken streets, the second step is the redraw of Sur Lawatyia's street map in a simple layout. The simplification is presented in Map 3 where, for example, streets 2, 10, 11, and 12 combined in one straight street and all numbers of the street remained in parentheses for the benefit of comparison. Also, all dead end-streets became straight since they are single broken spaces. In order to demonstrate the distribution of different social zones of both maps, the third step is to calculate the \( C \) value for each space. The results show that for the traditional spaces the \( C \) values ranges from 0.17 to 4.53; while for the simplified spaces \( C \) value ranges from 0.09 to 4.5. In the following step, it is important to determine the thresholds for different social zones. For public and semi-public zone, there are no defined criteria to select control value thresholds; Hillier and Hanson (1984) used 25, 50, and 75 percent of the control values. The mean value can also be used as a threshold but it divides the spaces of a resident area into two zones only, that is above or below the mean value. Since the street network has (according to many researchers such as Newman, 1972) up to three zones: public, semi-public, and semi-private, the mean values are not considered here.

To select the threshold for the high, moderate, and low-controlled spaces, we seek the case of the minimum connection for each type. This is because the less connection a street has, the higher given value to neighboring spaces. Taking this condition into consideration, Figure 1 illustrates the minimum connection of three levels of controlled spaces. That is a dead-end street for the high-controlled space; one dead-end street and a public pace for moderate controlled space, and three connections for a low-controlled space.

The dead-end street is an extreme case of high-controlled space because it has only one single exit street. This exit street gives a maximum \( G \) value of \( 0.5 \) to the dead-end street; minimum connection with the exit street represents the maximum given value to the dead-end street. Therefore, the \( C \) value of 0.5 is selected as the maximum threshold for high-controlled space. The moderate-controlled space, or exit street, is connected with one high-controlled space and one low-controlled space. The high-controlled space gives the maximum given value of 1 to the moderate-controlled space.

The low-controlled space has the minimum connection; therefore it gives the exit street a \( 1/3 \) share = 0.333. The \( C \) value for the exit space in this example is the sum of both received given values.

Figure 1: Minimum connections with three types of streets: (1) High, (2) Moderate, and (3) Low-controlled spaces. (Source: Author).
(1 + 0.33 = 1.33), representing the maximum C. value or threshold for moderate-controlled space. In brief, between the highest and the lowest C. values, the classification of three levels of controllability of spaces is defined as follow:

1.32 and lower = High-controlled space  
1.33 - 1.49 = Moderate-controlled space  
1.50 and higher = Low-controlled space

Accordingly, the calculated C. values were divided into three categories that were illustrated in Maps 4 and 5.

Discussion

This analysis provides different possible inhabitant-outsider encounter situations, and not inhabitant-inhabitant encounters. As defined above, inhabitants of one street are outsiders for inhabitants of other streets within the same neighborhood. For the comparison of both the traditional map and its simplified layout, it is important to examine two aspects: 1- the spatial distribution of streets with different control values; and 2- changes in the strengths of the degrees of controllability.

Spatial Distribution of Streets with Different Control Values

An investigating look at Maps 4 and 5 confirms that the number of streets in the traditional street pattern is reduced in the simplified layout almost to half, from 78% to 40%. However, the major percentages go to low control values of 26% and 28%, and high control values of 69% and 72% respectively. Both maintain no significant differences. In regard to the moderately controlled streets, the number is very small (4 out of 78) in the
traditional map while none is found in the simplified map. Despite the close to tied percentages between both groups of control values, this finding does not illustrate the syntactic changes of the spaces’ distribution. Systematic analysis of Maps 4 and 5 shows different connectivities of social spaces: low, moderate, and high-controlled spaces where the examination of each type raises several questions: Are they located, in the core or in the periphery? Are they radial or parallel, cluster or evenly spread pattern? Are they long or short? And, how they cross the area?

Map 4 shows that low controlled spaces form 26% of the total streets while map 5 shows 28%. In the former case, there are major roads (17, 66, and 64) located in the middle of the neighborhood. As a broken road, these roads lay east west forming the longest street of all. Some other low controlled roads lay northward and the southward, as the case of roads 9, 25, 67 and 56. In the simplified map, we have roads 17, 66, and 64 in the center and others with similar low C. value lay above it (as roads 35, 26 and 42, 43, 47, 49, 50, 51, 53) and below it (as roads 15, 4,6,7,8, and road 2,10,11) with link roads such as roads 3, 13, (21-22), (25-26), 70, (39-38), (44-45), (67-69), and (55-56). They are clustered in forms of loops or grid-like core.

The moderate-controlled roads for map 4 are very few and represent only 5%, which are of relatively medium and short length; while the high-controlled spaces that are relatively short and medium, represented two third of all spaces in both maps. In the traditional Map 4, high-controlled spaces are found as dead-end and connector streets; while in the simplified Map 5 there are only dead-end streets with exception of four connectors: 3, 9, 20, and (31-32-30).
In both maps (4 and 5), there is a lack of intermediate or semi-public zones. Semi-public space is also called the filtering zone because it works on reducing or filtering the types of users who enter the place. As a result, it is evident the dramatic shifts from semi-private to public, such as streets 26, 57, 65, and 68. In typical cities or unconfined neighborhood, the absence of semi-public zone is responsible for the increase in crime rate (Newman, 1972) and the social isolation (Jacobs, 1995). In the case of walled neighborhood of Sur Lawatya, the isolation of the strangers is determined by the single gate, enforcing low control level on street 1. Therefore, I believe, the direct connection between Low and High controlled spaces is acceptable here since all residents in this compact neighborhood know each other at least by family names, as one of the residence told me. In a relative sense, the presence of strangers becomes unusual in this zone while the present of outsiders, defined earlier as friends or relative, is expected.

Changes in Strength of Control Values

Investigating changes in the strength of streets’ control values is important for the comparison between the traditional street layout manifested by both broken and curvilinear streets and their transformation to straight lines. This investigation points out two questions: Is there changes in the strength of C. values? If yes, is there a correlation between C. values of the traditional streets and that of their counterpart of the simplified layout? To answer both questions, an examination of C. values in Tables 1 and 2 is possible through two statistical tests, the standard division and the correlation coefficient test.

By a close look at the related data, it is clear that C. values unevenly range between the lowest number (0.09) and the highest one (5.29) that found in the simplified map. The scatter chart shown in Figure 2 demonstrates changes of all traditional streets’ C. values and its counterpart of simplified ones. The mismatch of C. values of both cases is clear. In another word, the level of controllability changed more or less besides a shifting up of the mean value from 1.06 (in the traditional map) to 1.36 (in the simplified layout). Additionally, the Standard Deviation for the traditional C. values is 0.802, while for the simplified C values is 1.402, proving that the Standard Deviation of the traditional C. values is relatively closer to its mean value than that of the simplified one.

Figure 2: Comparison of the dispersion of 78 C. values of traditional and its simplified streets. The mismatch between both cases is clear. (Source: Author).
To find out whether this mismatched of C. values of both cases can be correlated, a performance of a correlation coefficient test is performed. It reveals an intermediate value of 0.53466, a demonstration of a lack of a strong correlation. Since not all C. values have the same degree of correlation, Figure 3, a plot of C. values of traditional map against C. values of the simplified layout, helps to determine the strongly correlated values from the weak ones.

Figure 3: Correlation plot for paired comparison of 78 C. Values of the traditional and simplified maps (Source: Author).

David Lowenthal (1972) used strong resemble lines with an equal division of the scatter chart by a center line and two other dash lines. Likewise, Figure 3 was constructed. The closer of a control value to the center line, the higher its correlation and the farther the weaker is its correlation. The other two dash lines form a strong resemble cone where that value lying inside has strong resemblance, while the one located outside has a weak resemblance. Therefore, streets lying outside the cone of a strong resemblance tend toward either Y or X. The former pertains to the simplified data that has 15 streets, while the latter pertains to the traditional data that has 18 streets. Streets lying outside the cone form 42% of total streets, an indication of moderate resemblance of C values between both cases.

Conclusion

Outdoor spaces are perceived and cognitively understood by the social rules (publicness, privacy, security, etc.) governing space accessibility and shape (straight, broken, or curved). This produces a coherent spatial and semiotic arrangement. The method followed in the analysis of these coherent spatial arrangements helped the construction of maps to show locations of public, semi-public and semi-private spaces in Sur Lawatiya and its simplified layout. However, these maps only give a general interpretation of the social logic. For traditional neighborhoods, syntactic analysis of the relationships of outer-spaces at the local level helps understand the social rules that govern the logic of space connectivity. It means looking at given space relationships with neighboring spaces. It was demonstrated through a comparison study of Sur Lawatiya, a traditional Arab neighborhood, with its simplified layout. The study focuses on streets’ spatial distribution besides strength and correlation of their control values. This result suggest that both traditional and its simplified layout cannot clam similarity, as both have different space connectivities.
References


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SETHI HAVELI, AN INDIGENOUS MODEL FOR 21ST CENTURY ‘GREEN ARCHITECTURE’

Samra M. Khan

Abstract
In the 21st century, there has been a growing concern for the degradation of the environment from large quantities of CO2 and green house gases, produced by the building industry. This led to the concept of ‘Green Architecture’, which aims to reduce the environmental impact of buildings through energy efficient designs and healthy indoor environment. In the context of Pakistan, our current practices in architecture are based on Western standards, leading to a growing dependence on fossil fuels and resulting in rapid environmental degradation. Rapoport (Rapoport, 1969) states that, modern solutions to climatic problems often do not work, and homes are made bearable by means of mechanical means whose cost sometimes exceeds that of the building shell. Before the import of the Western model for architecture, vernacular architecture provided energy efficient and sustainable spaces. Pearson states that, the new importance of vernacular building is that it has vital ecological lessons for today (Pearson, 1994). In the current scenario, the study and analysis of indigenous architecture can help in developing a home-grown and workable model for ‘Green Architecture’ of 21st century Pakistan. In this paper the climate responsiveness and appropriateness of the Sethi haveli, Peshawar, are analyzed in order to understand the indigenous responses to the issues of environmental comfort. The focus of the study will be the courtyard and how it provides thermal comfort and day-lighting to the building.

Keywords
Green architecture, Sethi haveli, indigenous architecture, environmental comfort.

Introduction
Today, the building sector uses up to 30-40% of the world’s total energy consumption (I.E.A., 2008). In developing countries (World Energy Outlook, 2007) it accounts for a much higher percentage. A large portion of the energy used in buildings is used for achieving thermal comfort for the inhabitants through cooling, heating and lighting. This energy is produced by burning of fossil fuels, which result in the production of CO2 and green house gases. Developing countries like Pakistan will make a substantial contribution to the CO2 emissions from its commercial and domestic (21% of total energy consumption) energy usage (ENERCON, 2006).

The concept of green architecture took shape when the usage of fossil fuels began to do irreparable damage to our environment. Green architecture involves a holistic approach to the design of buildings so that the many conflicting issues and requirements; of ecology, economy...
and human wellbeing are integrated. Modern buildings are increasingly unable to adapt to a warming climate and are inherently energy intensive. In contrast, vernacular architecture is more adaptable to the environment, according to principles evolved over many generations. Evolution in the paradigm of traditional housing took place from the 18th century onwards due to socio-political and socio-economic reasons (Salama, 2006). This resulted in a complete disregard of vernacular technologies, many of which were energy efficient as they worked with natural forces (sun-light, wind etc.) to create buildings that minimize consumption of natural resources and their subsequent depletion. As our climate heats up and changes, the need to study and understand vernacular buildings in the context of green architecture increases.

This research explores the havelis of Sethi Mohalla, Peshawar, Pakistan, with a view to address the benefits of the vernacular courtyard form of design and speculate its appropriateness in the modern architectural arena of Pakistan. The seven Sethi havelis are located on Bazaar Bolan Road near Gor Khuttree. They were constructed without any mechanical means, and thermal comfort was achieved through climatic modifying strategies like internal courtyards, orientation, thermal mass, solar gain and evaporative cooling. Rapoport (1969b) observed that vernacular solutions are a response to climate and culture.

**Green Architecture and the Haveli Form**

The Haveli is a courtyard house, a predominant form used in the Indian sub-continent since the cities of Mohenjo-Daro and Harappa. The courtyard form developed as a response to climatic and cultural factors in regions as wide spread as Europe, Middle East, and Asia. Bahadori (1978) states that the courtyard introverts space to fulfil several functions, including the creation of an outdoor yet sheltered space, the potential to use indigenous passive cooling techniques, protection against dust storms, and the mitigation of thermal heat from the sun. Courtyards represent an attempt to bring the forces of nature under partial control (Reynolds, 2002a). European, Middle Eastern and Asian courtyard forms share similar properties of modifying climatic conditions both cold (Mänty, 1988) and hot. Edward (2006) notes that Western and Eastern types adjusted their orientation and designs to balance the benefits of wind and the sun. The courtyard typology is a more sustainable form of housing as it allows constant contact with the natural world; sun, fresh air and water (Sibley, 2006). Revivalist architects like Fathay have advocated for and successfully incorporated courtyards in their design for modern housing.

The environmental performance of the courtyard form in relation to the pavilion form was studied at Cambridge University (Martin & March, 1972). Results confirmed that courtyards performed better than pavilions in terms of efficiency in built potential and day-lighting. Raydan et al (2006) re-evaluated the original study and concluded that the best form in environmental terms (without sacrificing floor space for a given plot of land) for hot arid climates is the courtyard form.

**Climatic Conditions**

The Peshawar district lies between North latitude 30°40´ and 32°31´ and East longitude 71°25´
and 72°47’.

The city of Peshawar, experiences longer summer spells; May to September and shorter winters; December to February, the moderate weather is in October, November, March and April. During the summers, the mean maximum temperature is over 40 °C (104 °F) and the mean minimum temperature is 25 °C (77 °F). In winters, the mean minimum temperature is 4 °C (39 °F) and maximum is 18.35 °C (65.03 °F) (Weatherbase: Historical Weather for Peshawar, Pakistan). The architectural design of buildings must address the problems of both weathers and provide relief accordingly.

The mohallas of the city employ various passive design measures to combat the extremes of weather including the use of narrow and winding streets, the huddling of the various havelis together to protect against excessive heat and cold. By avoiding exposing individual external walls, an optimum indoor temperature is achieved in both summers and winters. The courtyard form is dominant in the tightly packed traditional architecture of Peshawar city.

Methodology of the Research

A case study research method has been adopted for analyzing a representative sample of the havelis of Sethi Mohalla, in order to understand their inherent bioclimatic responsiveness and use of natural and renewable energy sources.

The research tools include:
• extensive surveys of the courtyard houses observed,
• interviews with the residents of the havelis,
• on-site photography,
• analytical sketches.

The Allah Buksh Sethi haveli was chosen as the final choice for the case study based on the following factors:

1. All the Sethi havelis are similar in their use of high thermal mass construction externally and lightweight construction on the inside facade.
2. The size of the courtyards in relation to the total volume of the havelis and their aspect ratios were similar.
3. The Allah Buksh haveli was accessible for data collection and detailed study.

The analysis of the Allah Buksh Sethi haveli was done with respect to the comfort of the courtyard and the surrounding rooms. To understand the bioclimatic significance of these havelis, the analysis is based on courtyard thermal performance with respect to both solar shading and day-lighting.

The Allah Buksh Sethi Haveli

The Karim Buksh haveli, constructed in 1898, was the largest haveli of the Sethi Mohalla (and possibly of the area), which consisted of separate courtyards and spaces for the mardana (men’s area), zenana (women’s area) and servants’ areas. The zenana quarters were turned into an independent haveli by Allah Buksh Sethi in 1930.

The haveli has a central courtyard measuring 40' x 40' with a water fountain in the center. There are wooden arcades on all four sides, housing the balakhanas (reception rooms) on the ground floor. The balakhanas are elevated five feet above the courtyard and three balakhanas (NE, NW & SW) have large tehkhanas (basements) underneath them. The
balakhanas, the rooms behind them and the tehkhanas all receive sunlight, air and ventilation through the courtyard.

**Courtyard and Climatic Comfort**

The placement of the central courtyard, its size and orientation are important aspects of the design. The courtyard plays a major role in the modification of the harsh summer and winter environment by providing a comfortable microclimate for the haveli.

**Form and Orientation of the Courtyard**

The courtyard forms a perfect square and occupies nearly 30% of the total haveli area. The surrounding walls rise to 19’ and there are overhangs of 6’ wide on three sides, whereas the NW side is covered by a thakht, protecting that side from excessive solar exposure. The

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*Figure 1: Ground Floor Plan of the Allah Buksh Haveli (Source: Author).*
The courtyard is laid in a SE-NW orientation. This is about 40° off the cardinal points, which exposes the NW wall to morning sun. The NE wall also gets the sunlight from early morning until midday, after which the sun penetration is largely controlled by the takht on the NW side (fig. 2). The lower winter sun is able to penetrate the courtyard (NW, NE & SE sides) until mid-afternoon i.e. 4 pm (Personal observation on site 15th Nov. 2008).

**Courtyard and Thermal Comfort**

The intense heat and glare from the sun, especially in the summer months can easily cause overheating, discomfort and glare if the courtyard is not designed and protected properly. The Sethi haveli employs multiple devices to avoid heat gain through the courtyard, through a variety of permanent and temporary shading devices; wooden arcades, roof overhangs, lattice-work screens, stain glass windows etc.

**Roof Overhangs of the Courtyard**

The courtyard is protected by 6’ overhangs on all four sides (figure 3). On the NW side there is a thakht (fig. 4) for sitting and eating meals on the first floor. This blocks excessive sunlight into the courtyard and provides vital shade. Early morning, late afternoon and a lower sun path in winter are the only time that direct sunlight may fall on the internal walls of the courtyard.
Open-able Shading Devices
There are iron loops and hooks on the sides of the overhang of the courtyard indicating the use of a large covering which was tied to cover the opening of the courtyard. This was closed in the day to reduce direct sun penetration and glare. During mid-day (the hottest part of the day) of the hottest summer months, the amount of light and heat are greatly reduced. The cover was folded away in the early evening, when water is sprinkled on the floor of the courtyard to facilitate evaporative cooling, ventilation and cold-sky radiation.

Large Fabric Fans in Courtyard to Promote Air Flow
A steel rope was hung across the opening of the courtyard; this had large loops which held a large fan. The fan was moved manually to increase the air flow within the courtyard and into the balakhanas.

Water Fountain in Centre of Courtyard
There is a water fountain in the courtyard, which inducts water into the air. This cools and moistens the hot dry air inside the courtyard and the balakhanas providing relief from the hot dry conditions.
Sprinkling Water on the Floor
Water was sprayed on the brick floor of the courtyard in the mornings and evenings and this encouraged cooling of the area through evaporation.

Analysis of Thermal Comfort of Courtyard
Exposure of the Courtyard: Aspect Ratio
The courtyard’s effectiveness in terms of environmental response may be measured by studying its aspect ratio (Reynolds, 2002b). The aspect ratio is a measure of the degree of the courtyard’s openness to the sky; a greater aspect ratio indicates that the courtyard is more exposed to the sky.

The Allah Buksh Sethi haveli’s courtyard has an Aspect Ratio of 2.11. This indicates that this is a relatively shallow courtyard and thus has good exposure to the sky. This exposure allows winter sunlight to warm the courtyard and the rooms on the N, NE and S sides. The summer sun will also heat up the courtyard floor but most of the balakhanas are protected by the overhangs and the takht on the NW side. The courtyard floor which is heated during the day is quickly cooled by evaporative cooling (wetting of the floor) in the early evenings and radiation to the cold sky at night time. This aspect ratio allows direct and diffused light into the courtyard and

Figure 4: Takht on first floor; covering the courtyard. Taken by author on October 21st 2008. (Source: Author).
facilitates entry of the wind.

**Solar Shadow Index and Winter Solar Penetration**

Another aspect of comfort is the solar shadow index, which deals with winter sun exposure in the courtyard. In the context of the Sethi haveli, the solar shadow index was calculated as 0.575. This value shows that the courtyard well is not very deep and allows more winter sun on the Sethi haveli’s courtyard’s sunny (NE) face at noon. The haveli’s living rooms on the SW sides are used in the summer and the main NE balakhana is predominantly used in the winters as this side gets the maximum winter sun all day (figure 5).

**Courtyard’s Role in Modifying Extreme Temperatures**

The hottest summer month is June when the temperature swings between an average high of 81°F/27.2°C - 101°F/38.33°C. In order to test the assumption that the courtyard forms modify the external temperature extremes, the temperature of the Sethi courtyard in relation to the outside temperature (taken as 38°C) was calculated:

\[ 14(1 - 0.759)°C = 3.374 °C \]  
(Reynolds, 2002c)

The calculated temperature difference that the courtyard offers from the outside is 3.374°C. Thus, for an external temperature of 38°C the Sethi courtyard will maintain a temperature of about 34.62°C.

**Daily Temperature Range (Summer)**

Discomfort in the hot-dry summer is also caused by the extreme diurnal swings in temperature. In order to understand the courtyard’s response to the diurnal temperature swings, its response to the daily temperature range was calculated. The average temperature range of Peshawar is 11.13° (between 27.2°C – 38.33°C).

The calculated range that the courtyard offers is between 29.5°C – 34.62°C; a variation of 5.12°C. The courtyard form avoids large heating and cooling ranges and is effective against the extremes of the diurnal swings in temperature during the day. Thus the temperature within the house is more stable and thus more comfortable.
The Courtyard and Daylight

To fulfill the needs for adequate day-lighting, there is the need to maximize light through ample window area, yet protection and shading must be provided to prevent solar gain. In the context of daylight, various factors influence the amount of daylight available in rooms: these include the path of direct sunlight on the facades, the ratio of room sizes and the proportion of window size to floor size.

Solar Angles of Summer and Winter Sun

To calculate how much of direct sunlight penetrates the courtyard and into the balakhanas in summer and winter, the angle of the summer and winter sun into the courtyard were calculated. The noon solar angle for summer solstice was 79.5°, this is almost a straight angle of the sun. The height of the balakhanas (raised 5’ off the courtyard floor) and the overhang of the courtyard (6’) protect them from direct solar penetration in the summers. Thus direct sunlight into the balakhanas is averted in summer by design. The winter solstice angle of sun is 32.5°, this much lower angle of the sun. It is facilitated by the design of the haveli, and sunlight penetrates the courtyard floor and all rooms on the N, NE and NW sides, during the day. A graphic representation is given in figure 6.

Figure 6: Section (SW-NE) showing the path of summer and winter sunlight. (Source: Author).
The importance of the solar path during the summer and winter months has played an integral part in the design and layout of the balakhanas and dalans of the first floor. All windows are placed within the internal courtyard and are protected by the overhangs of the courtyard roof. The NE side of the haveli is deeper than the other sides of the haveli due to maximum amount of sunlight in this direction. The largest tehkhanas (basement) is also located on the NE side, its ventilators face the courtyard, and provide ample amount of light in the daytime.

Ratio of Room Size
In the Allah Buksh haveli, all rooms on the ground, basement and first floors face inwards and are dependent on the courtyard for daylight. As a consequent the layout of the balakhanas are adjusted in such a way that the longer side of the room lies along the courtyard and the depths of the rooms are shallow in comparison. For even distribution of daylight, Reynolds (2002d) specifies the preferred proportion of a room adjacent to a courtyard should be 3 : 1 (length along courtyard to rear wall of room). The proportions of the balakhanas of the haveli also show a longer length to width ratio (Table 1).

The NE balakhana receives the maximum amount of direct and reflected sunlight in both summer and winter and thus has the lowest length to width ratio (2.4:1). The three other balakhanas have greater proportions (2.7:1), their size allows maximum amount of direct and defused light to enter the rooms (figure 7).

Proportion of Window Size to Floor
The relationship of the window size to the total floor area of a room also determines the amount of daylight in a room. According to Reynolds (2002e) the larger the window relative to the floor area, the higher the daylight factor (DF). This relationship is calculated for the balakhanas surrounding the courtyard and presented in table 2:

The above table shows that there is a high percentage of window area to the floor area of the balakhanas. The three balakhanas (SE, SW and NW ) have 40%- 66% of window area to floor area, as these are facing away from the sun, there is a need for larger percentage of window area. The NE balakhana has the lowest percentage of the window area to floor area (33%), and by virtue of its location on the sunniest side of the courtyard, this is a deliberate design element to control the amount of light and the resultant heat.

Elements to Control Glare
Although there are continuous windows along the internal arcades, yet they have multiple operable parts which facilitate the amount of daylight admitted to the rooms. The balakhana window shutters may be opened to create an arcade along the courtyard and this allows maximum amount of light and ventilation to reach the rooms (fig 9). The windows are made of multiple components so that they may be opened and closed in parts to control the amount of daylight admitted inside. Stain-glass windows in these shutters also diffuse the bright sunlight (fig 10). The use of ventilators on top of the windows also are a controlling elements, as they may be opened up and tilted to adjust light in the room.
Table 1: Ratio of balakhanas length and width (Source: Author).

<table>
<thead>
<tr>
<th>Orientation of Balakhana</th>
<th>Length along the courtyard</th>
<th>Width</th>
<th>Ratio of room, length : width</th>
</tr>
</thead>
<tbody>
<tr>
<td>NE balakhana</td>
<td>35’2’’</td>
<td>14’7’’</td>
<td>2.4 : 1</td>
</tr>
<tr>
<td>SE balakhana</td>
<td>21’8’’</td>
<td>8’2’’</td>
<td>2.7 : 1</td>
</tr>
<tr>
<td>SW balakhana</td>
<td>34’</td>
<td>12’3’’</td>
<td>2.7 : 1</td>
</tr>
<tr>
<td>NW balakhana</td>
<td>32’6’’</td>
<td>11’8’’</td>
<td>2.7 : 1</td>
</tr>
</tbody>
</table>

Figure 7: SE Balakhana. Taken by author on January 15th 2009. (Source: Author).

Figure 8: Windows of the internal arcades. Taken by Author, October 2008 (Source: Author).
Conclusions

Today the typical architectural solution to global warming concentrates on making buildings more efficient by enclosing them with glass and increasing the use of mechanized cooling and heating systems. There is a need to look at courtyard buildings not just as remnants of the past, but rather as lessons for our future. Fathy (1986) states that traditional solutions in vernacular architecture should be evaluated, and then adopted or modified and developed to make them compatible with modern requirements. This research concludes that by opening up the house around a courtyard form creates more thermally comfortable conditions inside the house and also improves the amount of daylight in the house, thus reducing dependence on mechanical energy.

In the analysis of the Allah Buksh Sethi haveli we observe that the factors of shape and size configuration and orientation of the courtyard has an impact on its environmental performance. Reinvesting in the successful vernacular courtyard house by updating its features and amenities to provide for contemporary needs is the answer to our quest for green architecture.
A number of general design guidelines can be deduced from this study:

- Reintroduction of the courtyard form in homes as a garden or parking area; the size of the courtyard to be calculated so that the square of average height of the surrounding walls should be less than area of the courtyard. An aspect ratio that is not too shallow (increases summer heat gain) and not too deep (decreases daylight penetration) is important. A balance between the two is ideal for winter solar penetration, adequate daylight and ventilation benefits.

- Orientation of the house to avoid solar gain in summer and utilize prevailing winds on site. In the context of Pakistan, a N-S orientation is best as it reduces lengths of South facing facades.

- Opening majority of windows within the courtyard to benefit from its micro-climate. Calculation of summer/winter sun angles for designing window overhangs to maximise daylighting and minimise glare in the summers and allow winter sun penetration. Providing multiple openable components within windows to increases the ability of the occupants to control the level of light and heat in the room.

The need for making today’s architecture green may well be served by employing climate responsive designs based on vernacular architecture. Modern interpretations of these principles can be energy conserving and culturally responsive.

References


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Samra Khan is an associate professor of architecture at the COMSATS Institute of Information Technology, Islamabad. She has been working since 1987, in Karachi, Islamabad and Ireland. Projects include: Terminal Building of Allama Iqbal International Airport, Lahore. (Part of NESPAK Design Team), Administrative block, Cargo block, F.C.R (fire, crash rescue) building; Islamabad International Airport. (Part of design team). Multiple commercial, educational and residential projects done. Her research work includes “Indigenous architecture of Earthquake areas; Godar and Jabber, Mansehra, N.W.F.P.”, ‘Mapping architecture of Rawalpindi cantonment during the colonial era’, ‘Heritage mapping of Pre-colonial Rawalpindi city’, ‘Havelis of Mohalla Sethian, Peshawar; Architectural and environmental design’, ‘Mapping of the Architectural Heritage and Cultural Identity of Islamabad City’. Ms Khan has published in the area of vernacular architecture, sustainable building design and related green design issues. She can be contacted at sjmkhan@yahoo.com, samramkhan@gmail.com
SUSTAINABLE ARCHITECTURAL DESIGN: REVIVING TRADITIONAL DESIGN AND ADAPTING MODERN SOLUTIONS

Ibrahim Mostafa El Demery

Abstract
Architecture is the art and science of designing which involves the manipulation of mass, space, volume, texture, light, shadow, materials, program and other elements in order to achieve an end which is aesthetic, functional and sustainable. Sustainability is a growing trend within the field of architecture, it is currently the most pressing, complex and challenging agenda facing architects. The industrialization and modernization of the world has led to increased initiatives regarding sustainability debate, where recently the word ‘sustainable’ entered into the consciousness of architects and became an essential concern in the discourse of architecture. What is more, we are nowadays witnessing the defense of former ways of life that affect not only the architecture, but also the habitat, work, and, in short, what can be called sustainability. Although sustainability at the human settlement scale has received great attention so far in most of the developing countries, it still remains the most glaring challenge in terms of its demand on resources and expertise.

The aim today is to bring modern technologies and knowledge representing design solutions as guidelines like double skin façade, adapting traditional concepts, in tune with such practices to develop solutions that provide us with sustainable buildings that interact and are in harmony with natural climatic conditions. The paper will make an attempt at highlighting sustainability challenges we currently face including its implications for the built environment, in order to propose a sustainability evaluation framework, drawing out transferable lessons learned for future development.

Keywords
Sustainability; transparency; façades; double skin; traditional design

Introduction
Cities are artifacts of information, technological change, economic growth and cultural transformation. In that sequence, the developed world is built by rearranging the relationships between houses, cities, green areas and human beings according to their requirements. Man has the right to live in a beautiful world and he has the responsibility to contribute to the make-up of his environment. Despite social and scientific advancements, setbacks are common in the development of cities. Some of the reasons can be traced to misplaced priorities and short sightedness, with regard to global interaction of both natural and engineered systems. This trend of accounting for development is variously referred
Sustainable Architectural Design: Reviving Traditional Design and Adapting Modern Solutions

IBRAHIM MOSTAFA ELDEMERY

...or rural housing and neighborhood planning and designing projects have been encouraged worldwide to promote sustainable settlement development, development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability

Sustainability is the concern of the best thinkers of our age; it can be traced as an underlying theme in the Harry Potter books, in Seamus Heaney’s reinterpretation of Beowulf, and in Peter Hall’s rewriting of urban history. It is meeting the needs of today considered the necessity of preserving the earth for future generations to create a sustainable planet to bond civilization (James, 2005).

For many of the world’s best architects (i.e., Piano, Yeang, and Foster), it is the challenge of our age; the first unifying basis for a new architecture since le Corbusier, “Towards A New Architecture” was published in 1927 (Edwards, 2001). Sustainability is currently the most pressing, complex and challenging agenda facing architects. The ever-expanding urban population of the globe has meant that over the last decade it has moved on from being a single concern, focused largely on global warming, to one where much wider issues of the environment and health are at stake.

One of the most often-cited definitions of sustainability is the one created by the Brundtland Commission, led by the former Norwegian Prime Minister Gra Harlem Brundtland. The Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The definition...
was carried further by Berke and Manta which reads, “sustainable development is a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local, social, economic, and ecological systems, and link local actions to global concerns” (qtd in Alshuwaikhat & Nkwenti, 2002). More specifically, sustainability can be defined as simultaneously enhancing economic growth (economy), social progress (equity), and environmental protection (ecology & institutional) issues. In this definition the combination of social progress and environmental protection stand for meeting future needs. The economic considerations (economy) relate to questions about the financing of the infrastructures, maintenance and utilities required for the built environment to accommodate the urban development process and employment of resources associated with this. The social issues (equity) concern matters about access to such services, the safety and security of cities, human health and well-being cultural heritage provides. The environmental issues (ecology) take on the form of considerations about how the process of urbanization consumes natural resources, energy efficiency, and the effect development has on the biodiversity of habitats. The institutional issues refer to the governance, justice and ethics of settlement patterns subject to urban development (Ree & Meel, 2007).

**Energy and Design Control**

A starting point for buildings to become minimal energy consumers is by minimizing their energy-demand. High performance architecture meets both comfort and energy issues to a maximum level. On the other hand, it is good to realize that low-energy design of buildings, where no attention is paid to comfort and health can as well become non-sustainable due to higher energy use of occupants to compensate for the discomfort. Building systems are sometimes designed from the single objective of providing optimal comfort while energy-efficiency was not considered at all. It seems that at a time when consuming energy did not ring a bell on resource depletion and environmental damage, comfort became a synonym with high energy consumption.

We often underestimate the tremendous influence of the introduction of mechanical air-conditioning systems on the evolution of architecture. Such systems have severed the relationship between the building and its natural climatic environment. Accordingly, both designers and clients have become less concerned about how their buildings relate to factors such as the movement of the sun, direction of the wind and changes in outside temperatures. Mechanical systems, control of climatic conditions within a building and, therefore, a decision as to whether or not to sheath a building with a curtain-wall glass façade, for example is unfortunately now most often based on factors unconnected with climatic issues. Obviously, such an approach is neither sustainable nor responsible. The use of mechanical air-conditioning and cooling systems further contributes to carbon-dioxide gas emissions in the environment, thus increasing problems relating to pollution and global warming. It is also economically inefficient and wasteful (Figure 1).

Energy goals in design is to use passive solar energy through orientation and using of renewable energy source like solar, wind, etc. Also, energy goals in design are to emphasize the use of natural light, ventilation and energy conservation to control heat loss and gain.
Traditional Design

In pre-modern times, people had no choice but to live in harmony with nature. Natural forces were too powerful for available technologies to tame or keep at bay. In this context, the traditional design of the Islamic world, which extends over a wide geographical area with various climatic conditions, such as the moderate, hot and humid, the moderate tropical, and the predominant hot-dry climates, has always been able to effectively respond to its natural environment (Edwards, 2001). The energy efficiency of buildings greatly and easily increased at little cost, and in a manner that does not negatively affect lifestyles. Moreover, achieving such efficiency does not necessitate the use of technologically complex, untried and experimental gadgets, but can be realized through incorporating a number of traditional pre-modern cooling systems that are very much in tune with nature.

A second track in achieving energy-efficient, climatically interactive design involves the use of appropriate materials for buildings, including walls and roofs. For example, the use of high thermal-capacity materials for walls and roofs provides thermal masses that regulate the temperature within structures located in hot-dry zones. The mud and straw, adobe or stone walls of traditional buildings of Islamic regions have served as thermal masses by limiting the penetration of heat from
the sun during the daytime, and returning this heat to the outside during the night. Thus, dealing effectively with the city’s harsh summers, shutters provide a simple solution, since they need arises to regulate the entry of the sun. Traditionally Mashrabiyyas, grilled wooden window screens, have been used to control the entry of the sun, and there are many examples of them around the Islamic world (Gabber, 2009). It is worth mentioning here that in traditional architecture, careful attention is paid to the location and size of windows in order to regulate the circulation of air through buildings and the entry of sun. This is evident in the placement of openings in the walls bordering courtyards, in allowing for cross ventilation and in the use of high-level windows to let the hot air out. Also, Shukhshaikhas (clerestory windows) were commonly used as wind and breeze regulators, as in many of Cairo’s traditional houses.

Building form and plan layout contribute to the creation of climatically sensitive buildings. The arrangement of building components around courtyards is a common plan layout of traditional buildings in Islamic regions, and the role of courtyards as temperature regulators has been extensively dealt with. Urban fabrics affect the degree to which buildings may achieve energy efficiency. Obviously, the more it is possible to physically connect buildings, the better those buildings are able to function together as one unit in terms of climate control. Under such circumstances, each building would provide the adjacent building with additional protection from the elements (Mortada, 2003). For example, the compact urban of old Islamic cities in hot-dry regions, such as Cairo, where there are often no setbacks from one plot to the other, and no exposed façades except for those facing adjacent streets, is a good example of buildings functioning together as elements of climate control. On a related note, the narrow streets often found in such traditional cities also provide sensitive climatic solutions since they limit the penetration of the hot summer sun into the space of the street, and allow the street to remain in shade during much of the day. However, urban arrangements in modern cities in the Islamic world, with their dispersed buildings (often glazed high-rises) and wide streets, are climatically inappropriate. The cumulative effect of these changes is so far-reaching as to make poverty itself a major global scourge (Wheeler & Beatley, 2009).

Climate-Responsive Buildings

Sustainability and “green architecture” have become important architectural issues today as concerns about depletion of natural resources, reuse of natural and synthetic materials, as well as conservation of nonrenewable energy resources take on global proportions (Ali & Armstrong, 1995). For optimal performance on both comfort and energy issues, a potential design solution is an integrated building concept where climate-responsive building elements are combined with energy strategies, and sustainable building systems for climate control. A responsive building is a building that is able to adapt or react to changes in the environmental conditions. Building elements that specifically address this feature are called climate-responsive building elements. In this context climate-responsive refers to internal and external climatic conditions and to occupant intervention. Therefore, climate-responsive building elements actively store and transport heat, light, air and moisture. They form an integrated part of the building structure (e.g. roof, wall, and floor).
For optimal performance on both comfort and energy issues, a potential design solution is an integrated building concept where climate responsive building elements are combined with passive energy strategies, and sustainable building systems for climate control as shown in Figure 2.

By responding to changes in dynamic conditions, climate-responsive building elements contribute to maintaining a comfortable environment with an improved energy performance. The use of climate-responsive building elements more or less reverts to the original combined role of a building structure to meet both the function it was created for and to provide comfort, where extreme climate has incurred a heavy reliance on air conditioning.

Figure 2: The stages for producing integrated building concept representing the relation between the inputs, systems (building services) and the required output (Source: Author).

**External Facades**

External facades are one of the most significant elements in the design of any building. Whether there are relatively small punched openings in the facade or a completely glazed curtain wall, windows are usually a dominant feature of the building’s exterior appearance. They are among the most important components in building construction. They provide social identities and environmental comfort for accommodation. It is an intermediate location where collective and individual needs meet. It is related to the environmental performance of the building, the cost and technology provided, and the relationship between the territories between inside and outside. Finally, it is still the major component of the building form which imposes a large impact to the larger environment if not limited in visual. Building energy consumption is directly related to its orientation and to the buildings materials selected, where orientation of building means placing on site in such a way that it gets the maximum advantages of natural sources for maximum possible functional comfort. Building façade is one of the most complicated issues in building construction and management. Traditionally architectural design treated as an outlook, which may reflect the design styles of the time and interests of the clients or designers, beyond the basic functional needs, such as natural lighting and ventilation. Because of recent developments in technology, especially those related to the glass and curtain wall construction and the sustainable issues involving energy saving, more research efforts emerge (Beisi, 2007).

Because natural light is seen as a key driver to people's well-being, both in the workplace and at home, a maximum glazing naturally became the solution. Fig.3

Many architects and their clients prefer buildings with all-glass facades. In most cases, such buildings use a single-skin façade consisting of fixed glazing.
(windows) that forms the outer surface of the building. Relative to buildings with largely opaque facades, they tend to have higher space conditioning loads from heat transfer through the building envelope because windows pose less resistance to heat transfer than insulated walls. Recently, building designers have begun to use double-skin facades (DSF) to attempt to improve the thermal energy performance of facades of buildings with high glazing fractions (Roth, 2007). Sustainability is iteratively changing based on evolving knowledge that connects science and design. Double skin façade is getting more and more attention as it provides many possibilities for creating good door environment (Williams, et al, 2007), it is considered an example of climate-responsive architecture towards sustainability, a system consisting of two glass skins placed in such a way that air flows in the intermediate cavity. The ventilation of the cavity can be natural, fan supported or mechanical. Apart from the type of ventilation inside the cavity, the origin and destination of the air can differ depending mostly on climatic conditions, the use, the location, the occupational hours of the building and HVAC strategy. The glass skins can be single or double glazing units with a distance from 20 cm up to 2 meters. Often, for protection and heat extraction reasons during the cooling period, solar shading devices are placed inside the cavity Figure 4. Simply put, a shading device within the double skin can absorb solar gain and re-radiate it as heat trapped in the cavity. Apertures at the wall’s top and bottom induce air movement. The heat’s natural tendency to rise pulls fresh, cool air in at the bottom while exhausting hot air out the top. Controlling the capture or venting of this trapped heat dictates cavity air temperature and, in turn, the inner glass surface temperature (Husain, et al, 2009).

Uuttu (qtd in Poirazis, 2004) described the double skin façade as “a pair of glass skins separated by an air corridor”; the cavity is connected with the outside air so that the windows of the interior façade can be opened, even in the case of tall buildings subject to wind pressures. This enables natural ventilation and night time cooling of

Figure 3: Work place glazed curtain wall outlook as a dominant feature for office building’s exterior appearance (Source: Author).
the building’s thermal mass. In winter the cavity forms a thermal buffer zone which reduces heat losses and enables passive thermal gain from solar radiation (Figure 4). All types of double skin facades offer a protected place within the air gap to mount shading and daylight enhancing devices such as venetian blinds and louvers. Sheltered from wind and rain, these shading devices are less expensive than systems mounted on the exterior (Poirazis, 2004).

As indicated by the term “double-skin” such a façade is intended to mean a system in which two “skins” - two layers of glass - are separated by a significant amount of air space, that is to say, a second glass façade is placed in front of the first. These two sheets of glass act as an insulation between the outside and inside enabling the air to circulate between the cavity of the two facades skin providing good air circulation, thermal and acoustic performance, etc. The type of double-skin façade then determines the type of air circulation. Of course, the most interesting systems are those designed in such a way that in addition to permitting natural air circulation, they also use solar energy, converting it into electrical energy.

Hendriksen, Sorensen, Svensson and Aaqvist (qtd in Poirazis, 2004) support that the transparency is often seen as the main architectural reason for a double skin façade, because it creates close contact to the surroundings. This, in fact, is also derived from a client’s point of view saying that physical transparency of a company gives a signal of a transparent organization with a large degree of openness. In almost all the literature sources, transparency in architectural design is mentioned as the desire of the architects to use bigger portions of glazing surfaces. As Lee et al. (qtd in Poirazis, 2004) claim, “the double skin façade is a European Union architectural phenomenon.
driven by the aesthetic desire for an all-glass façade”. According to Kragh (qtd in Poirazis, 2004), transparency in architecture has always been desirable and the problem has always been to realize a transparent building envelope without compromising energy performance and indoor climate. For years the development of advanced façade and environmental systems has aimed at creating fully glazed buildings with low energy consumption and high level of occupant comfort. Ventilated double skin façades reducing solar gains in summer and providing thermal insulation in winter is an example of a technology, which is becoming still more common.

Natural ventilation is one of the main advantages of the doubles skin façade systems is that they can allow natural (or fan supported) ventilation. Different types can be applied in different climates, orientations, locations and building types in order to provide fresh air before and during the working hours. The selection of Double Skin Façade type can be crucial for temperatures. If the air velocity and the quality of the introduced air inside the building is designed well, the natural ventilation can lead to reduction of energy consumption during the occupation stage and improve the comfort of the occupants.

**Sustainable Design and Context**

Context quality has always been a fundamental objective of the planning system, and good design can often resolve the apparent conflicts between the need for development and the desire to conserve the best aspects of the natural and built environment. Design is a creative activity; it depends on intelligence and fantasy, and it can put something forward which was not there before. Architects play with forms masses, functions, and structures. They do this in order to find better solutions (Farivarsadri & Alsac, 2006). Sustainable building design should establish a relationship between building and life, reducing impacts in human health. Moreover there must be an ecological integration between human life and other species’ lives. Sustainable design is often viewed as a necessary tool for achieving sustainability; it highlights the need for setting sustainability targets, indicators, and benchmarks at a very early stage in order to prevent potential conflicts between key actors, which hinder the progress towards sustainability.

Sustainable design (also referred to as “green design”, “eco-design”, or “design for environment”) is considered a means of reducing or eliminating these impacts while maintaining quality of life by using careful assessment and clever design to substitute less harmful products and processes for conventional ones. Buildings can offer opportunities to increase habitats for greening to improve the micro-climate and visual amenity of an area. This is achieved by the use of roof gardens or green roofs, climbing plants on walls, window boxes and balcony gardens. In Richard Rogers’s design works, nature is allowed to colonize the interior spaces, the roof tops and the surrounding landscape. The justification is that of conservation but the effect is to uplift the spirit by making nature immediately visible. For Rogers, nature is both an aesthetic tool and a source of delight, necessary to humanize cities (Edwards, 2001).

We are surrounded by a built environment. Buildings are essential to human beings for living, working and multiple other activities. According to Vitruvius (qtd in Looman, 2007), one of the most fundamental functions of architecture is to provide shelter from the dynamic conditions of our environment. He also mentioned concerning the
building’s environment as a design parameter, “we must at the outset take note of the countries and climates in which buildings are built”. So, architecture initiated from function, local climate and availability of local resources. A key design policy consideration is that development responds appropriately to its context, but that context is defined to include the visual, social, functional and environmental dimensions. Concerned with how development fits into its social, economic and ecological context, how it deals with the activities and flows of people and traffic that a development generates, the spaces it creates its impact on the natural processes of the city.

Conclusions

There is a world-wide need for a sustainable development, which strongly emphasizes the importance of engaging architects and encouraging good contemporary design, recognizing importance of not stifling experiment, originality or initiative, to ensure quality architecture that respects its context, enhances the sense of place, provides visual interest for future generations, and which will support the principles of sustainable development. Moreover, as environmental guardians, architects also have a duty specifically to encourage more sustainable approaches to building design. Thus policy should make clear an authority’s acceptance of the visual consequences of sustainable objectives, and should wherever possible encourage sustainable construction. Good design is the aim of all involved in the development process, but it is primarily the responsibility of designers and their clients. Final building design has to meet a variety of design objectives (such as comfortable indoor climate, healthy environment, life-cycle costs, resource use, environmental loading, functionality and architectural expression) that are interrelated. This demands that consideration of all objectives should be applied from the very early stages of the design process, by full understanding of the interrelationships between the different design objectives and close cooperation among all designers (architects and technical designers) of the design team in an integrated design approach where all available knowledge is shared.

The challenge is to create structures that remain cool in the summer and warm in the winter. In the summer, this includes keeping out the summer sun and heat and bringing in the cool breezes. Keeping a building warm in winter includes bringing in the winter sun and keeping heat in and the cold winds and temperatures out. One needs to identify local conditions and microclimates, by applying more demanding environmental criteria including the study of prevailing winds and breezes, and various microclimates created as a result of surrounding buildings or topography. Identifying regional and local climatic conditions is always a most suitable point of departure in attempting to create an energy-efficient building, for saving the environment and reducing building reliance on fossil fuels.

Architects must be mindful of multiple concerns in designing building facades. There are always trade-offs that must be made in optimizing building facade performance and the challenge lies in balancing conflicting criteria. A desire to maximize transparency, daylight, and views, for instance, can often be at odds with the need to minimize solar heat gain and reduce air-conditioning loads. Double skin facades are an appropriate approach to maximizing the positive qualities of glazing while minimizing its negative energy impact and its potential for thermal
discomfort, especially on easterly or westerly glazed facades.

Design considerations indicate how buildings should perform from both a user and a sustainability perspective comprehensively, which draws together the full range of sustainability concerns: location and form, movement, natural systems and building design. The key design considerations remains how the proposed development relates to its surroundings and all developments must respect their surroundings. In environmentally sensitive areas the context can exert a more powerful influence upon design, and a more detailed level of controls acceptable. Still, many buildings hardly comply with standard building codes and regulations are yet to be incorporated in the building planning phase.

Sequentially from the previous analysis, we can conclude an assessment method including sustainable design guidelines, comprising a set of indicators specifically selected from the economic, social and environmental subsets to assist the refinement of design brief sustainable indicators appropriate for applications to design.

For architectural design criteria the following issues including form, orientation, lighting, transparency, cladding and opening percentage should be well studied. For urban design elevations, exposure (grouping of buildings) and street width should be incorporated effectively into the design process. For energy design control the walls, roofs design, materials, textures and energy building codes should be taken into design considerations. For environment design, water, greenery, roof gardens, atriums, and climatic control systems should be well adapted and utilized in the design process. Hazardous materials should be excluded and minimized as possible including (toxic, chemical, mechanical, and waste) emissions. For social and economic values culture norms and architectural style, low energy consumption should be the aim in design to provide low maintenance utilities cost.

Environmental design and construction community must become actively engaged in writing code change proposals and encouraging funding research and testing to support those changes. Building community needs to share their direct experience in contending with the realities of those standards by participating more fully in the standards-development process.

It is recommended that sustainable development should be a principal goal of design at all scales, and should take into account both differential environmental capacities and sustainable to develop a conception of urban/environmental design that embraces notions of the values that people ascribe to the built and natural environment. The social and technological development and the ecological equilibrium must walk together promoting clean technologies reviving traditional design concepts and adapting modern solutions like double skin facades, without any ecosystem’s aggressions, by incorporating eco-design applications in the design.

Design policies and proposals should recognize the severe limitations of negative controls and seek to promote an overall climate for good design, encouraging design creativity by engaging skilled architectural advice and encouraging high design standards, developments as well should be tailored to encourage healthy living and mutual coexistence with the environment.
References


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THE MEANINGS OF DWELLING ATTRIBUTES FOR TEMPORARY RESIDENTS FROM DIFFERENT CULTURES: THE CASE OF KOREAN TEMPORARY RESIDENTS IN THE UNITED STATES

Eunsil Lee and Nam-Kyu Park

Abstract
The cross-cultural temporary resident population is one of the fastest growing cultural groups in the United States. However, their housing experiences in the new environment have not been extensively studied. Thus, the current study sought to examine meanings of dwelling attributes for cross-cultural temporary residents in the host country. In order to obtain insights into not only functional meanings but also underlying values, a conceptual framework was developed based primarily on Gutman’s (1982) means-end theory and Rapoport’s (1988) three levels of meaning. A case study was conducted using in-depth laddering interviews with ten Korean temporary residents in the Lansing, Michigan, area. Seven dwelling attributes emerged from interviews: two satisfactory attributes (i.e., surrounding natural environment and architecture) and five unsatisfactory attributes (i.e., carpeted floor, interior lighting, acoustics, bathroom, and entryway). Data were analyzed utilizing the measurement of means-end chain (Gutman, 1982), identifying the lower-level, everyday meanings as well as middle-level, latent meanings of dwelling attributes. A hierarchical value map was used to illustrate the interrelationships among the attributes, consequences, and values. Results revealed that dwelling attributes in participants’ current housing did not effectively satisfy their fundamental needs. In particular, carpeted floor was linked to the greatest number of negative meanings. Moreover, the cultural aspects of Korean housing affected the meanings of dwelling attributes in participants’ current homes. Findings suggest design professionals, facility managers, and policymakers must understand how people from other cultures attach different meanings to the dwelling attributes in their homes and provide more culturally responsive residential environments.

Keywords
Cross-cultural; temporary residents; meanings of dwelling attributes; means-end theory

Introduction
Globalization of the world economy increases international travel for study and work abroad purposes. For example, during the last two decades, the United States has experienced significant growth in the number of international visitors, increasing from 16.1 million in 1989 to 30.8 million in 2004 (U.S. Department of Homeland Security, 2006). According to the U.S. Department of Commerce (2007), this number is expected to continue to increase. Due to differences in residential environments from one culture to another (Rapoport, 1969), these temporary residents from different cultures bring with them...
unique cultural housing experiences. Dwelling features in the host country may not be able to support their lifestyles and will create stress physically and emotionally (Adjukovic, 1998; Adler, 1995). According to Hadjiyanni (2005), dwellings in the United States are not suitable for people from other cultures. Designers should have a good grasp for the needs of diverse cultures in housing design, yet current research has not adequately addressed how temporary residents from different cultures experience their dwelling attributes in the host country.

Thus, given the increasing numbers in and diversity of cross-cultural temporary residents, as well as the limited research about their housing experiences, the purpose of this study is to explore meanings of dwelling attributes for cross-cultural temporary residents in the host country.

Based on Gutman’s (1982) means-end theory and Rapoport’s (1988) three levels of meaning as a theoretical underpinning, the present study seeks to obtain insights into not only functional meanings but also underlying values. Means-end theory (Gutman, 1982) posited how physical attributes of products have personal meanings for users based on the assumption that a product is a user’s means to accomplish a desired end. The present study also attempts to explore the feasibility of means-end theory to examine meanings of dwelling attributes for cross-cultural temporary residents.

Using the measurement and analysis of Gutman’s means-end theory (1982), a qualitative case study was employed with ten Korean temporary residents in the Lansing, Michigan, area. In-depth interviews were conducted focusing on participants’ dwelling attributes, consequences, and personal values. Results were analyzed utilizing implication matrices and hierarchical value maps to discover dominant perceptions and behaviors (Gutman, 1982). The findings of the study are expected to provide a greater understanding and knowledge of cultural differences in the meanings of dwelling attributes and could be practically applied in residential design. The main research questions addressed in the present study were:

1. What meanings do Korean temporary residents attach to the specific dwelling attributes in their current housing environment?
2. How do cultural backgrounds relate to meanings of dwelling attributes?
3. Can means-end theory be useful in describing relationships between cross-cultural temporary residents and dwelling attributes?

Meaning of Built Environment

The meaning of home has been studied extensively based on the notion of home as a whole (Easthope, 2004; Kenyon, 1999; Moore, 2000; Sixsmith, 1986). However, meanings of dwelling can be created for a home as a whole as well as while people use and experience their dwelling attributes in the process of dwelling (Coolen, 2005). Meaning is not an intrinsic characteristic existing in an object, but is developed in the course of interrelationships between the object and the user (Blumer, 1969). Consequently, an object may offer different meanings to different users. Depending on the diverse possible activities, a variety of meanings can be attached to an object. Thus, on the basis of the ecological perspective, Coolen (2005) defined the meaning as the functional relationship between a person and an object.

In identifying meanings in terms of the functional
relationship between the user and the built environment, studies indicated different levels of meanings can be produced. For example, in a study of meanings in the urban environment from the semiotics point of view, Krampen (1979) claimed that the function of architectural attributes conveys meanings in two levels: (1) a first meaning from the direct function of the object and (2) a second-order meaning produced by socially maintained use of the object. According to Krampen (1979), cultural codes explain the meaningful relationships between people and building attributes by the signification created through the secondary use.

Similarly, Rapoport (1988) characterized the meaning of built environment at three different levels. High-level meanings relate to cosmologies, world views, philosophical systems, etc.; middle-level meanings such as identity, privacy, status, wealth, power, etc., are called latent functions; and lower-level, everyday meanings (e.g., accessibility, seating arrangements, movement) are called manifest functions. Specific dwelling attributes in the built environment are associated with lower- and middle-level meanings, while a dwelling as a whole tends to have mostly higher-level meanings (Coolen, 2005; Rapoport, 1988).

It is assumed that temporary residents from different cultures will attach meanings to their dwelling attributes in different levels. The present study seeks to discover all levels of meanings including not only immediate functions (Krampen, 1979) or manifest function of dwelling attributes (Rapoport, 1988) but also from socially sustained second-order use (Krampen, 1979) or latent function of dwelling attributes (Rapoport, 1988).

### Means-End Theory

Means-end theory (Gutman, 1982) originates from market and consumer research that examines relationships between consumers and products. The theory presents a hierarchical model of three levels of meaning: attributes, consequences, and values (Reynolds & Gutman, 1984; Reynolds & Perkins, 1987). The first level of meaning is attributes, which are products’ physical or observable characteristics. The second level of meaning is consequences, which reflect tangible or intangible personal meanings derived from attributes. Direct and tangible outcomes are considered functional consequences whereas emotional outcomes experienced by the person using the product are called psychological consequences. According to Gutman (1982), consequences can be positive or negative, depending on the relationship to people’s personal values. As such, people choose products whose attributes produce their desired consequences and minimize their undesired consequences. In turn, the desirability or importance of these consequences is determined by personal values. Thus, values are considered to be key factors underlying consumers’ preferences and choice behaviors (Gengler, Mulvey, & Oglethorpe, 1999). The final level of meaning in means-end theory is personal values, which are preferred states of being, major goals, needs, or ideals people aspire to achieve.

Investigating means-end chains of attributes, consequences, and values popularly relies on laddering, a specialized in-depth interview technique (Gutman, 1982). To facilitate this laddering technique, researchers analyze consumers’ purchases through a series of “why is that important to you” questions to reveal key personal reasons that make an actual purchase...
happen. Through this laddering approach to interviewing, the three different levels of meanings are identified with concrete meanings at the attribute level and more abstract meanings at the consequence and personal value levels.

Although the means-end theory has been heavily utilized in marketing and consumer research, few researchers have used means-end theory to examine how people attach their personal meanings to their dwelling attributes. Coolen and Hoekstra (2001) investigated values as determinants of preferences for dwelling attributes using means-end chain theory. Coolen and colleagues subsequently utilized means-end chain theory in several studies exploring meanings of dwellings for a particular residential project in the Netherlands (Coolen, 2005; Coolen & Meesters, 2006; Meesters, 2006; Zwarts & Coolen, 2006). These studies shed some light on the possibilities of applying means-end theory when exploring meanings of dwelling features, as in the current study.

**Conceptual Framework**

The main focus of the present study is to explore how temporary residents from different cultural backgrounds interact with specific dwelling features in their homes and attach personal meanings to them. To obtain all different levels of meanings, the conceptual framework was developed based on the ‘meaning structure’ as defined in Zwarts and Coolen (2006), which was primarily derived from Rapoport’s (1988) three levels of meaning and means-end chain (Gutman, 1982). Although Rapoport’s layering of meanings has not been effectively applied in previous empirical studies (Coolen & Hoekstra, 2001), this layering of meaning is expected to be useful in identifying not only functional meanings of dwelling attributes, but also the reasons why those functional meanings are attached.

Table 1 presents the conceptual framework of the current study, illustrating the relationships between the layers of meanings (Rapoport, 1988) and means-end chain (Gutman, 1982). In this study, attributes of the means-end chain were considered to be dwelling attributes, and consequences derived from the dwelling attributes were considered to be lower-level meanings, which was the manifest function of the attributes. Values that are the underlying goals, needs, or motivations for consequences of dwelling attributes were considered to be the middle-level meaning, which was the latent function of the attributes.

The current study utilized Schwartz’s (1992) universal value for the value categories. Schwartz (1992) defined value as “a conception of the desirable that influence the way people select action and evaluate events”; consequently, Schwartz (1994) suggested ten types of universal values using 56 specific personal value items.

<table>
<thead>
<tr>
<th>Value</th>
<th>Middle-level meanings (Latent functions)</th>
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<tbody>
<tr>
<td>Consequences</td>
<td>Lower-level meanings (Manifest functions)</td>
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<tr>
<td>Attributes</td>
<td>Dwelling attributes</td>
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Table 1: Conceptual Framework for the Present Study (Source: Authors).
Methods

Sample
A qualitative case study was used to investigate meanings of dwelling attributes using the measurement and analysis of means-end chain (Gutman, 1988). In-depth interviews were conducted with ten Korean housewives who viewed their residence in the United States as temporary, ranging about six months to several years. Participants lived in two specific apartment complexes in the Lansing area, thereby sharing more homogeneity in their housing conditions. Participants’ ages ranged from 32 to 55 years old. Participants’ length of residence in the United States ranged from approximately 6 to 18 months, with the total planned time of 1 to 2 years of residence.

Data Collection and Analysis
Laddering, a semi-structured interview technique, was used to elicit data on dwelling attributes, consequences, and personal values. Measurement of means-end chain (Reynolds & Gutman, 1999) for this study was done in the following phases: 1) eliciting attributes; 2) constructing individual means-end chains; 3) selecting attributes; and 4) aggregating and analyzing data.

Eliciting attributes. Respondents were first asked to list dwelling attributes that they felt were satisfactory and unsatisfactory in their current homes. Nine satisfactory attributes were mentioned: surrounding natural environment, architecture, closet, quietness, zoning, kitchen opens to the living room, service facilities, location, and school district. Meanwhile, ten unsatisfactory attributes were stated: carpeted floor, interior lighting, acoustics, bathroom, entryway, size of rooms, poor ventilation, type of heating, outdated appliances, and high rent.

Constructing individual means-end chains using laddering interviews. Once satisfactory and unsatisfactory attributes were identified, the interviewer asked respondents why they felt the features were particularly satisfactory or unsatisfactory. The interview continued to ask “why/how did you feel like that?” or “why is it important to you?” to develop—with the respondents—the means-end chains through laddering.

Selection of the attributes. To attain a higher chance of meaningful attributes-consequence-value chains, dwelling attributes mentioned by more than 50% of respondents were chosen for use in further analysis (Coolen, 2005). A total of seven attributes, including two satisfactory attributes (surrounding natural environment and architecture) and five unsatisfactory attributes (carpeted floor, interior lighting, acoustics, bathroom, and entryway), were mentioned by more than 50% of respondents.

Aggregation and analysis. The entire set of ladders for the seven attributes across respondents was recorded on a coding form and classified into attributes, consequences, and values. When developing these codes, special attention was given to preventing categories from becoming too broad and to preventing valuable meaning from being obscured. The implication matrix represents the number of times each element leads to another on the ladder (Reynolds & Gutman, 1988). Using coded individual ladders, implication matrices were constructed to display the aggregated number of connections among each attribute,
consequence, and value—both directly and indirectly—across all interviews.

The hierarchical value map was constructed from data aggregated in the implication matrix to interconnect all significant chains in a manner that is easy to read and interpret (Reynolds & Gutman, 1988). The hierarchical value map represents all respondents' ladders in a single map that describes all relevant relations and shows dominant perceptual orientations. A typical approach to building the map involves establishing a cut-off level of relations (i.e., all connections below this level are ignored) to find the most informative set of relations. Reynolds and Gutman (1988) originally suggested a cut-off level of 4 direct relations for a sample of 50 respondents; however, as this study's sample size was only 10, the cut-off was not applied to include as many relations as possible.

In this study, the hierarchical value map was presented in the manner proposed by Klenosky et al. (1993). Each element is indicated by a circle, the size of which is proportional to the number of mentions by respondents. White circles represent attributes, light grey circles consequences, and dark grey circles values. Finally, the relative strengths of association between elements are represented by the width of the lines connecting circles.

Results

The results revealed that two attributes, surrounding natural environment and architecture, were perceived as satisfactory with positive meanings. Meanwhile, interior dwelling attributes used in everyday activities, namely, carpeted floor, interior lighting, acoustics, bathroom, and entryway, were perceived as unsatisfactory with negative meanings.

Meanings of Satisfactory Attributes

Surrounding natural environment. The surrounding natural environment was associated with seven consequences and six values (see Figure 1). The predominant consequences were ‘enjoying view’ and ‘relaxation’. ‘Exotic,’ ‘healthy living,’ and ‘purifying body and mind’ were also mentioned as consequences of the surrounding natural environment. Meanwhile, the six values associated with surrounding natural environment included ‘emotional security’ (with the most number of relations), ‘enjoying life,’ ‘quality of life,’ ‘unity with nature,’ ‘pleasure,’ and ‘excitement.’ All consequences of the surrounding natural environment were positive, indicating that this attribute fulfilled participants’ underlying values.

The hierarchical value map of surrounding natural environment in Figure 1 visually represents the interrelationships among the attributes, consequences, and values. One of the stronger chains, ‘enjoying view’-‘relaxation’-‘emotional security’, indicates that respondents attached a feeling of relaxation to the surrounding natural environment by enjoying views and their value of emotional security was fulfilled. The hierarchical value map further showed that ‘enjoying view’ fulfilled the values of ‘pleasure’ and ‘unity with nature’. The chain of ‘surrounding natural environment’-‘fresh air’-‘healthy living’-‘quality of life’ indicated that respondents attached the meaning of ‘healthy living’ to the attribute ‘fresh air,’ thereby fulfilling the value ‘quality of life’. The chain of ‘surrounding natural environment’-‘living creatures’-‘exotic’-‘excitement’ indicated that respondents attached feelings of exoticism to
the small animals around their current housing. According to respondents, small animals around their current home, such as squirrels and fireflies, were exciting to see because it is unusual to find such animals near residential areas in Korea.

**Architecture.** As Figure 2 demonstrates, architecture was associated with six attributes, six consequences, and six values. Respondents expressed that a ‘building orientation’ (n = 3) facing south was an important attribute in their architecture, followed by ‘low-rise building’ and ‘living close to the ground.’ Among the six consequences, ‘enjoying daylight’ (n = 3) and ‘physical comfort’ (n = 2) showed stronger associations than the others (i.e., ‘attractive,’ ‘feeling stable,’ ‘enjoying view,’ and ‘eco-friendly’). Among the six values of architecture, ‘tradition’ (n = 3) and ‘quality of life’ (n = 3) were shown to be their strongest values, followed by ‘enjoying life’ and ‘health and safety.’

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**Figure 1:** Hierarchical Value Map (HVM) of ‘surrounding natural environment.’ This HVM shows consequences and values for the attribute ‘surrounding natural environment’ resulted from the in-depth interviews with participants of the present study. (Source: Authors).
The hierarchical value map of architecture (Figure 2) displays two chains from ‘building orientation’ showed stronger associations than others. The connection between ‘building orientation’ and ‘tradition’ confirmed the importance of cultural traditions about orienting the building to the south. The chain ‘building orientation’- ‘enough daylight’-‘physical comfort’-‘quality of life’ indicated that respondents’ preference for a building orientation facing south was not only a result of tradition, but also due to quality of life by being physically comfort thanks to sufficient daylight. Thus, although architecture was considered to be a satisfactory attribute in their current housing, participants who lived in a building facing directions other than south attached negative meanings to it related to insufficient daylight and physical discomfort. In relation to ‘low-rise building,’ respondents attached meanings of ‘attractive’ and ‘feeling stable,’ which fulfilled values of ‘enjoying life,’ ‘health and safety,’ and ‘unity with nature.’ When compared to large-scaled, high-rise apartment complexes—typical building types in most cities in Korea—respondents were pleased with living in a ‘low-rise’ building.
Unsatisfactory Attributes

Carpeted floor. Among the five unsatisfactory attributes, carpeted floor was associated with the greatest number of negative consequences. Figure 3 indicates that the predominant consequences for carpeted floor were ‘unpleasant to touch’ (n = 7), ‘unhygienic’ (n = 5), and ‘uncomfortable’ (n = 5), followed by ‘desire to modify,’ ‘hard to keep clean,’ and ‘causing allergy.’ Meanwhile, the major values related to carpeted floor were ‘health and safety’ (n = 15), ‘quality of life’ (n = 8), ‘emotional security’ (n = 5), and ‘tradition’ (n = 5). Consequences of carpeted floor were predominantly negative, indicating that it did not support their underlying values.

The hierarchical value map of carpeted floor in Figure 3 clearly presents specific reasons related to each negative meaning attached to this factor. ‘Health and safety,’ the value in the biggest circle in the map, showed strong associations with three consequences: ‘unhygienic,’ ‘causing allergy,’ and ‘hard to keep clean.’ Respondents believed that a carpeted floor did not fulfill their important values for health and safety because they perceived

![Hierarchical Value Map (HVM) of 'carpeted floor.'](image-url)

Figure 3. Hierarchical Value Map (HVM) of ‘carpeted floor.’ This HVM shows consequences and values for the attribute ‘carpeted floor’ resulted from the in-depth interviews with participants of the present study. (Source: Authors).
the carpeted floor to be unhygienic, cause allergies, and be inconvenient to clean. The strongest consequence, ‘unpleasant to touch,’ was linked to two behavioral consequences: ‘desire to modify’ and ‘wearing slippers,’ indicating that respondents made efforts to reduce their uneasiness to touch carpet directly and eventually achieve better a quality of life in their housing. Respondents also expressed their discomfort with a carpeted floor in that it prevented them from fulfilling their ‘emotional security’ in their housing environment.

The link between ‘hard to adapt’ and ‘tradition’ indicated that respondents’ value for cultural tradition was one of the most significant reasons for their aversion to carpeted floors. Carpets are rarely used as floor covering material in homes in Korea. Since radiant floor heating systems (called On-dol) are still generally used in Korea, the link between ‘missing On-dol’ and ‘tradition’ also indicated respondents’ attachment to their traditional On-dol in their homes in Korea.

**Interior lighting.** Figure 4 indicates that interior lighting was linked to seven consequences and five values. The primary consequence of interior lighting was ‘too dark’ (n = 9), followed by ‘being
frustrated’ (n = 6) and ‘hard to adapt’ (n = 5). Participants indicated a ‘wish for a brighter room’ (n = 4), and some (n = 4) indicated they had already taken action to fix their interior lighting condition. Among the five values linked to interior lighting, ‘emotional security’ (n = 7) was found to be the most significant with the maximum number of relations, followed by ‘tradition’ (n = 6) and ‘health and safety’ (n = 6).

The hierarchical value map of interior lighting in Figure 4 clearly shows that all consequences were derived from the meaning of ‘too dark.’ The strong link of ‘too dark’-‘being frustrated’-‘emotional security’ indicated that dark interior lighting causes respondents to feel frustrated because their emotional security was not fulfilled well. Meanwhile the ‘tradition’-‘hard to adapt’ link derived from the attribute ‘no ceiling light.’ This chain suggested another reason for negative meanings attached to interior lighting. As bright general lighting from the ceiling is the norm in Korean homes, the localized movable lighting arrangement and lack of general lighting in respondents’ current homes were unfamiliar to them and hard to adapt to. The chain of ‘too dark’-‘inadequate for reading’-‘health and safety’ revealed another problem of dark lighting: poor visibility. Two consequences—namely, ‘wish for brighter room’ and ‘trying to fix’—were linked to ‘too dark,’ suggesting behavioral consequences to improve respondents’ health and safety in their current homes.

**Acoustics.** Figure 5 indicates that the acoustics factors were linked to seven consequences and four values. ‘Noises from neighbors’ (n = 7) due to poor acoustic conditions and ‘squeaks’ (n = 3) caused by wood-framed structures were the main attributes of acoustics. The main consequences included not only perceptual consequences such as ‘sensitive about making noises’ (n = 4), ‘being irritable’ (n = 4), and ‘missing home in Korea’ (n = 4), but also behavioral consequences such as ‘controlling children’ (n = 3) and ‘careful not to make noises’ (n = 2). The major values derived from consequences include ‘self-discipline’ (n = 6) and ‘emotional security’ (n = 5).

The hierarchical value map of acoustics in Figure 5 shows the main consequences derived from ‘noises from their neighbors’. The consequence ‘sensitive about making noises’ was linked to two behavioral consequences—‘controlling children’ and ‘careful not to make noises’—indicating that noises from neighbors made respondents more sensitive about making their own noises in order not to bother other people. For example, respondents with young children (n = 3) mentioned that they did not allow their children to jump or run inside. Respondents also indicated that they themselves tried to walk quietly at home, especially late at night and early in the morning. Both ‘noises from neighbors’ and ‘HVAC noises’ were linked to ‘being irritable,’ which prevented respondents from fulfilling their ‘emotional security’ in their homes.

**Bathroom.** Figure 6 shows that bathroom was linked to eight consequences and three values. The main attribute for bathroom was ‘no floor drain’ (n = 8), which is a typical attribute of bathrooms in Korea. The consequences of bathroom present two contrasting meanings. Although negative meanings were more prevalent with ‘inconvenient to clean’ (n = 6) and ‘feel unclean’ (n = 2), positive meanings
also emerged, such as ‘getting more adapted’ (n = 3) and ‘more refreshing’ (n = 3).

Interview data demonstrated that participants who had lived in their current homes more than one year (n = 3) expressed that, the longer they remained, the more they adapted to the bathroom without a floor drain. These participants also indicated that changes in their perceptions occurred from negative to positive, such as ‘more refreshing’ by ‘getting more adapted’ in regard to the same attribute. As a result, the bathroom was simultaneously linked to positive as well as negative meanings, although the negative consequences were dominant. The main values of bathroom include ‘cleanliness’ (n = 8), ‘tradition’ (n = 6), and ‘enjoying life’ (n = 3).

The hierarchical value map of bathroom in Figure 6 illustrates two distinct major paths linked from ‘no floor drain,’ representing the two opposite attitudes about this attribute. The negative meaning chain of ‘no floor drain’- ‘inconvenient to clean’- ‘tradition’ tended to be more evident among newcomers. Newcomers
were not satisfied with a bathroom without a floor drain in their current homes because they were not able to clean their bathroom floor with soap and water, as they did in Korea. On the other hand, the chain of ‘no floor drain’-‘getting more adapted’-‘more refreshing’-‘cleanliness’-‘enjoying life’ was more common among those who had adapted to their bathroom condition and felt more refreshed in their bathroom without any floor drain; in other words, the longer they stayed in their current housing, the more changes occurred in a positive direction.

**Entryway.** Figure 7 shows that the entryway was linked to five consequences and four values. Since removing one’s shoes inside the home is the norm for Koreans, ‘no shoes amenities’ in the entryway was the main attribute for the resulting consequences and values. ‘Inconvenient to organize shoes’ (n = 6), ‘not functional’ (n = 4), ‘not suited for lifestyle’ (n = 3), ‘unhygienic’ (n = 2), and ‘looks awkward and cluttered’ (n = 2) were consequences related to the entryway. The important values were ‘pleasure’ (n = 6), ‘tradition’ (n = 3), ‘health and safety (n = 2), and ‘cleanliness’ (n = 1).
Underlying Values

Table 2 indicates that the most frequently shared values were ‘health and safety’ (n = 25), ‘tradition’ (n = 23), ‘emotional security’ (n = 21), and ‘quality of life’ (n = 14), followed by ‘enjoying life’ (n = 9), ‘cleanliness’ (n = 9), ‘pleasure’ (n = 8), ‘self-discipline’ (n = 6), ‘family security’ (n = 3), and ‘unity with nature’ (n = 3). The findings revealed that most of these frequently shared values were not effectively achieved through dwelling attributes in their current housing. Respondents perceived their dwelling attributes to be unsatisfactory not only when their fundamental needs—‘health and safety,’ ‘emotional security,’ and/or ‘quality of life’—were not supported, but also when their traditional cultural amenities were not supported. Although ‘quality of life’ was not a value item included in Schwartz’s (1994) value types, the current study found it to be an important value related to the residential environment.
Discussion and Conclusion

The present study sought to (1) investigate meanings of dwelling attributes for cross-cultural temporary residents focusing on the layers of meanings to examine both functional relationships and underlying values; (2) identify how cultural background affects meanings of dwelling attributes; and (3) explore the feasibility of means-end theory (Gutman, 1988) when identifying layers of meanings attached to dwelling attributes. Based on the conceptual framework, the manifest function (i.e., lower-level, everyday meanings) of dwelling attributes were investigated through consequence categories while middle-level, latent meanings of dwelling attributes were examined through value categories (Coolen, 2005; Rapoport, 1988). The interrelationships between consequences and values for each of the seven attributes were illustrated in the hierarchical value maps (see Figures 1 through 7). The findings demonstrated that the dwelling attributes were associated with diverse lower- and middle-level meanings for Korean temporary residents.

A summary of meanings of the seven dwelling attributes follows. The salient manifest meanings of surrounding natural environment were ‘enjoying view’ and ‘relaxation,’ which related to respondents’ latent meaning of ‘emotional security.’ Meanwhile, the important latent meaning of architecture was ‘tradition’ regarding the building orientation facing south, which resulted in the manifest meanings of ‘enjoying daylight’ and ‘physical comfort.’

Carpeted floor had the greatest number of negative manifest meanings, such as ‘unhygienic,’ ‘causing allergy,’ and ‘hard to keep clean,’ which were related to the latent meaning of ‘health and safety.’ The manifest meaning ‘unpleasant to touch’ caused two behavioral consequences: ‘wearing slippers’

Table 2: The Frequency of Value Categories Resulted from the Analysis of In-depth Interviews with Participants of the Present Study. (Source: Authors).

<table>
<thead>
<tr>
<th>Values</th>
<th>Satisfactory</th>
<th>Unsatisfactory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and safety</td>
<td>2</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Tradition</td>
<td>3</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>Emotional security</td>
<td>4</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Quality of life</td>
<td>5</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Enjoying life</td>
<td>4</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Pleasure</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Self-discipline</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Family security</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Unity with nature</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Excitement</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sense of belonging</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Protecting the environment</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
and ‘desire to modify’ in order to improve the latent meaning ‘quality of life.’ The manifest meanings of ‘missing On-dol’ and ‘hard to adapt’ derived from the latent meaning ‘tradition.’ Meanwhile, the most notable manifest meaning of interior lighting was ‘too dark,’ which was associated with most other manifest meanings, including ‘being frustrated,’ ‘hard to adapt,’ ‘wish for brighter room,’ and ‘trying to fix.’ The major latent meanings were ‘emotional security,’ ‘tradition,’ and ‘health and safety,’ which were not effectively fulfilled by interior lighting.

The main attribute causing negative meanings of acoustics was ‘noises from neighbors.’ The manifest meaning ‘sensitive about making noises’ caused two behavioral consequences: ‘controlling children’ and ‘careful not to make noises’ due to the latent meaning of ‘self-discipline.’ On the other hand, the dominant manifest meaning of bathroom was ‘inconvenient to clean’ due to the absence of a floor drain system, although ‘getting more adapted’ and ‘more refreshing’ were the manifest meanings of the same attribute attached by those who had lived in their current dwelling for longer periods. Finally, the most salient manifest meanings for entryway were ‘inconvenient to organize shoes’ and ‘not suited for lifestyle’. The main latent meanings were ‘pleasure’ and ‘tradition,’ which were not effectively fulfilled by entryways.

These results support Hadjiyanni’s (2005) findings and revealed that these important latent functions of dwelling attributes were not successfully achieved through respondents’ current dwelling conditions. The overwhelmingly high number of unachieved values indicates that housing attributes in their current housing did not effectively satisfy their fundamental needs. In particular, carpeted floors were linked to the greatest numbers of negative meanings, representing respondents’ perceptions that carpeted floors prevented them from achieving health and safety—one of the most fundamental needs.

The results also showed that consequences related to each attribute include behavioral consequences as well as perceptual consequences. Behavioral consequences for carpeted floor, interior lighting, and acoustics indicated that respondents associated certain adjustments in their behaviors or in their housing attributes as efforts to reduce their negative meanings. As Morris and Winter (1978) suggested, housing dissatisfaction leads families to involve themselves in various adjustment behaviors. Thus, these behavioral consequences demonstrated that respondents tried to reduce their dissatisfaction via various adjustment behaviors.

This study’s second aim was to identify how cultural aspects of housing influence the meanings of housing attributes for Korean temporary residents. This study’s findings revealed the latent meaning ‘tradition’ was significant in five attributes (i.e., architecture, carpeted floor, interior lighting, entryway, and bathroom), indicating that cultural aspects of Korean housing affected the meanings of dwelling attributes in their current homes. Considering that all the negative attributes except acoustics were strongly attached to tradition, interior dwelling features in their current housing were not well-suited to the lifestyles of those from different cultures.
Moreover, the results indicate that it is important for design professionals, facility managers, and policymakers to understand how differently people from other cultures attach meanings to the dwelling attributes in their homes. Given the increasing numbers of temporary residents from different cultures, housing attributes should be more culturally responsive so as to support their lifestyle and enhance their quality of life during their stay in the host country. The results herein demonstrated the importance of greater variability in dwelling attributes in order to satisfy varying degrees of cultural needs for different groups within our society.

The final aim of this study was to explore how means-end chain theory is useful in describing relationships between cross-cultural temporary residents and the housing attributes in their current housing. The results of this study showed means-end chain theory was effective in examining meanings of housing attributes and illustrating the relationship between housing attributes and cross-cultural temporary residents. Through the data processing, attributes and consequences of these attributes were identified. The analysis also revealed how physical attributes of housing gain personal meaning for cross-cultural temporary residents.

The hierarchical value maps effectively represented not only how respondents perceived and reacted to their housing attributes, but also why they have positive or negative meanings for the specific housing attributes. The most obvious benefit from the process was identifying underlying values attached to their perceptions and behaviors. Thus, it can be proposed that means-end theory can be effectively applied in the context of housing research to obtain meaningful results and help understand the relationships between housing attributes and cross-cultural residents.

The results of this study reflect attributes, consequences, and underlying values of the temporary residents from different culture. However, some limitations offer opportunities for further research. For instance, larger samples and households from different cultural backgrounds are warranted in order to expand the knowledge of meanings of residential environment.

References


Environmental Psychology, 20, 207-217.


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COMPREHENSIVE ENVIRONMENTAL DESIGN (CED) STUDIO IN TWO ARCHITECTURE SCHOOLS IN KARACHI: EVOLUTION, PROCESS AND IMPACTS

Noman Ahmed

Abstract
Since 1979, a studio module was introduced in the final year studies of Bachelor of Architecture programme at the Dawood College of Engineering and Technology, Karachi which was the only architecture school in the city at that time. A key objective of this studio module was to sensitize the ‘architects in making’ about context of the built environment, the process through which it was shaped and the forces that contributed in its shaping. The students were assigned to study a micro urban area for in-depth investigation and analysis. At the conclusion, analytical presentations followed that also included basic proposals for addressing problems that were identified in the studio exercise. Begun in Dawood College, the studio was adopted by many schools of architecture in the country including the NED University, Karachi. This studio had multiple impacts. Understanding the realities behind creation of urban built environment, realization of multiple roles for professional contribution to ongoing metamorphosis and appreciation of diverse fields of studies within the domain of architectural education and practice were some of the vital aspects. The objectives of this paper are to document the evolution and process of CED studio work. The paper also aims to study the affects of CED work on the perception, understandings and professional orientation of architects who graduated from the schools where CED studio was conducted.

Keywords
Studio methodology, documentation approaches, analytical tools, urban environmental understanding, alternative roles of architects.

Introduction
In the domain of architectural education in the developed world, the understanding of roles and spheres of input from varied actors in shaping the built environment became significant during 1960s and after. Many schools of architecture introduced this dimension of knowledge through different ways and means. Special studio sessions, workshops, course modules, summer practices and organized voluntary work were some of the methods adopted to inculcate this useful tenet of societal development among the student architects at the undergraduate level. Rich literature is available in the domain of neighborhood re-vitalization studies, though the origin and expansion has been greatly focused to ‘slums’ in western cities (Goodman, 1972). The rationale to incorporate beyond the conventional ingredients in architectural...
pedagogy was derived from several factors. The post war reconstruction efforts in Europe and East Asia constituted a useful case with reference to spread out contextual examples. The emerging cities in the developing countries experienced a rapid change due to migrations, spatial transformations and addition of new urban functions. For the appropriate training and education of young architecture students, creation of a sound understanding about the factors that affected the urban built environment was crucial. These aspects laid down the foundation of studio and case study modules of comprehensive environmental design (CED) in architectural education in Karachi.

In Karachi, this realization was introduced under the influence of architects / educationists who were trained abroad and exposed to this tradition in their respective context of education. Many professional architects who were educated at the Middle East Technical University, Ankara came and taught at the Dawood College from 1972 onwards - which was the only architecture school in the city till 1990. Almost all of them were sensitized to the problems of common man through internships in the rural areas, squatter setting or summer practices in construction in less developed contexts. The decade of 1970s saw rapid changes in the built environment of Karachi. Expansion of the existing neighbourhoods, creation of new neighbourhoods, steady increase in developer-builder built housing, relative affluence among middle classes, continued migration of people towards cities and consequent overcrowdings of older settlements were some of the most visible phenomena. Incapability of state organizations and apparatus as a whole towards housing and infrastructure needs of the poor and low income groups gave rise to the squatter settlements. Through a clandestine relationship of state functionaries and para-professionals, an entrepreneur class came into being that facilitated informal settlements and their consolidation at a large scale. Initially, the state bodies continued to deny the existence of the squatter settlements on legal grounds. But as the scale and spread of these settlements was vast, the need was felt to study the phenomenon with a view to upgrade them. Visible transformations included land use changes, haphazard densification of inner city areas and expansion of transit based activities in different nodes / directions of the city. The academic and professional exploration had also begun in the city to understand and interpret this vital set of attributes. Much of this research was done under the disciplines of sociology, anthropology, social work and development economics.

The city was informally divided between ‘have’ and ‘have nots’. The former had access to usual amenities of urban life while the later were devoid of them. Professionals including architects also served the former only. The conventional approach in architectural practice was organized as under in Figure 1:

This professional relationship was found to be uni-directional and limited in terms of its impact and outreach. Architect – educators considered it vital to link up the capacities and orientation of architects with the special needs of such segments of the society that could not access professional inputs. The faculty at the Dawood College was keen to come up with alternative options for extending the benefit of professional solutions to a vast
clientele, irrespective of economic status or social classes. It was observed that alternatives could only be developed if the professionals have a sound understanding of the context and clientele. Therefore the input of CED at the concluding stage of undergraduate education was deemed instrumental in exposing the base realities to graduating young architects.

**Comprehensive Environmental Design: Evolution, Process and Outputs**

**Inspirations**

The faculty members introduced the ideas and works of architects and researchers working in similar direction, though with different approaches. The studio received references of international and national professionals and researchers who made useful additions to knowledge in this domain. Many architects and planners, though educated and trained in the conventional tradition, keenly observed the transformations in the built environment. They approached the changes from different angles in order to evolve planning and design alternatives that could help the masses, most of whom were negatively impacted by this change. A summary is presented below in Table 1:

<table>
<thead>
<tr>
<th>Professional / Academic</th>
<th>Some Salient Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hasan Fathy (Egyptian architect and master trainer)</td>
<td>Pioneered adobe construction. Authored ‘Architecture for the Poor’ which became an influential work.</td>
</tr>
<tr>
<td>Laurie Baker (Indian architect of British origin)</td>
<td>Gandhian missionary known for his low cost solutions with high aesthetic value called ‘Baker Architecture’.</td>
</tr>
<tr>
<td>John F. C. Turner (British architect and author)</td>
<td>Well known for housing and community empowerment solutions – extensively worked in Latin America.</td>
</tr>
<tr>
<td>Arif Hasan (Pakistani architect and planner, teacher and author)</td>
<td>Pioneered the self help technical solutions for Orangi Pilot Project in Karachi and elsewhere in Pakistan.</td>
</tr>
<tr>
<td>Bal Krishna V. Doshi (Indian architect and educator)</td>
<td>Proponent of environmental design and sustainable architecture. Founded CEPT University, Ahmedabad, India.</td>
</tr>
<tr>
<td>Nabeel Hamdi (British architect-professor of Iraqi origin)</td>
<td>Ardent supporter of public housing, community development and people’s participation in design.</td>
</tr>
</tbody>
</table>
Curriculum Structure and Methodology

Comprehensive environmental design must not be confused with the developed world academic tradition of undergraduate (or even postgraduate) environmental design degrees of the same nomenclature. The core focus of the latter category is to view the objects and phenomena as an outcome of a design process. The main ingredient of this academic tradition is a design studio aimed to facilitate creativity in problem solving process. The studio also provides for material and non-material ingredients vital for assimilating knowledge towards design solutions. Examples include the environmental design programmes in the University of Manitoba in Canada, Bilkent University, Ankara and University of Dundee at UK. The comprehensive environmental design studio in Karachi was based on the tradition of studying and analyzing the contextual realities, absorbing the vital attributes of social environment and formulating appropriate proposals. Similar references also existed in the works of Prof. Johan Silas in Surabaya, Indonesia; Jorge Anzorena in Latin America countries and several others mentioned in Table-01. When the input of comprehensive environmental design was introduced, it was placed in the final year studio work. At a later stage of transformation, the studio was articulated into the ninth semester work. The main idea was to explore the composition, making and characteristics of a finite environment. The students were encouraged to observe and investigate into different attributes of the environment including its inbuilt features. Table 2 and Figure 2 elucidate the process of CED studio.

Table 1: Some Theoretical References (Source: Author).

<table>
<thead>
<tr>
<th>Name</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kausar Bashir Ahmad (Pakistani architect</td>
<td>Advocated and taught architecture as a socially responsive environmental</td>
</tr>
<tr>
<td>and educator)</td>
<td>design discipline.</td>
</tr>
<tr>
<td>Johan Silas</td>
<td>Indonesian architect and academic well known for his work on upgrading</td>
</tr>
<tr>
<td></td>
<td>low income communities.</td>
</tr>
<tr>
<td>Mohammad Pervaiz Vandal</td>
<td>Pakistani academic in Lahore who introduced field investigation as a means of</td>
</tr>
<tr>
<td></td>
<td>understanding housing development and shaping of built environment.</td>
</tr>
<tr>
<td>N.J. Habraken (Dutch architect and</td>
<td>Promoted linkage between built environment and people. Authored ‘Structure</td>
</tr>
<tr>
<td>educator)</td>
<td>of Ordinary’ – an influential work.</td>
</tr>
<tr>
<td>Christopher Alexander (Architect /</td>
<td>Founder of pattern language movement. Taught and contributed many powerful</td>
</tr>
<tr>
<td>academic of Austrian origin)</td>
<td>texts.</td>
</tr>
<tr>
<td>Shlomo Angel (Architect and Urban Planner)</td>
<td>Taught, researched and published in affordable housing, urban development</td>
</tr>
<tr>
<td></td>
<td>and planning theory.</td>
</tr>
<tr>
<td>Jorge Anzorena (Argentinean architect and</td>
<td>One of the founders of Asian Coalition for Housing Rights, activist for the</td>
</tr>
<tr>
<td>missionary)</td>
<td>right of urban poor communities - editor of ‘Selavip’ journal.</td>
</tr>
<tr>
<td>M. Fazal Noor (Pakistani architect and</td>
<td>Catalyst for extending professional support to community groups, civil</td>
</tr>
<tr>
<td>planner)</td>
<td>society organizations and vulnerable communities.</td>
</tr>
</tbody>
</table>

Table 2 and Figure 2 elucidate the process of CED studio.
<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1   | **INTRODUCTION AND BACKGROUND** | a) It is a course focused onto the study of micro urban environments and their relationship with the larger city contexts.  
   b) Micro environments are of various types: new residential developments, peripheral settlements, inner-city areas, growth corridors, city centres and emerging sub centres, industrial belts, relocation sites, ecologically sensitive areas, urban environmental assets, major infrastructure corridors, proposed and existing project sites.  
   c) Relationship of micro environments: direct physical relationships; communal relationships; interest wise relationships; legal and administrative relationships are a few kinds.  
   d) As architects, the understanding of the environment where one works/operates is a must. CED course aims to equip the graduating architects with this vital aspect of professional comprehension. |
| 2   | **SOCIETAL UNDERSTANDING** | a) Historical Background  
   Evolution and development of the micro context; major city/national level events and their implications on the area; land mark developments; chronological points of changes and their after effects are some of the parameters of investigation.  
   b) Sociological characteristics  
   Types of communities and groups; life styles and patterns; social inclinations; cultural denominations; intra and inter relationship of groups; value systems; relationship with the larger city community; ethnicity, religion, sect and gender issues.  
   c) Economic activity  
   Employment and enterprises; skills and capital; prospects of growth (and otherwise); economic status of the individuals and community; link up with the larger city economy and in turn national economy.  
   d) Physical characteristics  
   Typology of spaces; space utilization pattern; infrastructure; transport; mobility and community links; density; occupancy; building stock and its characteristics; real estate; rules; regulations and byelaws governing the development; emerging trends in physical development.  
   e) Environmental considerations  
   Environmental assets; threats and dangers to environmental assets. |
| 3   | **DESIGN, ANALYSIS AND TOOLS** | Documentation and survey procedures; modes of data collection; analysis synthesis; possibilities and justifications of interventions; preparation of planning and design briefs; proposal development; presentation. |
| 4   | **OUTPUTS** | The course generates several visual outputs leading to a final presentation and a written report. A series of preliminary work is done before reaching to the final outcome. |

Table 2: Comprehensive Environmental Design: Studio Brief.  
(Source: Notes by the author, 1993).
Studio Process at DCET

The students were divided into groups and studied the assigned area according to the various parameters identified in Table-02 and Figure-01. Several approaches were adopted to gather information. Literature review was done with specific reference to the published, unpublished and compiled information available with municipal agencies, NGOs, resource centres and newspaper archives. Key informants pertinent to the broad area and study location were identified to add upon the information base. The baseline information acquired from these informal discourses was articulated for proper utilization in the studio. The students documented the built environment by using sketching and photography as the key techniques. While dealing with different sets of activities, importance was given to time zones and days where the activity took place in its varied scales and profiles. The interaction of students with the area residents, workers, pedestrians, vehicle operators, shop keepers, vendors, hawkers, social workers, police officers, administrators and other stakeholders was found effective in generating useful information base about the area. Whereas the students were normally guided to prepare a check list of questions and issues to be discussed, the random and informal discussions were also revealing from many standpoints. Common peoples perspectives about the components of built environment, invisible problems experienced due to spatial disorders or short comings, points of conflict between various interest groups, evolution and consolidation of informal control mechanisms in commercially attractive locations, matters related to women, children, disabled and social outcasts were keenly observed through the various forms and formats of this unstructured interface.

The phase of fact finding and information collection was followed by analysis. The
Comprehensive Environmental Design (CED) Studio in Two Architecture Schools in Karachi: Evolution, Process, and Impacts

NOMAN AHMED

analysis was done from different perspectives. Identification of key processes and forces in the chosen cross section of built environment, definition of trends in urban development, identification of negative and positive practices and link up of formal/informal governance structure with the development process were some common denominators in analytical work. The students were asked to utilize their graphical skill in organization documentation and communication of information and analytical findings. Fact finding and analytical work was translated into charts, diagrammatic notations, link diagrams, photo-texts and sketches with captions. These exercises attempted to fulfill several requirements. Capacity building among architecture students to present complex observations into ‘easy to understand’ graphical forms, using architectural drawing and drafting skills onto large scale contexts, evolving proper sequence to show the area documentation in an effective manner and creatively building up a presentation material to initiate discussion and debate with the peers were some of usual results normally achieved in this studio. During interim and final juries, the students developed the skills to verbally defend the presentation from the strength of information base, argumentation framework enacted around identified issues, trends and directions in development outlined during analysis as well as conceptual proposals to improve respective scenarios. Table 3 gives a summary of outputs:

<table>
<thead>
<tr>
<th>No.</th>
<th>Batch (by graduating year)</th>
<th>Topic / Location in Karachi</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1980</td>
<td>Quaidabad</td>
<td>An emerging transit camp along National Highway.</td>
</tr>
<tr>
<td>2.</td>
<td>1981</td>
<td>Old Town</td>
<td>A typical example of inner city area with mixed land use and activities.</td>
</tr>
<tr>
<td>3.</td>
<td>1982</td>
<td>Old Town</td>
<td>Follow up on the earlier location.</td>
</tr>
<tr>
<td>4.</td>
<td>1983</td>
<td>Sabzi Mandi (fruit and vegetable market)</td>
<td>A whole sale and retail enterprise which began impacting the land use of the surroundings.</td>
</tr>
<tr>
<td>5.</td>
<td>1984</td>
<td>Cantonment Station</td>
<td>A multi model transit node where intercity trains and buses had an interface space and activities.</td>
</tr>
<tr>
<td>6.</td>
<td>1986</td>
<td>Hasan Square at University Road</td>
<td>An evolving land use pertinent to administrative and residential activities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tariq Road</td>
<td>A trendy shopping space in the midst of an upper class locality.</td>
</tr>
<tr>
<td>7.</td>
<td>1987</td>
<td>Lines Areas Re-Development Project</td>
<td>An example of a planned intervention in resettlement.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dhobi Ghat (washermen yard) in the Old Town, Area.</td>
<td>A traditional washer men community at the edge of a dense city centre.</td>
</tr>
</tbody>
</table>
Several benefits were derived from the CED studio. The students learned to formulate a composite methodology of documentation, analysis and proposal preparation according to the considerations of assigned contexts. Working in teams enabled them to distribute work, utilize collective and individual potentials and follow deadlines in a professional manner. Interaction with stakeholders and municipal agencies helped in the development of interpersonal skills and communication abilities. They also experienced the attitudes, systems and procedures of various ranges of municipal offices concerned with urban development. The overall understanding about the visible and invisible processes that shape the built environment increased to a great extent. For many students, it was the first experience to observe a complex urban area in such detail. These studios generated useful documentation of several types around urban locations such as old city centre, traffic nodes and corresponding land use, wholesale market spaces, historic districts and commercializing streets.

**CED Studio at NED University**

The Department of Architecture and Planning (DAP-NED) was set up in 2000. The structure of undergraduate curriculum introduced a chain of courses pertinent to environment, planning and development. This move was based on the objective of inculcating gradual buildup of understanding about the built environment issues from the foundation year to the final year. Many faculty members had done CED studio as students. Some had even supervised it at DCET. A full studio course in the final year was kept for CED work. During the earlier batches, the methodology adopted at NED was similar to DCET. However, it was deemed
appropriate to change the process, construct of the studio contents and outputs to some extent in order to improve the teaching, outputs and skill development.

The faculty took upon themselves to prepare a CED Source Book before the commencement of the actual exercise. This volume contained published and unpublished material about the case study location, facts and figures, basic working maps and layouts, articles and news clippings as well as information about government proposals and policies related to the area. The main idea for taking this demanding preparatory exercise was two folded. It allowed the students to utilize their time and efforts on fieldwork and exclusive interviews with chosen stakeholders. Besides, it also enabled the faculty members to gain first hand understanding about the case study and associated locations. Lecture presentations were also conducted on the CED studio process, supporting case studies and related issues. The second change introduced in the CED was the requirement of a detailed proposal at an urban design scale based on their surveys and analysis. The idea was reinforced when NED collaborated with four other universities from South Asia and Europe under the auspices of Asia Link Programme of European Commission (EC) during 2004 to 2007. Under collaborative arrangements, CED work received valuable inputs from international faculty members who hailed from

<table>
<thead>
<tr>
<th>No.</th>
<th>Batch (by graduating year)</th>
<th>Topic</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2001</td>
<td>Study of Mai Kolachi and its Environs</td>
<td>A new connecting road to the port with Clifton and Defence Society neighbourhoods that opened a corridor for prospective real estate development.</td>
</tr>
<tr>
<td>2.</td>
<td>2001</td>
<td>Study of Dhan Mandi Relocation and Rehabilitation Project</td>
<td>An old wholesale and processing activity in old town of Karachi that is in need of relocation to a sub urban district.</td>
</tr>
<tr>
<td>3.</td>
<td>2002</td>
<td>Lea Market and its Environs</td>
<td>An old market and its precincts that have been experiencing transformations.</td>
</tr>
<tr>
<td>4.</td>
<td>2005</td>
<td>Study of Lyari Expressway on Sohrab Goth Interchange</td>
<td>Origin of the expressway has begun impacting land use and activity pattern along a major sub-urban highway.</td>
</tr>
<tr>
<td>5.</td>
<td>2006</td>
<td>Study of Lyari Expressway on the Lyari Corridor</td>
<td>An infrastructure project introduced at the cost of social dislocation, physical and environmental impacts.</td>
</tr>
<tr>
<td>6.</td>
<td>2007</td>
<td>Karachi Water Front Development</td>
<td>Study of newly planned real estate and recreational projects along Karachi’s coastline.</td>
</tr>
<tr>
<td>7.</td>
<td>2008</td>
<td>Study of seven Commercial Corridors on PECHS Precincts</td>
<td>Transformation in land use and activity pattern of an upper class neighborhood in the central part of the city.</td>
</tr>
</tbody>
</table>

Table 4: Selected Topics of CED Studio at Ned University (2000-2008)  
(Source: Derived by the author from the data and records at DAP-NED Archives, 2009).
The CED studio at DAP-NED has received input and feedback from the concerned stakeholders at various stages of development. This category comprises municipal councilors, local activists, members of community based organizations and technical staff in different development agencies. The juries have been held in front of a diverse audience comprising faculty members, practicing architects, developers, builders, real estate experts, engineers, municipal staff and NGO managers.

**Comparative Approaches: A Critique**

The DCET model has been useful in several distinct ways. The processes of sharing, transforming, adding and even financing the built environment became known to participating students. They were able to assimilate the process of development, change and corresponding stakeholders. The students also understood the nature of technical inputs by professionals from various orientations. Architects, engineers, surveyors, lawyers and others had varied inputs in the various stages. For instance, if a heritage building in a historic location was decided to be pulled down by the owners, the professional cadres normally colluded and evolved administratively valid options. The collusion often stretched into the decision making fora in the governmental structures. A very significant aspect of understanding was about the clandestine nature of transactions, partnerships and arrangements in informal, quasi formal or informal areas. The students were able to see that the construction and management of facilities of different ranges invariably possessed many inputs which were not formally documented or accounted for. They were also able to observe the linkage between regulatory control mechanism prescribed for buildings and facilities with the actual sequence of construction and development. The CED studio created a methodology of urban documentation and analysis which did not exist before. When became an integral part of architectural education, it was also adopted by several individual consultants or firms working on similar assignments. The DCET model stopped short of approaching a detailed design proposal as the focus was more on building a comprehensive understanding. At times, the information gathering from public agencies became a tiresome and lengthy exercise. Motivation level of faculty also had a bearing on conduct and output of studio work.

In the case of CED approach at NED University, the understanding aspects mainly benefited from the earlier discussed methodology. However the emphasis on developing a design solution was introduced to enhance the design capabilities of the students. As several faculty members had postgraduate qualification in urban design and planning as well as experience of working in the same domain, the emphasis on design became effective. Time management was done in a manner whereby the students received threshold support in the form of source book, lectures and presentations. Thereafter the students would set out to field work and concentrate on area findings. The analysis leads to identification of salient issues and development trends. While taking the factual aspects of understanding into view, the students were encouraged to expand their
imagination to formulate design solutions with rational justification. Some images from the studio outputs are outlined in Figures 3 – 8.

Figure 3: Cross section of a main street at Sir Shah Suleman Road which is a busy artery towards the eastern part of Karachi. Informal processes contribute to the change of landuse in a rapid manner (Source: Author).

Figure 4: A traffic junction in the dense central part of Karachi (Source: Author).

Figure 5: Mausoleum of Abdullah Shah Ghazi (Source: Author).

Figure 6: Route analysis of Lyari Expressway (Source: Author).

Figure 7: A view of Lea Market (Source: Author).

Figure 8: Night view of Lea Market (Source: Author).
Impacts

Faculty’s Perspective

Five faculty members gave their responses to a structured questionnaire. The responses are presented and summarised in this section. As per the feedback from the first faculty member, the need to study the contextual realities evolved into CED studio. It also linked with the possibilities of addressing them through design solutions. The structure of the studio has been worked out to develop observation capacity, interview methodology, information gathering from different sources, analysis / synthesis and design interventions among students. A manual is prepared by the faculty for guidance of the students. Lectures are given and site visits organized. Design programmes are formulated and concepts are developed to address identified issues. Evidences of changing perceptions amongst students have been noticed in different ways. More students now want to be involved with post CED works through the Urban Research & Design Cell (URDC). This unit is helpful in expanding the work to a realistic level. In addition, feedback from graduates in architectural practices suggests that the skills gained (in CED) are very rare in conventional practices and thus greatly appreciated. The strengths of the course include observation, synthesis and translation skills amongst the students. More clarity is needed in respect to (develop) inter-relationship of architectural design issues / larger influences in a more elaborate manner.

The second faculty member elaborated the process and outputs in some detail. Comprehensive Environmental Design (CED) was introduced in 1979-80. Several factors constituted its background. There was no City and Regional Planning Programme existing in Karachi / Sindh. The four years architectural studies were found adequate for students to equip them for a challenging design assignment at an expanded scale. It was also deemed necessary to study the social, economic, political and cultural context of the chosen locations through surveys, observation and documentation. In DAP-DCET, the role played by some lead professionals who was particularly useful in guiding the field research, documentation and analysis process. In the usual sequence of organizing CED, a problem write up is prepared and shared. Orientation is provided about the different aspects of study parameters, key informants and institutions. Series of juries are conducted to see the development of understanding and student performances. CED has helped the students to undertake research in an organized manner. It also enables them to study and link the economic, social and cultural parameters in relation to design process. There are several strengths in the CED process. Students get to learn through the interaction amongst themselves. They realize that solutions may not always evolve in the form of physical form. CED also helps the students to develop vision about diversified areas related to the built environment. In some cases, it generates more interest among those students whose abilities in conventional architectural work is limited.

The faculty has identified development of observation and analytical skills as the strengths of the studio. Weaknesses include the occasional inability of students to establish inter-relationship of design process with
external influences. Shortcomings in routine preparatory aspects also become a handicap in this reference. It has been found that such faculty members who either participated in the CED studio as students or supervised it were in a better position to manage it. Other faculty members developed that capacity after conducting the sessions as co-teachers for a few instances.

**Viewpoint of Beneficiary Architects**

A questionnaire was circulated to twenty-five architects from DCET and NED. Twenty-two responses were received. However, two representative responses are presented in this text. The first architect recalled his experience of CED Studio on transforming a sub-urban location into an emerging city centre. A multi-layered vision forming approach was adopted. Ingredients included site analysis, data collection, literature review, strategies for intervention and views of stakeholders as well as professionals. The various groups studied infrastructure, landscape, ecology and socio-economic conditions (of stakeholders). In a step by step manner, the groups developed their respective visions under the broad caption of ‘Sohrab Goth as Gateway to Karachi’. Outputs also included development of commercial spaces, community development (in the Goth area) and ecological improvement of Lyari River. Outputs comprised conceptual strategy, schematic design and final design. Sizable understanding was drawn from other CED reports. This exercise has helped in the study of potentials and threats in urban environment. It also enabled the students to learn the documentation of complex urban environment and their graphical presentation.

Some of the solutions formed in this studio were superficial in nature.

The second architect shared his experience about Lyari River Studio. The river runs through the city with diverse urban landscape on its banks. The passage of Lyari River and its adjoining locations were studied. As it touches different localities with varying socio-cultural, economic and historic backgrounds, therefore the study area context was diverse in nature in respective micro context. Methodology comprised site visits, surveys and interviews. Facts and figures pertinent to socio-economic factors and physical aspects of the area were also examined. The situation was then analyzed under different scenarios to obtain possible pictures of the problems expected to be faced in the future. The know-how of the area mainly depended on students understanding. However, the process of analysis was taught thoroughly by the teachers. Feedback from the residents and stakeholders having no political objectives was missing. Analysis of the problems and understanding of their causes was of high standard. However, the design output generated were not realistic in many cases. Outputs as a whole and particularly towards the conclusion were of great importance. Learning from precedents was a missing dimension, particularly from the same context. The changing perceptions were easily noticeable with the passage of time amongst the students. The understanding of problems and their reasons were more realistic towards the end. Also a change in thinking was also spotted in students. Previously the problems were seen in isolation with other realities but after the exercise, the understanding progressed to be more context.
based, people oriented and environment friendly. The greatest strength of the process is that the students are given real life problem and trained around it. They are encouraged to analyze it in a realistic manner. Time was however very limited to wrap up the studio.

The beneficiaries have interpreted the learning experience in multi furious ways. Most of them confirm the description about studio process elaborated in the earlier heads. They also affirm the usefulness of methodology and experience. Commonly cited short comings include superficial nature of some design solutions, limited scope of application in the practical work in architectural offices, incomplete outputs at the design stage (in some cases), handicaps in group dynamics (and absence of monitoring the same by faculty members) and less preparation on the part of teacher (in some cases).

A reasonable correlation was found between the conduct of CED studio and the choice of undergraduate thesis design (see Table 5 and 6). It shows that a significant number of students preferred to work on topics inspired from CED work.

It is also vital to note that many architects chose to work in the unconventional fields such as public service, action research and voluntary work compared to the orthodox option of design office. A selected profile of graduates is presented in Table 7.

<table>
<thead>
<tr>
<th>No.</th>
<th>Batches (by graduating year)</th>
<th>Total Students</th>
<th>Students Who Chose CED Inspired Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percentage</td>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
<td>2000</td>
<td>07</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>2001</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>2002</td>
<td>19</td>
<td>100</td>
</tr>
<tr>
<td>4.</td>
<td>2004</td>
<td>16</td>
<td>100</td>
</tr>
<tr>
<td>5.</td>
<td>2005</td>
<td>22</td>
<td>100</td>
</tr>
<tr>
<td>6.</td>
<td>2006</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>7.</td>
<td>2007</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>8.</td>
<td>2008</td>
<td>26</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 5: Undergraduate Thesis Design Topics Inspired by CED Studio at NED (2000-2008)
(Source: Author’s assessment based on the records in DAP-NED Departmental Archives, 2009).
Table 6: Undergraduate Thesis Design Topics Inspired by CED Studio at DCET (1980-1993)
(Source: Author’s assessment based upon the records in DAP-DCET sources, 2009).

<table>
<thead>
<tr>
<th>No.</th>
<th>Batches (by graduating year)</th>
<th>Total Students</th>
<th>Students Who Chose CED Inspired Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Percentage</td>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
<td>1980</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td>1981</td>
<td>17</td>
<td>100</td>
</tr>
<tr>
<td>3.</td>
<td>1982</td>
<td>19</td>
<td>100</td>
</tr>
<tr>
<td>4.</td>
<td>1983</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td>5.</td>
<td>1984</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>6.</td>
<td>1986</td>
<td>36</td>
<td>100</td>
</tr>
<tr>
<td>7.</td>
<td>1987</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>8.</td>
<td>1988</td>
<td>21</td>
<td>100</td>
</tr>
<tr>
<td>9.</td>
<td>1989 (I)</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>10.</td>
<td>1989 (III)</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>11.</td>
<td>1990</td>
<td>24</td>
<td>100</td>
</tr>
<tr>
<td>12.</td>
<td>1991</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>13.</td>
<td>1992</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>14.</td>
<td>1993</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>330</td>
<td>100</td>
<td>117</td>
</tr>
</tbody>
</table>

Table 6: Undergraduate Thesis Design Topics Inspired by CED Studio at DCET (1980-1993)
(Source: Author’s assessment based upon the records in DAP-DCET sources, 2009).

<table>
<thead>
<tr>
<th>No.</th>
<th>Architect</th>
<th>Batch (by graduating year)</th>
<th>Career Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Shahed Anwar Khan</td>
<td>1981</td>
<td>Associate Professor of Urban and Regional Planning at Curtin University, Perth – involved with urban research and development.</td>
</tr>
<tr>
<td>5.</td>
<td>M. Fazal Noor</td>
<td>1987</td>
<td>Development consultant, advisor on social entrepreneurship and visiting faculty member at architecture schools in Karachi.</td>
</tr>
</tbody>
</table>
Table 7: DCET Graduates Directly Impacted by CED Studio: A Selected Tracer Profile
(Source: Author’s interpretation from records at DCET, NED and Pakistan Council of Architects and Town Planners).

<table>
<thead>
<tr>
<th>No.</th>
<th>Stakeholder</th>
<th>Remarks on CED Studio</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Essa Khan (late) 1982</td>
<td>Directed the planning support activities in northern areas of Pakistan.</td>
</tr>
<tr>
<td>11.</td>
<td>Rabia Siddiqui 1993</td>
<td>Former trainer for para professionals at OPP / now development consultant.</td>
</tr>
<tr>
<td>12.</td>
<td>Asiya Sadiq 1993</td>
<td>Faculty member at NED University / development consultant.</td>
</tr>
</tbody>
</table>

Table 8: Stakeholder Feedback.
(Source: Author’s notes during CED studio supervision and archival records at DCET, 1992-2000 and NED, 2000-2009).
Viewpoints of Allied Stakeholders
A selected profile of stakeholder responses has been prepared and presented in Table 8.

Conclusions and Recommendations
Several conclusions can be drawn from this research. They are outlined as follows:

(a) Contextual relevance of CED studio in the reference of Karachi is adequately established. Professionals relating and contributing to the built environment as designers and managers do not receive an opportunity to explore the context in a systematic manner. This exploration leading to understanding and sensitization at least equips them to deal with professional assignments in an appropriate manner. It may be noted that the stakeholders have identified the limited scope and opportunity of linking up urban problems with existing solution development process in an open manner. Thus CED as a social and educational initiative is found to be playing a useful role in a scenario where participatory decision making and planning still has a long way to emerge.

(b) The objective of understanding the complexities of built environment and the forces that shape it have been reasonably achieved. The outputs from two schools have had adequate evidence of that indicator. However the point of concern is that the information collection work in CED must not be confused with the compilation of a design project brief of usual nature. The importance of exploration, attempting with multiple techniques and consequent analysis are extremely vital to be ensured at all ends in the CED structure.

(c) The architects do not work in conventional design studios alone. They have multiple roles to perform. The CED studio hints towards the role of architect as a facilitator of development with regard to genuine problems and concerns of stakeholders. In this manner, he becomes a catalyst towards social justice, especially with reference to spatial transactions, utility and control. The exploration empowers him with the knowledge to offer alternative solutions, challenge conventions and even advocate the appropriate initiatives with relevant stakeholders. In this complex process, CED studio is merely an inception point. Those graduates who become interested to take upon themselves a professional role have opportunities as shown in the Table-03. Alternatively new scopes can be carved out by the enlightened professionals themselves.

(d) CED opens the window for architects to diversify into varied roles. They may even acquire a role which may not have an orthodox design or construction activity as the main stay of professional work. At the same time, the penchant to carve out solutions has led the architects to venture into development and NGO related sectors. It will, however, need a detailed and focused investigation to find out whether CED was the key reason for motivating such professionals to take up such careers or it pertained to their overall world view.

There are several recommendations towards the CED studio.

(e) As obvious, the process review for content, quality and methodology improvement
Comprehensive Environmental Design (CED) Studio in Two Architecture Schools in Karachi: Evolution, Process, and Impacts

NOMAN AHMED

must be done on a regular basis. This can be undertaken at two levels. The in-house faculty may conduct an internal review and evaluation with the external jury members. The outputs of the students, especially visual presentation and report or brief may be distributed to the concerned participants. The next stage is a reflection with reflection and alumni, especially the recent graduates. This open participatory assessment will bring in the feedback on understanding gained in CED and its impacts. It will also act as a forum for scoping the modification in the structure and conduct of the studio.

(f) The interaction with the stakeholders has been a very useful input to CED studio. However its full benefit can be realized in many ways. Faculty interaction with stakeholders, conduct of unstructured interviews, building in exclusive sessions during the development of design proposals and jury sessions are some examples. The students may also be encouraged to evolve communication approaches where spatial understanding can be translated into ‘easy to understand’ packages for non-technical audience. This input shall help make the participations more effective.

(g) The students may be encouraged to develop effective tools and graphic notations to synthesize field understanding in a concise manner. That is to say the utilization of meaningful graphics can be extremely useful in effectively summarizing their work at analysis and proposal making stage.

(h) There is a need to compile and transform the heritage of CED studio work and produce publications with concurrent attempt to derive theoretical connotations. A cursory review of the reports show that very valuable epistemological and applicational learning can be transcended from this rather underutilized wealth of knowledge.

Notes

‘Para-professionals’ are such individuals with practical known how to a particular field including construction and property management without any academic training or education in the same field. There have been a sizable number of such workers in construction and development who often become self employed entrepreneurs by virtue of working knowledge.

The works of Prof. Dr. Jan van der Linden and his team from Free University Amsterdam as well as Institute of Housing Studies, Rotterdam is vital. They teamed up with Department of Sociology, Karachi University and propounded urban research in an organized manner in 1970s.


See also catalogue of NED Archives, 2009.

References


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Noman Ahmed

Professor Dr. Noman Ahmed is an architect and planner by profession. He obtained his undergraduate degree from NED University, Karachi and a Masters degree in city planning from the Middle East Technical University, Ankara. Noman received postgraduate training in Urban and Regional Planning from the United Nations Centre for Regional Development (UNCRD), Nagoya, Japan and Centre for Housing and Urban Development Studies, Harvard University. Noman obtained his Ph.D. from Loughborough University, UK. He is currently working as Professor and Head of Architecture and Planning Department at NED University, Karachi. He has undertaken several self motivated research studies on developmental issues including environmental planning and management and has been a consultant to many NGOs, CBOs and government organizations in Pakistan and abroad. He has also published several books, reports, monographs and papers on different relevant topics and subjects. He regularly writes on developmental issues in the leading newspapers in Pakistan.
ASSESSMENT TOOLS: MATHEMATICAL FACTORIAL AND ADJACENCY DISTRIBUTION THEORY FOR HOUSING TYPOLOGY IN GAZA CITY

Emad S. Mushtaha, Mohammad Arar, Faisal Hamid

Abstract
There are few attempts to study the vernacular architecture in Gaza based on indoor space distribution. No attempts, so far, has been made to analyze Gazan indoor housing spaces from the perspective of adjacency distribution. This study aims to provide specialists with future design that meets the demand and requirement of Gazan people. A survey conducted in 2005 by the main author on some semi-detached houses built by people themselves to fit with their culture and climate revealed that majority of these houses were categorized into two common types: type one: "Corridor-Type Plan" and type two: "Hall-Type Plan". To select the most flexible type that could be used in future housing development, evaluations and social analyses were carried out using the theory of Adjacency Distribution and part of the Space Syntax. As a result, the outcome of the analysis has shown that the number of alternatives of space distribution in the type one is greater than those of type two as the ratio between these types is 30 to 4 types consequently.

Keywords: Adjacency distribution theory; space syntax; corridor-type plan, hall-type plan, Gaza city

Introduction
Housing condition in Gaza before 1994 was comprehensively characterized with terms of high density occupancy with little or no space for individual, shortages of land, high prices of land, insufficient social infrastructure, inadequate indoor planning and design, absence of legal framework, and high construction and material costs (UNDP/PAPP, 2003). Just after 1994, The Palestinian National Authority (PNA) built many housing units to reduce the shortage of housing units in Gaza city. During the construction process, researches on most common plans of housing units were not given high priority due to the increase demand on units.

Recently, the war 2009 on Gaza executed by the Israeli occupation has negatively resulted in thousands of destroyed and diminished housing units, which in turn deteriorated the crises and increased the number of homeless people.

The situation after the war 2009 is miserable and worse than before. It is mentioned at Aljazeera website that during the war on Gaza over 30,000 houses are partially damaged and over 4000...
houses are totally damaged. As a result, the International committees have started an urgent call to alleviate the negative impact of the illegal war through the title: “Rebuilding Gaza”. This inevitably urges specialists to propose a suitable designing plan for future units that respect the cultural distribution of indoor spaces. Architects would undertake practical steps to show their unlimited efforts and understandings of the situation by showing their valuable strategies, policies and designing approaches. Herein, the study would append an appropriate definition of architectural typology of housing units that might be considered in future development. The architectural typology of houses is widely understood that it is a circumstance of repeating characteristics of some elements and/or spaces regularly more than others in housing planning and design. These frequencies have been based on people satisfactions, psychological feelings, and/or scientific theories that control the arrangement. This approach was applied the application of Analytic Hierarchy Process (AHP) (Mushtaha, 2006) as assessment tools, but in this study the assessment tools are the mathematical equation “Factorial” and the theory of “Adjacency Distribution Diagram”, which is a product of analyzing the circulation and space distribution in plans (Ahmed & Kurosawa, 2005).

This study has used the approach of Prof. Kurosawa’s research (Kurosawa, 1988) but excluded outdoor space (yard space) from the analysis as the study focuses on indoor spaces of housing units. On the other hand, it has also utilized the theory of Space Syntax, described at Khattab’s study, to analyze internal spaces (Khattab, 2005). This is to show accessibility and circulation inside dwellings.

Following abbreviations used in housing plans, the Space Syntax, and Adjacency Diagram (AD).

LR= living room, LA= living area (the living room with its balcony [Bal])
GR= guest room, GA= guest area (the guest room with its spaces, W.C and sink)
KB = kitchen and bathroom, (wet spaces were found close to each other in many cases).
BR = bedrooms (one master bedroom for parents, and two bedrooms for children.
E, E1, E2 = entrances, S= staircase
Cr =Corridor, L1, L2, L3, L4= lobby

Figure 1: Shows the two common types, type one: “Corridor-Type Plan” and type two: “Hall-Type Plan” (Source: Authors).
**Study Objectives**

**The study aims to:**


2. Achieve a common plan that is possible to consider in future housing development by using the Adjacency Distribution Theory.

3. Explore the variety of different layout plan, which enhances people to have more opportunity in selecting housing choices.

**Characteristics of Indoor Spatial Spaces**

Statistics done in mid 2000 revealed that household size was approximated to 6.9 persons and 50.20% of the population is less than 15 years of age (Affi, 2002). Architects, planners and specialists have been challenged to define what a house design is needed to get people satisfied. Explanations on current housing design and the activities performed inside spaces are under research. From the study, it is found that four zones of guest, living, sleeping, and services areas formed indoor spaces which are connected by a link either in a shape of a corridor or living space.

**Guest Area (GA)**
The guest area consists of additional spaces for a special toilet and sink. The majority of Gazan houses have a special room for guests only. This space has to match the culture of Muslims, where privacy and separation between visitors and inhabitants are a must. Visitors, strangers or foreigners are welcomed in this specified area. Basically, western style furniture is used by over a half of the society, while the remaining percentage uses Arabic style due to its simplicity and rearrangement within the space Figure.2.

**Living Area (LA)**
The living area consists of a living room in addition to its required spaces such as corridors and balconies. Activities occur inside the living space are mainly enhancing family communication, informally used as a guest space for close relatives, dining space, and a place for practicing cultural activities. A wide utilization of light Arabic futons “Mattress” in the living spaces has given flexibility to the living style Figure.2. This space has been positioned mainly beside the entrance, which has two opposite routes for the living and guest rooms. In the same context, a kitchen has been set beside the living space increasingly, where people have meals within the space.

**Sleeping Area (SA)**
The sleeping area consists of bedrooms and its services. Over a half of the society has three bedrooms for parents and children (female and male). Most master bedrooms have been furnished western style, while children’s bedrooms by Arabic style for flexibility since the number of children in these families are numerous Figure.2. Children’s bedrooms represent their first living space where most of the children spend more than 8 hours daily inside bedrooms that are managed to deal with activities of studying, dining, and living.

**Services Area (KB)**
The service area consists of wet areas such as
(kitchen and bathroom or toilet). Kitchens are devoted to directly serve people in living spaces where people practice different activities within the same space Figure.1. The living space or bedrooms are commonly used for meals or drinks as the majority of houses do not have a separate dining room.
Methodology

Partial concepts of the Space Syntax and Adjacency Distribution Theory are introduced herein.

Gamma Analysis of Indoor Spaces

This aims to show the social analysis of internal cells, i.e. rooms in a house, accessibility and circulation inside Gazan houses. Khattab called it gamma map, which represents interior habitable subdivisions of a cell in a hollow circle. While circulation spaces, i.e. corridors and lobbies, are represented by a line. Moreover, permeability graphs, which interpret how accessibility and movement are controlled by the arrangement of cells, are shown in numbers right side of the gamma map. Figure 3, which describes the social analysis of the two-type plans, shows that “Hall-Type Plan” has more numbers of circled cells if compared to the Corridor-Type Plan”, 16 and 14 cells distributed in 6 and 5 levels respectively. Also, it shows that two separate entrances form the plans, one for inhabitants (E1) and second for visitors (E2). This proves that privacy lies in the core of Gazan culture and tradition.

In Corridor-Type Plan, the corridor has replaced the lobby and gathered all spaces around it and shifted all cells down one level from level-6 to level-5. This made the plan is more compact, effective, efficient, reachable and accessible as the circulation appears easier than the other type. Gazan people saw it comfortable so that most of the samples in the survey 2005 were from this type. This could be an excellent designing approach for a high-density area.

To simplify reading figure 3, codes (122551 and 12272) are given to the Hall-Type Plan and Corridor-Type Plan respectively. Herein, the 6 digits of 122551 interpret the number of permeability graphs or levels of a plan, while the code number itself represents number of cells located at each level. Therefore, the more digits found in a plan, the more scattered spaces and bigger internal spaces enlarge the size of homes. Also, the higher number of the cells accounted, for example; 122551= 16, the more complicated circulation inside a home. As the outcome of 12272 is 14 less than 16, then this proves that the Corridor-Type Plan is more compact and reachable than the other type.

The Adjacency Diagram Theory (AD)

The Adjacency Diagram shows the circulation and space distribution in the plans. This method is different from the previous one as it expects to typologize and categorize architectural plans. To draw the A.D, several drawings are to be done as follows:

Circulation Diagram

The diagram shows the distribution of internal zones: living area, guest area, and wet area indicated by KB, also shows circulation process from the entrance to another. To simplify reading the main access to the house, we consider one main entrance for a house from the staircase directly instead of two separate entrances as this study focuses on internal zones rather than the external one figure 4. In the figure lines represent the access from one zone to another.

Grid Diagram

To simplify understanding the process, figure 5 shows the distribution of zones and the possible circulation from one zone to another in a grid.
Circulation-Grid Diagram
The previous two diagrams are combined together in figure 6, which represents the direct access from one zone to another in bold lines, while the possibility of access from one zone to another in dashed lines.

The Adjacency Diagram (AD)
Zones are rearranged in a circumference where the adjacent zones are shown in sequence Figure 7. The corridor (Cr) in the Corridor-Type Plan or living area (LA) in The Hall-Type Plan is the central cell of the house that has possible access to all other spaces and zones.

Setting Bedrooms into the AD
Bedrooms average is approximated to 3 bedrooms in Gazan houses. The positions of those rooms are different as in Figure 8. To find out the possible permutation of bedrooms in a circumference of a house, the mathematical factorial equation is used.

Calculate the number of housing patterns without bedrooms
If we do not add bedrooms (Br) to the circumference, and consider position of (LA) and (Cr) constant in the circle, then we have the other circled spaces changing positions. Therefore, to calculate the number of patterns we can use the simple mathematical formula of Factorial of 3 as follows:
Assessment Tools: Mathematical Factorial and Adjacency Distribution Theory for Housing Typology in Gaza City

Figure 7: The Adjacency Diagram (Source: Authors).

Figure 8: Bedrooms into the A.D (Source: Authors).

Figure 9: Basic diagrams of housing units (Source: Authors).

Figure 10: Sub-types of the Adjacency Diagram of Type A (Source: Authors).
Then, the number of patterns of the factorial of 3 is 6. But, in fact those 6 patterns are actually 3 patterns and their mirrored forms; therefore we consider only 3 basic patterns: A, B, and C as shown in Figure 9. It is noticed that most Gazan houses have the direct access to the guest area (GA) through the staircase (S), which is the main entrance to the house (E). So (GA) and (E) should be adjacent in the circumference of the circle. This is to suit with the culture of Muslim-Gazan people.

**Calculate the Number of Housing Patterns with Bedrooms**

Locations of bedrooms are different and might be gathered within one or two zones between spaces. There are spaces in the circumference of the circle between four of the five basic requirements of the house, (LA, KB, E, GA), those space are numbered (clock-wise) from 1 to 4 to mark the locations of bedrooms (Br), when they are added to the diagram.

When bedrooms (Br) are added, then the sub-types of each pattern can be easily named. For example, if 3 bedrooms are added in position (1) of Type A, then the sub-type is named as Type A1-1-1 as in Figure 10. Also, if two bedrooms were added in positions (1) and one bedroom was added in the position (2) of Type A, then the sub-type could be named as Type A1-1-2.

To calculate the number of sub-types of each basic type (from Type A to Type C), 19 sub-types for each of our 3 patterns are found. For instance, for Type A, types are as shown in Table 1.

From table 1, it is found that 9 types within brackets are not found where no bedrooms are located between the entrance or staircase and guest room. It was mentioned above that the access to the guest area (GA) would be always through the staircase (S). Therefore, there would be 10 sub-types for each basic type (3 basic types from Type A to Type C) and the total number of types would be 30 types. On the other hand, the calculation for the Hall-Type plan used the same aforementioned process and accordingly found that the number of housing units for that type patterns is only 4 patterns.

**Conclusion**

Throughout the analysis covered both housing units, conclusion can be drawn for future design of Gazan residences as follows:

1. Corridor-Type plan is more compact, flexible and accessible, as it has more alternatives than those of the other type. It is recommended to implement it into future housing projects. This adds a newly practical definition of high-density buildings where people satisfied of the form.

2. The approaches described previously help specialists understand their architecture by
having all types summarized in a small table. As a result, people can locate their plans on the table and it would be easy to recognize the common types of Gazan housing units.

3. The need to study and analyze more existing contemporary, vernacular, and traditional plans and compare them to the figures expressed previously would strengthen the finding. This enables researches and specialists to prove their hypotheses.

4. The approaches used in this study could be further developed to include the geographic directions, which might increase the number of housing patterns. The authors would undertake this issue in their future researches.

**References**


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HISTORY, MORPHOLOGY AND PERFECT PROPORTIONS OF MUGHAL TOMBS: THE SECRET TO CREATION OF TAJ MAHAL

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Abstract
This study investigates the language of architecture of the east. Traditional Islamic architecture, especially Mughal architecture and its influence on India is examined through developmental growth and lineage of Mughal tombs. This paper basically presents research with emphasis on clarity of spatial characteristics on four Mughal tombs in India, two of which are world heritage sites including the world renowned Taj Mahal. A strong context of methodological approach in unfolding the codex of architecture at Taj and influences of its predecessors in creating this magnificent monument is examined. A key to some of the unknown mysteries of architecture in India, this paper can be of reference to historians, architects and the general reader alike in understanding what makes Taj the pinnacle of architecture in India. It lays emphasis on how western architectural students can get a better understanding of the paradigms of architecture in east. With methods like comparative understanding of ordering principles, proportional analysis and studies of composition and approach, this paper explains the process of systematically understanding the ground rules of architectural composition of non-western culture, especially Mughal architecture as developed through the renaissance phase in the east (AD 1508 to 1707).

Keywords
Mughal architecture; tomb design; Indian architecture; Taj Mahal; Humayun’s Tomb.

Introduction
The era of Hindus that survived for more than 2500 years was highly transformed through the epoch making change brought by Islam in India. The Mughal invasion of India in AD 1400 saw a new rise of a refined set of planning tools that led to the creation of some of the finest contributions of Islamic architecture in India, ranging from mosques, tombs, palaces and forts that related to the architecture of that age and time. Mughal architecture found its roots in India and brought in influences from the West through Islamic planning principles refined by scholarly exchange between Persia and Europe. The idea of the use of shell dome construction and pointed arches brought a whole new perspective to architecture in India. This architecture served as a necessary statement pertaining to religion, through the use of an architectural language that infused both Hindu and Islamic principles, to further emphasize the permanence of the Mughal
Empire in India. Monumental tomb buildings that followed the principles of sacred geometry, proportion and scale were imposed rigidly on the landscapes of India’s soil. As Brown (1990, p. 2) explains the following:

“The Indian masons had, for many centuries been engaged on the erection of great stone temples of exquisite design, and to their artistic ability the conquerors gave undoubted credit. On the other hand the conquerors not only brought with them an infusion of new blood, but also innovations gained from other lands, fresh principles and practices which had proved effective under all conditions.”

This initiated a new era of prosperity in intellectual and artistic enhancement through the skills transferred by Persian craftsmen to traditional Hindu builders. The period of Mughal occupation has come to be known as the renaissance age of India and it led to the construction of some of the most magnificent freestanding monumental sacred buildings in the country.

This paper examines the Islamic planning system and the techniques used in building construction and design during the introduction and use of sacred building in the Mughal period (AD 1480 to 1858). The study is based on the analysis and documentation of four sacred tombs, two of which are world heritage sites, built in this period. They include and represent the most refined use of geometry and proportions that express a wealth of knowledge and artistic skill that developed in India during the renaissance period in the East. This paper investigates the architectural language utilized in creating one of the wonders of the world, Taj Mahal, while understanding the architectural lineage of tombs that helped bring the experience to perfection. Elements of Mughal tomb design are explained and simplified so that they can be studied individually and as a whole to help the reader comprehend the components that make up Mughal designs.

**Linage of Mughal Tombs in India**

Before engaging in a discussion of design principles, it is necessary to briefly describe the history of the monuments in question, as well as their precedents: Mughal occupation of India began with the arrival of the Mughal Emperor Zahir ud-Din Mohammad Babur (1483-1530). Known as the Mughal prince, Babur descended on his mother’s side from the 13th century Mongol Temüjin Genghis Khan (1162–1227) and on his father’s side, Timur bin Taraghay Barlas (1336 –1405), the great Asian conqueror of the later fourteenth and fifteenth century. The Mughals established a homeland, a dynasty and an empire in this new domain, marking it with dramatic architectural manifestations of their might and reminders of their lineage, simultaneously adopting elements of the pre-existing architecture and its conceptual associations. This new style, which blends elements of Roman, Islamic and Hindu architecture, reached its pinnacle with the construction of the Taj Mahal, encompassing the functional and symbolic nature of pre-existing mausoleum architecture, as well as elements of its form, and becoming emblematic of the Mughal Dynasty in India. These monuments created a visual presence, which symbolically legitimized those, responsible for their construction, leaving an identifiable and authoritative mark on the landscapes they inhabited; the imprint was both cultural and physical and endures till today in its principles.
and iconography.

The typology of the Mughal mausoleum begins with the elementary need to cover the resting place of an important personage. This impulse has universal and varied application among humanity, but in India it finds some of its grandest expression. Mughal funerary architecture begins with the earliest burials of great men in the Islamic empire in mosques – a tradition most likely borrowed from the existing Christian examples of Martyria and churches dedicated to saint’s relics which sought to link the idea of divinity with human leaders, and to provide followers with a place to venerate the divine through the presence of these exemplary entities. Martyria as well as their direct inspiration, the Greek and Roman examples of mausolea, proved to hold a more lasting interest in the Islamic tradition; the mausoleum, according to scholar Hillenbrand (2004), becomes the “favored means of conspicuous consumption in architecture”. Muslim belief in the soul’s existence after death, bound by the limitations of time and space, explains the layout and spaciousness of Islamic tombs, which were decorated according to the spiritual and worldly power of the deceased.

“The building of mausolea was able to profit from the perennial Islamic tradition that any place could serve as a masjid [place of worship]” (Hillenbrand, 1994). Imperial Timurid architecture from the Iranian house of Timur, as the immediate familial and geographic relative of Mughal architecture in India, was a part of this tradition. Primarily, composed of brick architecture, Timurid monumental funerary structures are known for experimentation with colossal size, and the expression of the structural skeleton itself, which was then enhanced with the use of colors and material articulation. Large iwans and highly symbolic entrance sequences created an air of expectancy and began to take major significance, along with scenic views, as well as perimeter walls which marked the edges of the sacred compound. There is also suggestion of an awareness of design principals, as evidenced by the discovery of fifteenth and sixteenth century drawings in Istanbul and Tashkent, which contained “the detailed notations for the layout of ground plans, and the construction of muqarna vaults” (Hillenbrand, 2004). Factors of axiality, rhythm, repetition, transition and sound are systematically used to yield a full effect. The Mughals adopt much of this typology, with the added introduction of a highly symbolic design program (Burton-Page, 2008) in plan, section and elevation.

The impulse to build funerary monuments transcends theological boundaries and the Muslims were not immune to this undeniable human ritual or to the need for the utilitarian purpose of the mausoleum - namely commemoration. This same set of ancient monuments, and consequently the set of ideologies they embody, likewise inspired the artists of the Renaissance. Europe had come into new contact with west Asian regions following the conquests and losses of the crusades, and a newly rediscovered trade of ideas and aesthetics flowed between East and West. Many of these ideas found new life and were immediately translated into physical form – the pointed arch, the centralized plan, symbolic relationship of proportions, the tie between architecture and music, the iconography of strict geometries and numbering systems to name a few. These principles, many of which have universal human appeal, were once again consciously adopted into the design strategies of architects.
The Mughal Renaissance Age in India

The thrust of movement that ended with the construction of the Taj Mahal is generally accepted to have begun with the design of Nasiruddin Humayun’s tomb (completed 1571) [Figure 1]. Humayun’s Tomb marks the beginning of a distinctly Mughal tomb architecture. Persian and Timurid craftsmen traditionally worked with brick, and it was not until the Mughal domination of a Hindu populace whose craftsmen worked with stone, that an all stone Islamic mausoleum appeared. Humayun’s tomb was built by his son Jalaluddin Mohammad Akbar to establish, through a visual display of strength and power, the presence of the Mughals in a foreign place and to legitimize the Mughal line. The design shows a continuing importance of gardens (imported by the first Mughal emperor, Babur) as a symbol of the Mughals ability to tame the arid landscape of India with lush vegetation and irrigation systems.

Gardens offered the emperor the opportunity to evoke a highly charged vision of paradise and consequently allude to his own divinity and might. Akbar’s tomb (completed 1613) [Figure 2] was built during the reign of his son Nuruddin Salim Jahangir and evokes the highly popular attempts of Akbar to bring cohesion to the empire through the dismantling of religious boundaries. The idea of a family mausoleum in Delhi is abandoned at this time, and a new structure rises at Sikandra, just outside Akbar’s capital at Agra, which displays the might of the empire in its ability to absorb multicultural influences and simultaneously remain true to its roots. Jahangir’s tomb follows this same logic, as

Table 1: Mughal rulers, titles, and tomb types (Source: Authors).
does that of Itmud-ud-Daulah (tomb completed 1628) [Figure 3], royal official to Akbar and vizier to Jahangir. Nur Jahan, Jahangir’s wife, built the mausoleum of Itmad-ud-Daulah for her parents. Nur Jahan Jahangir is known as a prolific patron of architecture including gardens at Agra and in Kashmir and caravanserais in Punjab.

Last in the series of well-articulated stone tomb monuments built under Mughal empire is the Taj Mahal (completed 1632) [Figure 4]. Built by Jahangir’s son and heir, Shihab-ud-din Muhammad Shah Jahan, it is a grand symbol of Mughal power, a tomb ostensibly for his favorite wife, but completed just after Michelangelo’s celebrated dome appears on the Roman skyline and when the Mughal world was in frequent contact with the west; this time period marks the appearance of western visitors and traders who bring philosophy, painting, jewelry design, and
various other imports to the Mughal world. The designer of the Taj Mahal is the first to abandon the symbolic centrality of the garden in order to occupy a prime position of importance on the river— the main thoroughfare of Mughal life— and become visible from the royal palace (not to mention the nobility villas along the riverbank), in fact dominating the skyline thus, not only the royal family, but all the many visitors flocking to the site must see it. Mughal tombs reveal the existence of an impetus to dominate the visual imagination of the populace and create a symbol of wealth and power to which onlookers must submit. The dominance of the Mughal reign, not only as a ruling body in India, but in the wider world, is clearly established. Taj Mahal’s evident beauty and perfect proportions illustrate the transmission of similar ideologies and interests in creating aesthetics that are transformative and appealing in a universal form.
History, Morphology and Perfect Proportions of Mughal Tombs: The Secret to Creation of Taj Mahal

KRUPALI UPLEKAR KRUSCHE,  DANNY AIJIAN,  SELENA ANDERS,  IVA DOKONAL   AND  JILL KAPADIA

Figure 3: Itmad-ud-Daulah’s Tomb (Source: Authors).

Figure 4: Taj Mahal (Source: Authors).
The Making of Taj Mahal

The Taj Mahal was the only Mughal mausoleum that was built by a ruler for his own purposes during his own lifetime. This may serve as one of the reasons that the sheer scale, delicacy of material usage, and overall harmonic aesthetics are more prevalent in this structure than any other Mughal mausoleum. Built to honor his wife, Mumtaz Mahal, Shah Jahan built not only one but two major mausoleums during his lifetime, one for his wife and another for his father Jahangir. It was under the rule of Shah Jahan, that it is said that Mughal architecture entered its classical phase (Koch, 1991, p. 93). The intentional use of design principles in sacred buildings demonstra the desire to express the complex relationship between the human and the divine through architecture. Evidence of careful composition and study of these principles is seen during Mughal rule in India, through the progressive understanding of construction of predecessors to the Taj Mahal. Constructed successively, these structures became the paradigm by which all other successors were judged. As building type, the Taj Mahal primarily served the function of veneration, and secondarily, exhibits governing authority. Identification and analysis of the principles used to compose paradigmatic structures help describe the devices with which to continue the discourse of sacred architecture, so that designers are equipped with the necessary understanding and tools to compose equally commendable, contemporary centers for veneration. The overall site plan of the Taj Mahal is more complex than any of its precedents. To elucidate why Taj became the most refined building in the history of tomb designs in India, the various components used to create tombs are examined and their alteration to perfection studied. The components include 1) The use of Charbagh (the Garden that reflects paradise) 2) The complex use of the Nine-fold, Hasht-Bihisht plan 3) Hierarchy of materials used 4) The careful planning of building approach at Taj 5) Proportion and Geometry 6) The use of Perfect Proportions

The Use of Charbagh (The Garden That Reflects Paradise)

Charbagh when simply translated from Urdu means, four (char) gardens (bagh). Derived from the Persian name chahār bāgh, this style of design in architecture was first utilized to strict symmetry and the use of simple forms of geometry to create Persian gardens. Heavily influenced by the Persian style of architecture, the Mughals in India started creating and then further evolving prototypes of charbagh in Mughal tomb garden designs. The basic principle of the charbagh is to divide a square garden into four symmetrical parts by use of two transverse pathways in the middle. These individual parts are then divided further into smaller symmetrical squares to create flower and plant beds that can be accessed throughout with smaller walkways. The use of waterways is also incorporated generally on the same axis as the pathways leading to the tomb and on the periphery of the garden. Water is source of life, vehicle of cleansing and center of regeneration; traditions of water symbolism are seen in various cultures. Also running water is known to have regenerative as well as protective properties. So passing through water not only cleanses the body but also protects the monument itself lending it an extra aura of sanctity. In India they
generally located these gardens near river sources to create a water irrigation system. These waterways served two purposes: 1) to keep the gardens hydrated 2) to reduce the temperatures of the hot aerie climate found in India by means of water fountains at various intervals. Water was pulled from the rivers into a garden storage well by means of animals like bulls or cows pulling at a pulley attached with water bins. This was moved through the garden in form of shallow water channels that allowed irrigation and covering large areas of irrigated land with less amount of water. In the Hindu interpretation of the sacred mountain Meru, rivers flow in all cardinal directions forming a “cosmic cross”, similarly the Mughals saw the charbagh as a physical manifestation of the four rivers flowing from paradise.

Moore interprets the description of paradise from Koran. He writes, “The Koran promises that the faithful shall dwell in a cool, fruitful paradise and gives details of the attractions that await them there” (Moore, Mitchell & Turnbull, 1988, p. 179). He further states, “Sura 55 tells of gardens, green pastures, palm trees, and pomegranates, and of houris, cloistered in cool pavilions.” (Moore et al., 1988, p. 179). Thus the gardens attached to the tombs were seen as reflections of paradise and needed to be associated with fruit bearing plants to indicate life and cypress trees to indicate death. Thus the charbagh and the abode of the mausoleum were meant to be a place where death connected to life in paradise and earth connected to the heavens above. Thus the peaceful walks from the gardens to the mausoleum related to the fact that the buried lied in peace in the arms of the fruitful paradise.

As some of the major mausoleums built by the Mughuls attained great scales so did the charbaghs proportionately increase in scale and grandeur. This can be best seen in both Humayun’s and Akbar’s tombs. Humayun’s tomb was one of the first tombs to be built in India at such magnificent scale. Proportionately the charbagh is kept in proportion to the tomb building and encompasses the tomb well as the viewer walks through the first gateway to the gardens. Akbar’s tomb is even more monumental in spread of its layout. The tomb is much broader in relation to its height and charbagh is also laid to the width of two thousand feet in comparison to twelve hundred feet width of the charbagh at Humayun’s tomb. Given the large scale of the garden, four water wells are drilled in each garden to provide adequate water supply to the large irrigated land. The plants and trees are also much larger in scale to provide the proportionate visual appearance to the viewer in relation to the tomb itself. Interesting to solve the problem of ever increasing garden proportions in relation to the tomb, the builders of Taj Mahal, came up with an indigenous solution. They moved the mausoleum from the central cross axis of the garden to the uppermost edge of the garden on a platformed terrace [Figure 5]. This allowed the garden scale to be maintained at a much smaller dimension but at the same time gave the visual presence required while walking through the gardens to reach the mausoleum.

The Taj complex incorporates not only the charbagh but manipulates it to fit within a riverfront garden plan that pushes the mausoleum from the center of the garden to the edge of the waterfront to maximize visibility of the structure. The garden is entered
through a transitional forecourt that contains structures that would house a number of staff and leads to a planned market place. The overall composition of the market place is similar to that of a charbagh, composed of four equal parts that are governed by a central cross axis.

The Complex Use of the Nine-Fold, Hasht-Bihisht Plan
The overall plan of the Taj Mahal is a square with chamfered corners, which creates an irregular octagon similar to the plan of Humayun. The central two-storey octagonal hall contains the cenotaphs of Mumtaz and Shah Jahan. The importance of this space is made visible on the exterior by the large dome that rises above the central iwan of the elevation. The overall composition of the plan is governed by an emphasis on bilateral symmetry and
the central axis, denoting the most significant space in the complex. The plan of the Taj Mahal expresses a sophisticated and simplified design that evolved from tomb plans similar to that of Humayun and Itmad-ud-Daulah. The clarity of the nine-part plan (hasht bihisht) [Figure 6] and the direct passage to and from each of the rooms is similar to that of Itmad-ud-Daulah. The basic layout is divided into nine parts by four intersecting construction lines. The phrase hasht bihisht, meaning “eight paradises,” has been interpreted as a reference to the eight rooms surrounding the central chamber.

For instance, Mughal mausoleums introduce new plans: the oblong, the square or oblong with chamfered corners, to produce a ‘Baghdadi octagon’ or hasht bihisht plan, a square chamber with engaged corner rooms or engaged corner turrets. They also incorporate independent symmetrically disposed minarets, and may stand within a formal garden (Burton-Page, 2008). The transition from solid to void, and the juxtaposition of one with the other, creates or resolves tension in a way that affects the pilgrim both physically and psychologically. According to Koch (1991, p.72) in her explanation of the use of the nine-fold plan in Mughal architecture, “while Timurid architecture uses the symmetrical nine-fold plan as the exception rather than the rule, it is the characteristic of Mughal architecture to have adopted and further developed the model in a perfect symmetry faithfully reflected in the elevation”.

The use of an octagonal form at the corner of the building as an element to not only frame but give a sense of weight and purpose to the building is eliminated and replaced by four free standing minarets that are placed atop the corners of the square platform that elevates the tomb above the rest of the complex. By eliminating the use of the projecting octagonal form at the four corners of the mausoleum, the Taj Mahal becomes a simplified form that lacks the weight and dynamism created by the undulating octagonal forms found at Humayun’s tomb [Figure 7]. The placement of the minarets at the corners of the platforms and the use of chhatri’s placed above the center axis of the flanking pavilions and a massive bulbous dome rising above the central axis of the overall complex, creates a triangulation that leads your eye from the top of the domes spire down to the chhatris.

![Figure 6: Typical Mughal Nine fold plan (Source: Authors).](attachment:figure6.png)
Hierarchy of Materials Used

Material in architecture is responsible for providing both the color and texture to a composition. In the case of the buildings we are examining, the colors also have symbolic meaning, which enhances the impact of the architects design decisions as well as how the building is read.

The primary construction materials used in Mughal mausoleums are red sandstone and white marble. These are then inlaid with either intarsia or pietra dura, or sometimes decorated with glazed tile. The function of the decoration as well as the colors used for the inlay and the background are all chosen to convey a message, or to enhance an effect. The choice of white marble is significant because around 1577-9 white marble structures were limited exclusively to the tombs enshrining important saints. The adaptation of these iconographies to Mughal mausolea is directly related to an increasing desire to portray the ruler as extraordinary, at times even taking on the status of a saint or God (Asher, 2004).

Like the tomb of Itmad-ud-Daulah, the Taj Mahal is clad entirely in white marble and accented with semi-precious stones, the technique, derived from the Italian method of Pietra Dura. The use of inlaid stones is again simplified on the façade of the Taj Mahal and found in greater profusion on the interior. The use of red-sandstone and white marble inlay is made use of in the flanking mosque and pavilion as well as the gateways, music hall and guest pavilion. At the Taj very little difference in tonal value on the appearance of the Taj conveys a sense of spirituality and harmony. However, the value contrast of the red sandstone and green gardens to the white of the buildings creates a dramatic mood due in part to the contrast between light and dark. Using only a few rich tactile materials, which are enhanced by natural light they created a strong mystical ambience. Progression of increasingly expensive materials indicates the golden age of the Mughal Empire.
The Careful Planning of Building Approach at Taj

The orientation and placement of a building within the physical world is subject to cosmological considerations as well as adjacency to natural features or historically significant spots. Cosmology, which taps into the nature of the universe through understanding of heavenly movements and cardinal axes is recognized by humans everywhere and is both easily communicated and awe inspiring in its precision. The human interest in cosmology reflects a need for order, and a search for direction. This need is fulfilled at the Taj Mahal through the clear establishment of its structures in a significant orientation on a strict North-South grid.

The Mughals utilized symmetry in both garden and building plans, creating a comprehensive unified building complex that provided linear direction and visual clarity to the observer. Each of these gardens is distinguished by a perimeter wall that is marked by gateways that are placed at the primary cross axes of the garden. The specific placement of these gateways directs the viewer’s attention in a specific way, forcing visitors to approach the building on axis, followed by paved walkways that bring visitors to the building by means of a linear approach [Figure 8]. Approach towards the building is a processional route that begins at the gateway with a framed view of the building. Upon entrance into the complex the view is expanded and encompasses the walled garden together with the centrally located mausoleum. At the intermediate point between the entrance gate and mausoleum, the field of vision is again dominated by the mausoleum. Once the platform is reached the view again narrows and is dominated by surface intricacies of solid and void. Upon ascension of the platform the field of vision is narrowed once more and focused on the central entryway. In each instance, the viewer experiences the building at a different level thus making the journey or approach towards the mausoleum as dynamic as the mausoleum itself.

Axiality in the composition of both plan and elevation are universal features of Mughal tombs and are meant to suggest a powerful regulating device. At the Taj axiality is the...
dominant feature of the complex. The horizontal thrust of entrance once the monument has been seen is unavoidable. Although the visitor must pass through the first courtyard without being able to see the mausoleum at first, the sudden shift in direction brings them to the main garden gate, which is the only entrance into the garden, where they glimpse a distant white light and dark opening, suggesting the presence of a grand tomb, and then are blinded upon entering the gate chamber, where the eyes quickly adjust to the lush garden and shining mausoleum at its end. In this way, the architects of the Taj made use of both the effect of approach in which gardens and water both play important roles, as well as the entrance through multiple portals. The approach through the courtyard and garden is carefully orchestrated at the Taj Mahal, with more subtlety than at any of the other monuments. The location of the structure at the end of the garden means that it occupies both the highly visible spot on the river which dominates the skyline as well as creating the promise of wonder for the visitor who comes to visit the compound itself.

Proportion and Geometry
When considering ideal forms, the circle and square and have been used as a source of

Figure 8: Framed View of Taj Mahal and Itmad-ud-Daula (Source: Authors).
completeness in architecture around the world (Critchlow 1999). On occasion, the equilateral triangle can be considered idyllic as well. These have been given remarkable prominence because of their simplicity. They are believed to be perfect shapes due to the regularity of the distance from the perimeter to the center. This perfection has been linked to eternity and divinity. The circle and the square can also be related to the human figure proportioning system as first seen in the drawing of the Vitruvian man by Marcus Vitruvius Pollio, the Roman writer, architect, and engineer (Indra McEwen, 2003). The applications of simple geometries were greatly influential during the Renaissance (Adam 1990). Variations are often created with these geometric forms such as the octagon, hexagon and pentagon. These polygon variations are more commonly found in Mughal architecture as a direct derivation of the circle or sphere.

There are no predetermined rules or formulas for good design but there is a number of ways in which to layout and detail a building in a manner so that it embodies characteristics of a distinct or classical tradition. The defining elements at the root of a classical tradition are usually based on symmetry and axis from which a building is laid out. This symmetry is made to reflect the balance of nature and the human form. Symmetry in two directions, such as the plan of the Taj Mahal (similar to Palladio’s Villa Rotonda near Venice of 1550), is rare and it is more often on a single axis, such as the tombs of Humayun and Akbar. The overall symmetry does not always lend itself to equally balanced rooms [Figure. 9]. The axis is more than the geometric structure of the plan and volumetrically describes the way someone would move through the space, view and understand the building. The Mughal tombs in this study are symmetrical on a number of axes, but are still focused to have a primary entry into the mausoleums due to the religious practice of orienting the body of the deceased on a north-south axis with the head turned towards Mecca.

The challenge of creating a space for the interaction between the earthly and the ethereal is to represent each in its own right – demarcating the square from the circle – but simultaneously negotiating their interface and the subtlety related to their geometric combination through inscription, circumscript, superposition and adjacency. Such design decisions allow for the conveyance of different meaning, but it is the effective composition of these forms to manipulate the volumetric relationships that direct attention from the viewer toward an intended reading of the structure as a vehicle for interaction with the divine.

The extents of the mass of both the Taj Mahal mausoleum is identified as earthly represented, through cubical form. Further still, the crowning element of this structure, articulated through innovation in dome construction during this period is a direct volumetric representation of the sphere symbolizing and reaching toward the heavens. The Taj Mahal uses a double dome to establish divine axially, and is also unique in how it negotiates emphasis of the vertical axis and directional movement from the form of the building to the sacred space within the dome. The use of a drum to support the dome and transfer tectonic loads is an indication that the visual transfer from circle/sphere to square/
The Use of Perfect Proportions

The use of the double square, 1:2 ratio, is used in the overall composition of the mausoleum including the platform and minarets. At cube is carefully contemplated. The square volume holds the circular dome from below, but to be able to create this transition as the physical device for making that connection, there is an understanding that the structure directly attempts to act as intermediary for the pilgrim to the divine. The transition is further emphasized and resolved smoothly by using chamfered octagonal exteriors and interiors that allow the building to address eight sides instead of just four. The experience within the interior is heightened through the dematerialization of the corners which inhibits the perception of space, thus altering the conception of reality. This effect marks the transition from the earthly realm to the spiritual since the difficulty of comprehending the interior all at once heightens the sense of awe and awareness of the sacred. This relationship is also evident on the exterior of the building, where the corners are de-emphasized to give precedence to the dominance of the dome as the marker of the focal point.

Figure 9: Axes – Plans and Elevations of mausoleums (to scale) (Source: Authors).
Humayun’s tomb, the double square occurs from the base of the platform to the top of the domes spire, and mirrored about the buildings central axis. The double square found at Akbar’s tomb does not encompass the entire building but does include the entire tiered structure. The same proportion at Itmad-ud-Daulah’s tomb encloses the top pavilion and terminates on the center points of the octagonal piers but does not include the buildings platform. At the Taj Mahal, the double square does not include the top of the dome like at Humayun’s but it does follow the concept of terminating points at the center of the minarets similar to that of Itmad-ud-Daulah. If one takes a closer look at the use of proportion of the iwan, a primary feature found on the façade of the monuments one can further break down the proportions of these buildings. Although there is a visible difference in scale, each one larger than the previous, the proportions remain the same throughout. The central archway is a 2:3 ratio where as the overall rectangular frame of the opening is a 4:5.

Rhythm of a façade is a compositional principle which regulates the elements of the design in a way often used to provide a sense of gravitas. The Taj shows a clearer rhythm in façade than its predecessors. The solid versus void relationship also enhances the idea of a number cosmological system – in which the entrance iwan is either the third in the sequence, framed by lesser openings, or the fifth in a sequence, if the minarets and void are considered elements in their own right. Both three and five are highly charged symbolic numbers. Each entrance portal breaks above the datum of the building itself and becomes autonomous and important. Each façade carries an odd number of openings or elements so that a single emphasized segment is left over in the exact centre [Figure 10]. Each façade can be broken up into five parts – five is significant because it derives its symbolism from the fact that it is the sum of the first even and odd numbers (2+3 = 5) and secondly because it is at the centre of the first nine numbers. It is a sign of harmony and balance. It is also the symbol of the human being, which with arms outstretched in the shape of across appears to comprise five parts. It is also a symbol of the universe, its two axes, passing through the same centre. It also stands for the phenomenal world in its entirety – the five senses and the forms of matter amenable to sense perception. Five is a lucky number, five is the number of the hours of the prayer and the types of goods upon which tithes are payable; there are five elements in the hajj (pilgrimage), five types of fasting, five motives for ablution, five dispensations for Friday; there is a fifth of treasure of booty, five generations for a tribal feud, five camels for the diya and five takbir of formulae of prayer: God is Great! There were five witnesses to the Mubahala (treaty) and five keys to the Koranic mystery. There are also five fingers in the ‘Hand of Fatima’ (Chevalier & Gheerbrant, 1996).

There are many perfect geometries that can be found throughout the Mughal tombs. While the mausoleums fit within a perfect square in plan this form does not reveal itself in the same manner in all elevations. Taking a closer look at the mausoleums proper, the overall proportion of the structures wasn’t perfected until the Taj Mahal. Humayun’s tomb, including the plinth it rests on, is the only mausoleum that
comes closest to the perfect square found in both plan and elevation at the Taj Mahal. The Taj Mahal makes use of the cube that is found in the central chamber at Humayun’s tomb, perfecting its use by applying the concept to the overall building revealing itself on the exterior [Figure 11].

Figure 10: Rhythms
(Source: Authors).

Figure 11: Proportion:
A – Triangulation;
B-Perfect Proportions;
C- Overall Composition
(Source: Authors).
Conclusion

Architecture has a language; its vocabulary is meant to be understood by the viewer and its existence assumes the desire to communicate meaning. This concept is elementary in design theory, and universal in its application throughout the architectural oeuvre of humanity; principles of design which are used to this effect are generally shared and commonly understood.

As an architectural lineage each of the four Mughal tombs retains elements of its predecessor. These buildings represent the ways in which architecture as a distinct language evolves from the best examples that a tradition has to offer, leading to what can be considered classical forms. This is true of the evolution of Mughal tomb architecture and its culmination in the Taj Mahal. The combination of wealth and power of the Mughal Empire, along with the humanistic leanings of its emperors led to an architectural revolution that coincided with the Renaissance in the west. A revived interest in tradition was brought to India by Babur and reflected his understanding of Timurid architecture. Babur’s dynastic lineage was grandly manifested in construction of the first imperial Mughal mausoleum of Humayun in Delhi. By employing a specific building type that was rooted in tradition and immediately recognizable in form, function, and meaning, Humayun’s tomb was seen as a place of veneration for both Islamic and Hindu cultures in India. The establishment of a freestanding structure situated in the center of a walled four-part garden (chahar bagh) at Humayun’s tomb provided a precedent for later mausoleums.

By noting the similarities in the usage of axis, symmetry and rhythm, it was found that each of the mausoleums was planned in a manner that emphasized centralized planning and bilateral symmetry expressed in both plan and elevation. Rhythms were primarily created through the use of a five-part composition in elevation. The placements of openings that strengthen the overall form of the building was made possible by regulating openings to a single shape of the pointed arch, creating variety through a difference in scale. The experience of these four tomb complexes all followed a regimented program that included a framed view created by the entry gateway. The entrance gateways served as a transitional space from city to garden, followed by a linear approach that was purposely designed to focus attention on the mausoleum.

By further dividing these mausoleums into simple geometries such as the circle, square and triangle the decision process that led to the perfect geometries present in the Taj Mahal became apparent. Taj for the first time uses the perfect 1:1 ratio in both plan and elevation to create a perfect cube. This cube sits in the frame of minarets placed at 1:2 ratio to create a balance and harmonious composition surrounding the cubical tomb. The use of triangulation is present in all four mausoleums as a tool that takes the focus from earth to heaven. In each of these buildings the corner condition is altered to create a perfect framed view of the building. This is initiated at Humayun’s tomb by the use of protruding octagonal forms. At the tomb of Akbar, the octagonal forms are capped by chhatris, which evolve into the form of engaged minarets at the tomb of Itmad-ud-Daulah. By detaching the minarets at Taj, the visual appeal of the cubical form is enhanced.
and emphasized. The hard transition from a cube to a spherical dome is smoothened by using the octagonal form first seen at Humayun’s tomb. This helps the eye transition from the pointed arch iwan to the circular dome rising to the heavens. Chhatris placed at the base of the circular dome further enhance this connection. The shimmering white marble masterpiece combined with the lustrous green garden complex is a delight and depiction of heaven on earth in strong contrast to the dry arid climate of Northern India. As one lays eyes upon this timeless beauty after passing through layers of transitioning spaces, the much-anticipated approach can only be satisfied by limitless magnificence of this building. Taj follows the principles of firmitas, utilitas, venustas as described in the true classical traditional (Smith 2004, Vitruvius, Rowland & Howe 2001) which describes beauty and aesthetics across all cultures. Such is the language of beauty and architecture of Taj that transcends all borders and has a universal appeal to people around the world.

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Krupali Krusche is presently working as an Assistant Professor at the University of Notre Dame where she teaches urban design studio, historic preservation and structural design. Presently she is also working on developing a research program to laser scanning historic buildings for restoration, documentation and analysis of buildings of significance. In 2007, she started the DHARMA (Digital Historic Architectural Research and Material Analysis) research team that is specializing in 3D documentation of World Heritage Sites. In summer 2008, the DHARMA team spent four
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RE-USABILITY OF HIGH-RISE BUILDINGS: A CASE STUDY OF THE ARTS TOWER IN SHEFFIELD, UNITED KINGDOM

Ali M. S. Kashkooli and Haşim Altan

Abstract
Undoubtedly the high-rise buildings are phenomena of the new high-tech life style and a symbol of development, power and technology. Today, society is changing at such speed that buildings are faced with new demands where they need to be in a position to adapt the change. There are times when buildings change function during construction or even during the design process, and one of the necessities today is the re-usability of buildings, which would also help to increase their service life. The main aim of this paper is to identify some of the key areas in designing structure of high-rise buildings in order to allow the possibilities for future functional changes by illustrating an ideal framework for general structure of these giants. The paper also reveals an example of a case study building, in which these principles have been considered during its redesign, showing samples of master student projects with an aim to assign new function that considers a new concept of re-usability as a concretive structural design. The study is based on a qualitative method and the data is collected by site visits, with preparation of plans, sections, site photos and information using the internet, and through the use of appropriate literature review of high-rise buildings and their re-usability. The results highlighted a necessity for developing a concept of re-usability in designing of new buildings for future in order to prevent financial losses, also the waste of energy and time in respect of changes in construction, design and the negative environmental impact of demolition. This in turn leads us to get closer look into the concept of ‘Sustainable Development’.

Keywords:
Re-usability; high-rise buildings; conservative structural design; time-based architecture (TBA); sustainable development

Introduction
Certainly the result of the expansion of cities is the development of buildings and constructions citywide. Accordingly, high-rise buildings have appeared as phenomena of the new high-tech life style and as symbols of development, power and technology (Collingridge & James, 1989; John & Heather, 2002). They are also the representation of high population of cities and centralisation in official and municipal activities.

Today, society is changing at such a speed that buildings are faced with new demands where they need to be in a position to adapt to the change. There are times when buildings change...
function during construction or even during the design process (Reddy, 1996). For example, the current economic crisis has caused many property developers to convert ongoing projects of office buildings into housing. This usually means the plans are needed for redevelopment from scratch. The challenge in accommodating and building time-based architectural design is considered even greater than before and it is to design and build for change and adaptability. “Form follows function” is giving way to concepts like polyvalence, changeability, flexibility, disassembly and semi-permanence.

Lack of re-usability is a principal source of problems in buildings’ short service life and early demolition. Hence, the result is both great financial loss and waste of time, energy, and natural resources which are forming unsustainable future for development of the built environment. Therefore the important question here is: ‘What are the principal factors in the functional adaptability of high-rise buildings?’

The study is aimed to identify some key points in designing the structure of high-rise buildings in order to prevent the possibilities for future functional changes by presenting an ideal framework for the general structure of these giants. In addition, it reveals an example of a case study building where such principles have been considered during its redesign (Arts Tower, Sheffield, UK), together with some masters student projects with an aim to demonstrate a redesign option with new functionality in terms of the concept of re-usability as a concretive structural design.

In this case, the issue calls for the need of sustainability in design and implementation to accommodate possible changes in decisions as a result of changing market conditions during the construction period and attempts to reveal the potentials and problems in the case of future possible functional changes becoming a necessity. This study will attempt to find some new architectural solutions, not in other aspects such as psychological, social, etc. but in respect of the re-use of existing high-rise buildings.

The study uses a qualitative method for data gathering and the data is collected by site visits, with preparation of plans, sections, site photos and information using the internet, and through the use of appropriate literature review of high-rise buildings and their re-usability.

**High-Rise Buildings**

High-rise buildings are defined as vehicles for utilizing the third dimension of height in city planning. They are characterized by the particular systems of load collection, load transfer, and lateral stabilization. They are not a sequence of stacked up, single-storey systems, nor can they, as to their structural behaviour, be fully explained as a super cantilever turned up. Moreover, they are homogeneous systems with their own unique problems and unique solutions (Englel & Hatge, 1997; John & Heather, 2002).

In order to provide suitable conditions for a flexible floor plan and good possibilities for the later reorganization of individual rooms in each floor layout, the design is of height-active structure systems aimed at the greatest possible reduction of load-transmitting vertical elements in section and number (Satoshi, et al., 2000).
In terms of designing high-rise buildings, ‘high-active’ structural systems are employed to transmit the buildings’ vertical forces by using indirect structural elements in the foundations. The ‘high-active’ structure systems are instrumental and necessary for the construction of high-rise buildings. In this capacity, they are co-determinant in shaping modern buildings and cities (Engel & Hatge, 1997; Satoshi, et al., 2000; Swenson & Chan, 2008).

**Typology in High-Rise Constructions**

High-rise buildings can be distinguished by the different systems of storey wise load collection (Ali, 2001; Engel & Hatge, 1997; Swenson & Chang, 2008). From this point of view, the structural families are as follows:

1- Grid high-rise buildings; in which the collecting points are evenly distributed over the whole floor plan, with a number of columns in various but organized distances (see Figure 2);
2- Casing high-rise buildings; in which the collecting points are arranged peripherally, and the columns are located in the body of the building (see Figure 2);
3- Core high-rise buildings; in which the load collecting zone is located in the central core (Shaft) (see Figure 2);
4- Bridge high-rise buildings; in which the collecting points are directed to some superimposed separate structures (see Figure 2).

Moreover, sometimes a high-rise building can be a mixture of the afore-mentioned structural families (Ali & Moon, 2007). Hence, typically they include a core in centre (mostly to prevent the forces of earthquake and wind in top floors), and an exterior body based on Grid, Casing, or Bridge system (Ali & Moon, 2007; Engel & Hatge, 1997; Swenson & Chang, 2008).

**Time-Based Architecture (TBA)**

During the 20th century it become increasingly clear that architecture is by no means a timeless medium. Thus, in the late 1960s serious research was carried out into techniques that would enable buildings to be adapted to meet the demands made by time. The desire for flexibility led to the construction of “programmatically natural and characterless” buildings. Hence, flexibility became synonymous with blandness and the word subsequently disappeared from the architect’s vocabulary (Leopen, Heijne, & Zwol, 2005).
Even during the construction procedure, there are times when it is necessary to change the function of a building. Thus, the new approach is to design constructions that are able to accommodate such changes, in other words to create “buildings that respond to the time factor” (Leopen, et al., 2005).

Bernard Leupen (2005), propounded a question, ‘why this interest in time-based buildings and time-based architecture?’ defining the answer to this question, he stated that “time has a significant influence on the design and development of buildings. The concept of ‘time-based’ is derived from video and film art. What the ruler is for the architect, the time-base is for the video artist; it provides the basic measure for his work. Since designers of buildings—those people generally called architects—have to deal with aspects of time, the time-based could also become relevant to architects. But why has time become so important and how should we deal with time during the design process? [...]”.

Principles of Time-Based Architecture

As Leupen B. (2005) defined, in principle there are three possible ways to deal with time and uncertainty:

- Make buildings polyvalent; that the building should be proposed to be used in different ways without adjustment to the way it is built. That means there should be always possible to change the function of building. The polyvalence relates primarily to the interchangeability of activities between different rooms and spaces (Leopen, et al., 2005; Spangenberg, 2005).

- Construct buildings that are part permanent and part changeable; This is the origin of what termed the frame concept (Leopen, et al., 2005; Mayhew, 2004). That means to design the building with a completely independent implementation phases.
• Construct semi-permanent buildings, e.g. ‘industrial, flexible and demountable’ (IFD) buildings; an ‘industrial, flexible and demountable’ (IFD) building is designed and constructed in a way to be easily unassembled (Leopen, et al., 2005; Spangenberg, 2005).

According to this approach, the building can be categorised into three system levels (like a crate with bottles) (see Figure 3) (Bell, 2008; Geiser, 2005; Walker & Woeste, 2000):

1- The Primary Support System - with a service life of approximately 50-150 years as a long-term investment and unchangeable (see Figure 3). This system must be as open as possible for the different (and unforeseeable) activities in the secondary systems, so the scope of adaptation must be as wide as possible (Bell, 2008). The primary system mainly comprises the following elements:

- External site conditions (site access, public utilities);
- Load bearing structures (vertical and horizontal support structures);
- Outer building structure (facade, roofs);
- Building services structure (installation structure: concept of the technical access and location of the central control rooms).

2- The Secondary System - with a service life of approximately 15-50 years as a medium-term investment and adaptable (see Figure 3). Subsequent installability, disassembly and reassembly are the key focal points for this level of system (Channabasavaiah, Holley, & Tuggle, 2003). This system consists principally of the following elements:

- Finishing work (interior walls, floors, ceilings);
- Building services installations (central control rooms and technical access);
- Vertical and horizontal access, transport systems.

3- The Tertiary System - with a service life of approximately 5-15 years as a short-term investment which can be changed without any major structural work (see Figure 3). Accordingly it is subject to rapid change and is the least predictable. The tertiary system mainly involves:

- Technical, mechanical and electrical equipment;
- Fittings and furniture;
- Partitions, doors, metal areas etc.

Consequently, the concept of time-based architecture/re-usability intends mostly on the long-term part of the building (Hoffer, George, & Valacich, 2002; Marakas, 2001; Schatzberg & Schum, 2006), which is Primary Support System.
(see Figure 4). For instance, sometimes high number of columns, wrong placement of load-bearing walls (Satzinger & Orvik, 2001), or even wrong placement of utility ducts, prevent the possibilities for future functional changes in buildings (see Figure 4).

**Factors of Re-Usability in High-Rise Structures**

As previously stated in above sections, to achieve re-usability in high-rise structures there is a call for a kind of ‘conservative design approach’ considering some factors during the design procedure as follows:

1. To reduce the number of columns (open planning), by using cantilevers, cantilever girders connected to the main core (shaft), and reinforced armed concrete floors (Bell, 2008; Satzinger & Orvik, 2001).

2. To avoid locating the mechanical/electrical utility ducts or the elevator ducts out with the main core (Bell, 2008; Satzinger, Jackson, & Burd, 2002).

3. To avoid using the load bearing walls out with the main core (Norman, 1996; Satzinger & Orvik, 2001).

4. To divide the spaces with demountable partitions where possible (He & Beck, 1996; Satzinger & Orvik, 2001).

Hence, to achieve the concept of re-usability a typical and ideal plan can be defined.

Figure 4-b: An ideal plan of core high-rise systems (Source: Authors).

As can be seen in the above figure, all the electrical/mechanical utility ducts and also the elevators are placed in central core. Just the emergency fire exit steps are located out with the central core.
Re-Usability in Case of Redesign of the Arts Tower, Sheffield, UK

Location and General Information

The Arts Tower is a building at 12 Bolsover Street in Sheffield, England belonging to the University of Sheffield (see Figure 11). It can be known as one of the most elegant university tower blocks in Britain of its period. At 255 feet (78 m) tall it is the tallest building in the city, although, at 101 m, the 32-floor St. Pauls Tower on Arundel Gate, which was approved in October 2005, will be taller when completed. It is also the tallest university building in the UK (Schneider, 2008).

The building is designed by architects Frank Gollins, James Melvin, Edmond Fisher Ward & Partners, won the first prize in 1953 open competition for master-plan for the central development of the University of Sheffield. Construction of the tower started in 1961 and lasted four years (Schneider, 2008).

The building was officially opened by Queen Elizabeth, The Queen Mother in June 1966; it has 20 stories and a mezzanine level above ground. It involves the Departments of Landscape, Modern Languages, Philosophy, Biblical Studies, and Architecture as well as the library administration. As its name suggests, the building originally housed all the University’s arts departments, which had far fewer students in the 1960s (Mathers, 2005).

There are also two floors below ground level that house nine lecture theatres. The building contains a cafe in the basement. It has a student computer room on the 12th floor, and a self-service language teaching centre on the second. Circulation is through two ordinary lifts and a paternoster lift, at 38 cars.
In December 2007, the University announced plans for a major refurbishment of the Arts Tower. The refurbishment will see a major re-organization of the building’s interior, as well as a new façade, and will coincide with the move of the Modern Language departments to the former Jessop Hospital site. The building was vacated in April 2009, with refurbishment taking approximately two years to complete.

General Structural Information

From a typology view the tower is designed as a mixture of core and casing high-rise families. The structure of the Arts Tower building is based on armed concrete columns and slabs of floors in 23 stories (20 plus Mezzanine and 2 basement floors).

All the toilets, lifts, paternosters, stairways, and electrical-mechanical utility ducts are located in the central core, established on armed concrete load-bearing walls.

Conservative Design in Structure

Although the tower has firstly been designed for office spaces, classes, and cafes, the columns are placed in such way not to prevent the future functional changes in buildings functions. This is absolutely a positive point which increases the service life of tower by changing the demands of market and time. This in turn, shows the conservative and futuristic attitude of designers.

The paper deals with some examples of conceptual designs regarding the possibility of re-use of Arts Tower. The design works have been completed by the Taught Master Students of the School of Architecture at the University of Sheffield, Sheffield, UK, in the module ‘Applied Design Project’ held during February 2009. The course intended for ‘re-designing the Sheffield Arts Tower as a sustainable residential community for student use’. Accordingly, the students proposed several new functions for the tower by also establishing its re-usability.

Example 1: This example is designed by Anish Sharma. The design includes major changes to the layout of building in both horizontal and vertical sides. Moreover, added five new floors to the Eastern side of the tower.

Double skin facades are recommended as solutions to tackle heat gain and natural ventilation in this design work. Moreover, maximum number of rooms has been provided with balconies in order to promote natural ventilation and also gain indirect heat in the winters.

A double skin on glass along with terrace gardens has been provided towards both southern and northern sides of building to increase warmth
during winters as well as venting out the heat in summers. The roofs of both the blocks are recommended to be constructed from steel and be painted in black colour to they save the heat during the day. Green roofs and Terrace gardens are also suggested.

Example 2: This example is designed by Xi Wang. The principal intention of this design work was to accommodate students from different backgrounds, with various cultural values and behaviours. The proposed sections are as follows: Retails shops, student rooms, flat studios, one bedroom apartments, computer rooms, communal spaces, and theatre rooms.

As illustrated some major changes have been recommended for the interior layout of building (e.g. rooms and services). Moreover, four stair ways have been recommended to be added in Eastern and Western sides of building for more access among the units.
Example 3: This example is designed by Binh Khanh Nguyen. The design includes major changes for layout of the building in horizontal side. Accordingly, it aimed to develop the new model of Arts Tower considering the climatic situation of Sheffield in terms of natural heating and cooling, and to produce energy from renewable resources (e.g. natural ventilation and solar energy cells on the proposed facades). Hence, the building is proposed to operate energy efficiently as well as considering the aesthetical principles. Moreover, the design intended to provide contact with nature having to two sky gardens in floors 6 and 14. The new functions are as follows: Residential apartments and flat studios, restaurants, educational spaces, gym and leisure spaces, gardens, cinemas, retails, offices, and communal spaces.

Example 4: This example is designed by Rohan Shiram. The design proposed major changes for layout of building. It is based on keeping the primary support system of the Tower (columns and central core), and establishing a new
horizontal and vertical spatial organization based on open spaces used as green roofs and gardens. The dynamic style of building spaces and facade, as well as natural ventilation approaches were considered as significant aspects of this design work.

The new functions are as follows: Residential apartments and flat studios, cafeteria and dinning hall, laundries, gym and leisure spaces, roof gardens, retails, offices, and communal spaces.

As four examples indicated, the provident and conservative design of Tower’s structure opens the doors to ideas and possibilities aimed for betterment or re-usability of the building based on new demands of market, culture, and technology. This in turn, increases the service life of the building as new approaches to saving
energy, time, investment, and natural resources, which also provides a more sustainable future for the built environment.

Figure 10: Conceptual design to re-use of Sheffield Arts Tower building by Rohan Shiram (2008-09) - Master Student of Architecture at the University of Sheffield (Source: Authors).

Conclusion and Recommendations

While the results revealed that in order to achieve satisfactory re-usability in core high-rise building structures, some factors should be given serious consideration in the designing procedure:

1. To reduce the number of columns; as stated before in the study, the number of columns is one of the significant sources of problem in terms of limitation of re-usability in constructions. Thus, one of the successful ways of achieving increasing the possibility of re-usability and future functional changes in buildings is designing and constructing buildings based on using a lower number of columns.
Designing high-active structural systems is employed as one of the methods of reducing the quantity of columns in buildings (see section 2). Hence, the stresses are transmitting to the foundation in an indirect way through the horizontal and vertical components of the structure.

In addition, the new methods of creating and empowering the armed concrete and the new materials as concrete’s additives allow the structural designer to design constructions established on using the cantilevers - cantilever girders connected to the main core (shaft), and reinforced armed concrete floors with out the support of columns.

2. To avoid using load bearing walls out with the main core. Accordingly, load-bearing walls have been underlined as one of the major sources of limitation in the concept of functional re-usability. Again, as previously stated the traditional method of transmitting the forces by shear walls to the foundations can be changed by using cantilevers and cantilever girders, and also employing the new techniques of using reinforced armed concrete.

3. To avoid locating the ducts for the mechanical/electrical utilities and/or the elevator out with the main core; as previously demonstrated, locating of the ducts for the mechanical/electrical utilities out with the central core in high-rise buildings places significant limitations on the building in terms of its re-usability limiting the horizontal changes in building space.

4. Trying to divide the spaces through the use of demountable partitions. Thus, in order to achieve the goals of ‘time-based architecture’ the adaptable and changeable partitions need to be carried out of the prefabricated and demountable materials suitable for use in the division of spaces in buildings. This in turn, creates the possibilities for all future functional changes. In this case, the isolation against sound, water and humidity, high and low temperatures must be considered.

Therefore, as a result, the study has demonstrated that all high-rise buildings, which are designed out of the defined framework and principles, demonstrate problems in terms of future functional re-usability. This in turn, acts as a motivating factor for architects to consider and take into account the important issue of ‘re-usability’ in designing of high-rise buildings and to respond to the concept of ‘time-based architecture’. Hence in the first steps, before the further numerical calculations (by civil engineers) and plans of implementation, architects should provide the concept of appropriate structural supporting systems considering the future functional changes. This action can also form the base for further research by civil engineers in order to identify and incorporate new techniques in structural design based on the concluding points referred to this study.

Acknowledgments

The authors would like to thank Masters Students of School of Architecture, the Sheffield University, UK; Anish Sharma, Xi Wang, Binh Khanh Nguyen and Rohan Shiram, who have contributed to the paper with their designs in “Applied Design Project”, Master of Architectural Studies (Sustainable Architectural Studies - MArch Studies) course module.
Re-usability of High-Rise Buildings: A Case Study of the Arts Tower in Sheffield, United Kingdom


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Re-Usability of High-Rise Buildings: A Case Study of the Arts Tower in Sheffield, United Kingdom

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AN ARCHITECTURAL ANALYSIS: THE MUSEUM OF CONTEMPORARY ART, TEHRAN, IRAN

Kambiz Navai

Abstract
Kamran Tabatabai Diba is one of Iranian Architects, whose works during 60’s and 70’s are well-known among architects and scholars. His works are mostly considered as examples of Modern Style, scented by Iranian Architecture. His efforts on creating public, socio-cultural centers in Iran was a result of his concern about social matters, as well as seeking for a national, contemporary Architecture.

Tehran’s Museum of Contemporary Art is one of the most popular and well-known Diba’s works. In this article an effort has been made to get a better understanding of this remarkable piece of work, and to light up the Architect’s intents and the architectural methods he used to express them. The critique is concentrated mostly on two mentioned aspects of Diba’s works: “Integrating Modern Style and traditional Iranian Architecture”, and “Creating socio-cultural centers and institutions well related to society”.

The Analysis is based on the most important features of every work of Architecture: “Space” and “Form”. The author seeks for the meaning by “watching” the whole complex carefully, “giving descriptive information” about it, and in the meantime “analyzing data” with the help of “basic design methods” together with the knowledge of “Modern Style”, “Characteristics of Late Modern Movement” and “Traditional Iranian Architecture”.

Text is accompanied by drawings and figures, which help for better knowing the complex. The effort is made to use a simple language, understandable not only by Architects or scholars, but by every other interested non-specialist reader.

Keywords
Museum of Contemporary Art; Kamran Tabatabai Diba; museum design; late modern era in Iran; architectural criticism

Project Title: Museum of Contemporary Art
Design: DAZ Architects, Planners and Engineers
Date of Completion: 1967 – 1977
Commissioner: Farah Diba’s Bureau, Tehran
Architects: Kamran Tabatabai Diba, Anthony J. Major, P. Gupta
Construction: RAS Construction Co.
Location: Tehran
Site Area: 16000 m²
Floor Area: 5000 m²

Introduction
The Museum of Contemporary Art is located east of North Kargar Ave., bordering Laleh Park. Neighboring Arts and Crafts Bazaar is on its north;
and Laleh Park on its east (Figure 1). The building has two entrances. The main entrance leads from N.Kargar Ave. from west of the site, while the secondary entrance (service entrance) opens from Laleh Park. The museum is located south of the land plot, lying inside a vast green field occupying the northern side, called the Sculpture Garden. The building is composed of several low structures that have a 45° turn from the axis of the main avenue. All these structures are capped with identical skylights which look toward the Northeast, except from the four on top of the main entrance. The museum includes a central foyer, exhibition areas, an auditorium, a library, a bookstore, canteen, office space, documentation center and store, plus service and support areas. The idea of establishing a museum to house contemporary art for public exhibition was first put forth by architect Kamran T.Diba in 1967. He worked on and developed this idea through a long time until finally in 1976-77 it was realized, and afterwards he accepted to be director at the museum for some time after its inauguration.

Exterior Appearance

Tehran’s Museum of Contemporary Art is located west of Laleh Park, next to N.Kargar Ave. The main entrance faces the avenue ignoring the adjacent park. The secondary entrance which opens from the park serves particularly as a service entrance. The building mass stretches toward the avenue only to contain the main entrance, yet, its volumes could well be seen standing on the street side. By walking down the North-South axis along the avenue, one can enjoy the pleasant and diverse views that the museum’s architecture provides (Figure 2&3). The connection with the avenue on the west is stronger than its connection with the park. It is as though the adjacent park acts as a green context into which the building is incorporated to pose a stronger impact on the street façade (Figure 4). The facades on the park side are not meant as important (Figure 5).

In terms of urban land-use, the museum fits well with the adjacent elements, yet with no clear connection between them. A linear socio-cultural land-use scheme is apparent, although the layout of different functions tells of a disconnected sequence that avoids the creation of an integrated, socio-cultural/recreational urban district. The presence of neighboring Carpet Museum, Arts and Crafts bazaar, and Laleh Park indicate that even if it were intended to be, the urban complex is not functioning in reality.

The building’s volume is mainly composed of a plain, massive base upon which sit a multitude of skylights. The base is made of orange sawn stone blocks, and the top is made of creamish concrete that also shapes the skylight protrusions as the volume’s points of termination. The curve of the skylights is copper-clad, and its openings have dark-colored glass. The stone base moves back and forth, creating rectangular solids that are headed with half-cylinders and capped with two rows of skylights (Figure 6).

The back-and-forth placement of similar volumes at the base breaks up the exterior appearance of the building. The façade fragments are clearly visible from outside the building, making it a ‘lavish composition’. However, harmony is created by the similar shape and material of the base units among the diversity seen in the exterior. Moreover, the consistent arc form used in the section of skylights unifies the otherwise
shattered appearance of the building. Among the multitude of skylights, the four rising on top of the main entrance are thoroughly distinct in size and arrangement, and lead all other similar members in concert (Figure 7).

All of the skylights face the north-east, like a whole crowd who is watching enthusiastically an interesting display at the far distance. The orientation of the skylights plus the positioning of the rectilinear galleries makes the building seem as being rotated towards the North-east. This rotation implies turning from, or backing the main avenue on the west. The western neighbor of the museum—the avenue, or the ‘symbol of the city and society’—is thus ignored in spite of serving the museum better than the park. The building lies unlearned to its adjacencies, looking toward an indeterminate location in the distance.

The walls of the museum are closed off, mainly without openings, suggestive of bulky and massive walls of a fortress. This gives it a tone of impenetrability, strength, mystery and introversion. Like many of our traditional introvert buildings, the connection of the museum to the urban passageway is only via its main entrance. However, the position of the building inside a vast, open area make it inaccessible, as the contiguous outer walls of the traditional building merged with that of its neighbors to close it off. To access the main entrance, one shall walk down the main avenue long way heading south along the western border. Once in front of the entrance space, the four skylights on top of the main foyer direct the way, yet do not seem as vigorously inviting the visitor. This is different from traditional buildings that dress up and show a smiling face to the visitors upon entering (Figure 8).
Figure 2: View from the Southwest (Source: Author).

Figure 3: View from the Northwest (Source: Author).

Figure 4: General view of the museum—N.Kargar Ave. in front, and Laleh Park at the background (Source: Author).
Figure 5: View from Laleh Park (Source: Author).

Figure 6: General view of the side bordering the Sculpture Garden (Source: Author).

Figure 7: View of the museum and the Sculpture Garden from the North—Among the assets used to create unity in the composition of external volumes, the most important is employing skylights of the same shape and orientation. The four capping the main foyer, however, bring them all into harmony and meaningfulness (Source: Author).
The composition of skylights and diverse volumes makes the museum building show off, attracting everyone’s eyes. Even the closed off walls which give the impression of a fortress can be considered a deliberate act of design to fix up the exterior.

The shape of the skylights reminds one of the wind towers in traditional Iranian towns. The gradual sinking of the building into the ground—that actually happens in towns in the hot and arid climate of kavir—makes a gradation of volumes and their topping skylights, reminiscent of building clusters in traditional towns or the traditional urban fabric (Figure 9). Their composition, nevertheless, follows a strict order. The façade materials and their composition add to this traditional image.

The exterior walls of the building are made of orange sawn stone blocks. The upper part of the walls is made of creamish concrete that extends onto the container shape of the skylights. The curved part of the skylights is clad with copper...
plates, and the openings are of dark-colored glass. The sawn stone facing makes the building seem bulky like traditional ones, raising historical implications. The framing of stones in concrete softens its normal appearance—given the care and precision in its execution. The material of modern architecture is colored cream and laid out with boulders to echo the sounds of past Iranian architecture and the ambience of Shemiran verdant alleys. Using copper and toned glass creates a pleasant composition in contrast with that of stone and concrete.

What calls for special attention is the rejection facing stone cladding, cement finishing or ceramic tiles as facing material that are merely used to clothe the walls. This type of design delineates the architect’s inclination to employ a dual functionality of façade elements, both face-treating and load-bearing.

The Sculpture Garden is a vast grass field sloping from the northwest to the southeast. Featured inside this green space are a few of sculpture works of famous contemporary artists such as English Henry Moore. This garden can be accessed from the jelokhan (the space in front of the entrance). Past the jelokhan, one can go to the west of galleries via a green passageway at the back of projecting volumes of the galleries. This minor path is like backyard access ways; nevertheless, it is a piece of open located in front of the building, which also leads to the Sculpture Garden. The considerable difference of grade levels of the Sculpture Garden with the western avenue further dissects any connection. There is not an access way to the garden from the inside of the museum. The water canal in between the building and the garden—seemingly a ditch running west to east—cuts them apart further emphasizing their disconnection (Figure 10). The surface of the garden lacks any hard landscaping or paving with stone, gravel, or similar masonry materials, thus void of any area that could be used as a passageway or a sitting retreat (Figure 11).

As stated above, the Sculpture Garden is an abridged green space that disapproves of people entering it. It only calls to be ‘watched’, and its sculptures to be observed from ‘the distance’, as if it is house to sculptures and not to people. It constitutes a green background against which the modern sculptures stand out as mythical figures.

The Sculpture Garden includes very few trees. Therefore, the museum building can be well perceived from the garden side (though not actually a garden) displaying all its details and extravagant play of volumes. We could have called the whole site a sculpture garden provided the building was smaller or the open field larger. The building could have counted as one piece of sculpture inside the garden—the largest and the most remarkable. This effect, though to a lesser degree, can still be attributed to the museum building (Figure 7).

**Spatial Configuration**

The building can be generally divided into two parts, closed spaces, and the inner courtyard. The closed spaces of the museum have a spiral design including seven main areas. These spaces are chained together. The first link in the chain is the main foyer called ‘gallery no. 1’. The visitors’ path starts from this point on the entrance level. The path goes on, gradually sinking into the ground until it reaches the lower level of gallery no. 1, where it ends. This sequence resembles
a chain that is thrown out into the Sculpture Garden, and retrieved back to the same place but on another floor level (Figure 12).

Galleries are much alike in terms of design. However, the design of galleries no. 1 and 5 which define the main axis of the museum building differ.

Figure 9: View from the West--The shape and composition of the skylights implies the old traditional fabric of Iranian desert towns... (Source: Author).

Figure 10: View from the West--The trench running between the Sculpture Garden and the museum building dissects their connection and denies any link to be established between the two. (Source: Author).


Figure 12: Section through the three-dimensional projection of the museum (Diba Kamran, 1981). Kamran Diba - Buildings and Projects, Hatje, pp. 46 & 47. The closed areas are set in a chain that starts from the main foyer, passes through galleries, and reaches the underground level below the main foyer.

Figure 13: Ground Floor Plan (Source: Author).
The galleries are arranged at some points like a wide path to move in such as in passageways, and at others like spaces lying beside the main path and connected to it. Galleries no. 2 and 3 are examples of such arrangements. Corridors constitute some of exhibition areas, which open onto the inner courtyard by small windows in two or three instances. These corridors are ramps that create ‘movement’ inside the museum space. The succession of galleries and the connecting ramps encourage the visitor to move constantly onward. The space attracts people, and does not encourage returning or leaving the exhibition while only partly visited. In other words, the chained galleries are linked together in a labyrinth that has only limited contact with open space (Figures 13 & 14).

The Inner Courtyard

The inner courtyard has an irregular shape. Its longitudinal axis lies in the north-south direction, perpendicular to that of the entrance. Its shape is the result of recessions and projections of the volumes housing the galleries. Two glass doors provide access to this yard from galleries no. 1 and 5. In harmony with the sinking rhythm of the mass of the building, the courtyard also has different sinking levels that are connected by stairways. A rectangular pool sits in the middle, within the stairway on the main axis of the courtyard (Figures 17 & 18).

The location of the courtyard inside of the mass of the building reminds one of traditional architecture in which courtyards constitute the main element at the heart of the design, surrounded by closed spaces. The closed spaces in such works take their cue from the open space, and the vividness and identity of open space owes to the closed spaces facing it. This composition takes another form in The Museum of Contemporary Art associating other meanings. The sidewalls protrude and recess in different directions as if playfully located volumes give shape to the courtyard. In clearer words, although being symmetrical, the courtyard has minimum identity, being spontaneous and ‘randomly’ shaped as if it were the remainder of the space taken away by volumes housing the galleries. On the other hand, the galleries' sidewalls intrude into this inner space with invasive corners and angles. This intrusion weakens one's inclination to sit down and rest in the courtyard. The sidewalls are void of any large opening except for the two glass doors on the north and south sides. The stone bases appear totally solid (Figure 19). In other words, the closed spaces in the museum do not turn to the inner courtyard. Moreover, the position of the topping skylights is in discord with the courtyard space (Figure 20). All these factors make one inside the courtyard feel as though she were ‘outside’. The architecture of the ground surface featuring different levels and stairways is not encouraging to sit down, but rather inclines one to walk along the length of the yard. The pool in this design is relatively small, and because surrounded with stairs lacks its traditional quality of indulging silence and serenity.

The Main Foyer

The main foyer constitutes both the start and end point of the path of visitors inside the museum. Therefore, it can tolerantly be considered the central space in the museum, although not geometrically located in the center (Figure 21). Its plan is shaped like a slightly irregular octagon, with a high dome above. The large skylight opening located above the void inside
the spiral ramp shows the importance of the central space, and consecutively, all the foyer space in consecutively, all the foyer space in the architect’s mind. Highlighting this central area forms it a special identity and independence, making it a place of pause and contemplation. All this contribute to evoking a traditional image of space, translating the main foyer to the old version of vestibules in past Iranian buildings. They serve as introductory spaces to the visitor, leading through to the main areas. Other exhibition areas, although all remarkable, do not compare with the main foyer architecturally, standing at a lower rank. As stated earlier, not even the central courtyard is as commanding as the closed spaces. The foyer, therefore, serves as both the ‘introduction’ and the ‘subject’ of the composition, evolving into the climax in the architectural story of the complex—an early occurring one that, however, somewhat dims the rest of the story yet to come.

Figure 14: Underground Level Plan (Source: Author).

Figure 15: Interior view of a gallery (Source: Author).

Figure 16: Interior view of a gallery (Source: Author).

Figure 17: Courtyard Plan—shape of the courtyard is the result of recessions and projections of the volumes housing the galleries, as if it were the remainder of the space they had taken away. (Source: Author).
Figure 18: Section of the museum, through the main foyer and the courtyard (Kamran Diba - Buildings and Projects, Diba Kamran, Hatje, 1981, p.41).

Figure 19: View to the inner courtyard--The design of enclosing walls, stairs, and the pool in relation with the skylights sets the courtyard apart from the traditional architectural models. (Source: Author).

Figure 20: View of the inner courtyard--The design of the enclosing walls does not communicate with the courtyard, making one standing inside it feel as though s/he were ‘outside’ of the building. (Source: Author).

Figure 21: Main Foyer’s Plan--The main foyer, besides serving as a connection point, functions as a gallery. The ramp inside which leads to the underground is another feature of this space. All this make the foyer a busy node right at the start. (Source: Author).

Figure 22: View into the main foyer. (Source: Author).
As noted earlier, the main foyer is also functioning as gallery no. 1 (Figure 22). It constitutes an important node in linking spaces; besides having direct contact with the entrance and chain of galleries, it is connected to the level below, to the bookshop, to the courtyard, and to the restaurant. The connection with the lower level, made through a central void and an imposing ramp, is worth considering. The grandeur of the ramp owes to its particular shape and width, to the void inside, to the eight columns, to the high rising skylights above, and to the light that permeates through. Thus, the ramp becomes the first role in the story of the foyer, reminding us of the architect’s intimate focus on the ‘principle of movement’ in his traditional, resting architectural figure. It also reinstates that while binding with traditional models, he is fond of modern architecture as well—an architecture in which stairways and ramps hold important roles inside the main spaces of monuments. It is not an exaggeration to claim that the ramp in the interior compares with the museum building in the Sculpture Garden, as the most important interior sculpture (Figure 23).

The function of the museum’s central space calls for special attention. On one hand, it functions as a foyer; while on the other hand, it acts as an exhibition space. This shows the architect’s intention in taking full advantage of every space inside the museum, regulating functions and guiding the visitors’ behavior through. Spatial arrangement of galleries shows them as separate fragments that the architect has carefully set up, connected with paths that are carefully planned yet mixed with the exhibition activity also. In other words, the Museum’s plan resembles a “tailored” composition in which placing of every segment has been thought out and all set for visiting.

This brings us to one important point in the functional order of this thought-out sequence. The architect has placed spaces such as the auditorium, the library, lavatories and etc. on the level below the central space. This causes the visitor, who has been carefully guided through the galleries, to suddenly face a myriad of non-exhibition areas, and then return to one of the galleries again—the largest of them. This placement actually means an interruption in the functional sequence inside the museum, which nevertheless, is due to the multi-functionality of the central space. If we consider the central space as gallery no. 1, then the plan lacks legibility in the way just described. If we assume the central space as housing the entrance foyer, then there is the question of its unusually large size. Even naming the central space as the ‘entrance foyer’ and disregarding its inappropriate size wouldn’t justify the issue, as there is the grandiose ramp spiraling down to the underground. The position of this ramp at the center of the space takes away from it the atmosphere of a Gallery,

Figure 23: View towards the ramp and the main foyer from one level below the entrance. (Source: Author).
representing it more as a node of connection. The character of the ramp is also worthwhile in another way, in seducing any visitor to step on it and descend. This temptation disrupts the intended line of the story in the sequence of galleries for the visitor to tread. The condition of this ramp induces a descending movement rather than an ascending one, seeming a little odd to spare all the grandeur only to lift up the leaving visitor at the end of the exhibition course to the main foyer. It is as though the architect’s intention in selecting and using gentle forms and compositions has superseded an effective design of correct functionality, leaving the latter in favor of the former.

Notes:
1. This fragmentation of volumes brings to mind the works of famous architect Louis Kahn, such as Erdman Hall Dormitories at Bryn Mawr College, Richards Medical Center (both in Pennsylvania), National Assembly in Dacca (Bangladesh), and most notably Institute of Public Administration at Ahmadabad (India).

2. As a matter of fact, the skylights have a greater impact on the elaboration of the composition of exterior volumes of the building rather than their function for interior spaces. Walking inside galleries assures us of the little light that these provide, sometimes even disturbing as regards the maintenance of featured works, for which they are covered by dark cloths during some hours of the day.

3. A large district lain in the slopes of Alborz at north of Tehran, part of the city nowadays. Families used to move temporarily in the gardens at Shemiran to enjoy cool and nice summers.

4. The same color tones of façade materials, especially in contrast with the green background, represent it as a single-colored complex, emphasizing its resemblance to traditional town fabric.

5. The application of this modern theory can also be observed in the interior of the museum. The architect’s knowledge of materials, as evident in the composition of wood and concrete, the paving, and the false ceilings shows that without being lavish, the materials are appropriate and befitting. Proper care in selection of materials and in execution of construction details has assured the integrity and freshness of the building a quarter-century after its erection.

6. The courtyard can be entered from galleries no. 1 and 5. However, since they are meant to house works on exhibition, their doors shall be kept closed. This suggests that no effort has been made in attracting visitors to the courtyard, and no preparations been made to create a warm and inviting atmosphere inside it.

7. Some have pointed out similarities between Tehran Museum of Contemporary Arts with the building of The Juan Miró Foundation–Center for the Study of Contemporary Art in Barcelona, which is the work of architect Josep Lluís Sert. The shape of the skylights plus the façade material—exposed concrete—are among the most important similarities. The Spanish architect has asserted borrowing elements of oriental architecture for his design. The composition of volumes and the cream-colored concrete of Tehran Museum, however, provide a more attractive facing and a stronger link with Iranian architecture of the past. Beside these formal similarities, the ‘Sculpture Garden’ and ‘inner courtyards’ are elements found in both. A comparison of the spatial configuration and design of the two buildings can be truly helpful in the current analysis. The Miró Foundation’s Sculpture Garden is an enclosed green space with pedestrian access and multiple benches. The inner courtyards are surrounded on all sides by overlooking terraces and large windows of galleries opening onto them. This creates a totally different quality than what happens in the Sculpture Garden and the inner courtyard of Tehran Museum of Contemporary Arts. Surprisingly, the work of the non-Iranian architect evokes more of the meaning and spirit of place found in Iranian architecture.
8. Despite having four large skylights, the main foyer is relatively dark. The light penetrating through the skylights, except when from the south, is not intense. As a matter of fact, it is only one of the southern skylights that passes an adequate amount of light into the foyer. It can thus be said that the shape of the skylights has been of more importance to the architect than their functionality.

9. The main foyer, as described here, exposes a centralized configuration. All details are strictly arranged towards the center, which sinks to the underground level and forms a void. A square pool on the ground floor level inside this void attracts all eyes. These features are reminiscent of traditional architectural models. Yet, the architect has selected a metal pool containing dark oil—in total contrast with the master mason in selecting pure water in a turquoise pool that associates with a deeply different meaning. Perhaps, it is only the introductory phases of design in which the architect involves himself with traditional Iranian architecture, and draws back when attempting to develop and realize the design. The oil pool is the work of contemporary Japanese artist, Noriyuki Haraguchi, and is the highlight of the museum owing to its location inside the important central foyer. The use of oil in it has always been a controversial issue. Some have depicted it as the necessary medium for turning wheels of industry and technology, thus putting ‘science’ central to ‘art’, a logical composition in the modern scientific world of today. Others have viewed it like the treasure fluid that comes out from the earth, is sold vehemently, brings about a fortune, and vitalizes arts and crafts. It is in this kind of circumstances that museums are born, and art promoted.

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THE GENERATIVE NATURE OF ISLAMIC RULES FOR THE BUILT ENVIRONMENT

Besim S. Hakim

The built environment of Muslim towns and cities was determined in the past largely by the manner in which responsibilities were allocated and individual behaviors were affected by the notion of rights. In the early period the predominant customary practices (urf) of the Arabian peninsula in particular and the Near East in general were assimilated by the early Muslims (Hakim, 1994). These practices were adapted and changed as necessary to bring them into conformity with the practice and experience in Medina following the hijra in 622 C.E. Through his statements and actions, the Prophet Muhammad affirmed customary practices that were consistent with Islamic values, and he clarified the purpose of other practices that he encouraged. Thus was established the basis for practices that subsequently were elaborated upon and expanded by Muslim jurists. In general, it can be said that there are more similarities than differences in the positions adopted by the various schools of Islamic law relative to the built environment.

It was the responsibility of the ruling authority to establish the primary mosque in a central location and to specify the location of the government building, treasury, market, defensive perimeter wall and its gates, and thoroughfares leading from the center of town to the city gates. In newly created towns, it also was the responsibility of the ruling authority to allocate land to tribes, ethnic groups, and extended families through a procedure known as iqta. The subdivision and management of these allocated lands was the responsibility of the tribal elders or representatives and not that of the ruling authority. Heads of households in turn were responsible for laying out the organization of the cluster and the design of their houses (Akbar, 1990, 1992).

When Muslims settled in existing towns, the above-mentioned responsibilities were allocated in a similar manner. In certain cases the existing urban fabric underwent changes due to the rights and responsibilities associated with the parties that controlled various sectors of the built environment. The sectors and facilities of the built environment that were used by the public were overseen by the muhtasib.

At the level of neighborhood formation, change in the urban environment was regulated by
qawa’id fiqhiyya, overarching legal principles that formed the framework within which the Muslim community set out rules that people understood, respected, and followed in making decisions that affected the design of their houses and the manner in which those decisions affected adjacent buildings. Muslim jurists define the term qa’ida as a “general ruling that applies to its particulars,” or “an overarching rule that applies to the various levels of a situation or a problem” (al-Zarka, 1989). All law schools agree that the five primary qawa’id constitute a framework within which other qawa’id fit, covering most issues addressed by the law (al-Sadlan, 1996). These five principles and their corollaries comprise a system in which a concept or decision related to any one of them is affected by, or affects, the others.

The five qawa’id that served as the basis upon which secondary principles and rules were established are: (1) do not harm others and others should not harm you (la darar wa-la dirar); (2) affairs are determined by their intent (al-umur bi-maqasidih); (3) certainty is not removed by doubt (al-yaqin la yazul bi-l-shakk); (4) hardship brings relief (al-mashaqqa tajlib al-taysir); and (5) custom has the weight of law (al-ada muhakkima). These five principles influenced the formation of the built environment by forming a set of overarching rules that set limits on behaviour (al-Burnu, 1983).

With respect to the built environment, la darar wa-la dirar is the central and most influential principle (even though it is often listed as the second principle in legal texts). This principle is always applied to issues relating to decisions affecting the built environment.

Five additional rights and conditions that operated at the level of a single unit of the built environment (e.g., a house) affect decisions and actions:

1) Freedom to act, on the condition that harm is not inflicted on adjacent properties or facilities (Madkur, 1963). This freedom, known as ibaha, is defined as “freedom that is constrained by what is forbidden” or “permission to act as desired by the actor” (al-idhn bi-ityan al-fi’l kayfa sha’a al-‘a’il; al-Jurjani, 1983).

2) Precedence: realities on the ground created by earlier builders must be respected by those who follow. Thus a person who builds a new structure adjacent to or across from an existing structure must situate and design the new building—especially its windows and doors—so that no visual corridor is created between the two buildings (Hakim, 1986, 2007).

3) The person who builds first has the right to exercise “control over potential damage” (hiyazat al-darar) (Ibn Farhun, 1884). That is to say, the earlier building or facility exercises control over what a subsequent builder can do when building next to it.

4) A neighbour has the right to abut his building against the wall of an existing structure, provided no harm is done to the pre-existing wall or structure. Because houses were built around inner courtyards that provided light and air, this right facilitated the clustering of buildings adjacent to one another on more than one side.

5) Access to a structure is through a space called a fina (or harim) that is approximately 1–1.5 meters wide and runs alongside all exterior
walls of a building. This space also extends vertically alongside the walls of the building. The owner or tenant of a building has the right to use the fina for temporary purposes provided such use does not impede traffic in the street, and he is responsible for keeping his part of the fina clean and safe from any obstructions and the accumulation of rainwater or snow. The vertically extended fina allows upper level projections in the form of balconies, enclosed bay windows, and rooms bridging the public right-of-way (called sabat). In the traditional literature we find that some Muslim scholars attribute these projections and the sabat to the right of ihya al-mawat, in this case the utilization of dead space that would not harm the traffic underneath.

To summarize: It was the responsibility of the ruling authority to create the broad framework for the town or city. The decisions of the ruling authority affected city walls and gates; the location of the major mosque, the palace, and the central market area; and the general alignment of the primary streets connecting all of these structures. In other respects, the city emerged naturally as a result of the decisions and actions of its residents, who, when they built houses and other structures, responded to existing conditions on adjacent properties by adjusting their own design. Over time, changes occurred as the owners adapted to neighbouring and, especially, contiguous structures. The alignments of pathways and streets were delineated and extended in response to the creation of nearby structures and changes in them. In a word, the system was self-regulating and adaptive.

Islamic urbanization is governed at the local level by the principle of freedom, that is, that one may develop one’s property without restrictions, subject to overarching prescriptive rules derived from normative principles based on Islamic values. The city emerges from decisions made by the various actors involved in the construction and renovation within their immediate built environment. In this respect, the emergence of the built environment resembles any organized complex system (Weaver, 1948). As N. J. Habraken has put it, “to use built form is to exercise some control, and to control is to transform… A complex hierarchy of control patterns within a continuity of action emerges… [C]ontrol thus defines the central operational relationship between humans and all matter that is the stuff of built environment” (Habraken, 1998).

In order to understand the development of the built environment, it is necessary to think about process, to work inductively (reasoning from particulars to the general), and “to seek “unaverage” clues involving very small quantities, which reveal the way larger and more “average” quantities are operating” (Jacobs, 1961). The relationship between the owners of adjacent houses depends on decisions affected by negative feedback, as when a window in one house overlooks the private domain of an adjacent house: the owner of the adjacent house reacts by demanding that the window be sealed or removed; if the window existed before the new neighbour built his house, the new neighbour responds by designing his house in such a way that no visual corridor is created. In all living systems, feedback loops generated by networks of communication among its members make it possible for a community to correct mis-takes and to regulate itself (Capra, 1996). These features of living systems
help explain how the local built environment developed in the traditional Islamic city as residents interacted with one another. The emergence of the traditional Islamic city is best understood as a product of a system of rules that created boundaries that were observed by residents. The system’s capacity to accumulate and internalize experience by growth and experimentation derives from its adherence to these rules (Johnson, 2001; Hakim, 2007).

Acknowledgment

This article was first published in the Encyclopedia of Islam 3rd Ed., Brill, Leiden, 2009 – 3, under the title: Built Environment, in Law. Reprinted with permission.

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CULTURAL EVOLUTION AND THE ARAB HOUSE IN EGYPT

BOOK REVIEW: LA CASA ARABA D’EGITTO: COSTRUIRE CON IL CLIMA DAL VERNACOLO AI MAESTRI CONTEMPORANEI BY ADELINA PICONE

Ashraf M. Salama

Traditional houses in Egypt were discussed in the literature in a fragmented manner. While in many of the writings emphasis was placed on the stylistic debates and the analysis of their cultural authenticity, little emphasis was placed upon functional, climatic and socio-spatial aspects of the continuous process of transformation of their major spaces and within different regions and contexts. While it is evident that this book “La casa araba d’Egitto: costruire con il clima dal vernacolo ai maestri contemporanei” covers a wide spectrum of issues, I find it an opportunity to reflect on some issues that contextualize the discussion.

It is clearly evident that this is an important contribution where Dr. Adele Picone takes the debate further by offering a comprehensive analytical and articulated overview of traditional houses in different regions in Egypt from Nubia through the Western Desert Oases to Cairo. This is not all; the analysis goes beyond the typical discussions and offer reflections on important socio-spatial elements with emphasis on reactions to climatic conditions and natural light.

La casa araba d’Egitto: costruire con il clima dal vernacolo ai maestri contemporanei
Adelina Picone
Jaca Books, 2009
ISBN 8816408561, 9788816408562
300 pages
Within the argument and examples of this book culture appears to be a crucial concern. Culture encompasses the sources and methods of obtaining knowledge and the manner of its storage, dissemination and utilization. It is the creative spirit of people made manifest. Culture is what people uphold as essential, valuable and desirable, and how they go about making choices and transactions. It is an integrated pattern of human beliefs, customs, norms, morals and behaviors shared by a group, inhabitants of a region or a nation over a specific period of time.

There have been different views and assumptions on the changing concept of culture. In general, culture is a complex concept that was commonly considered to be a static phenomenon that could inhibit change. Today, culture refers to a relativistic and multidimensional concept with its components, evolving, changing and developing over time. On the one hand, the consequences of this more complex and dynamic interpretation of culture ought to be recognized in contemporary methodological research, for a better understanding of the past change and development of the spatial environment of traditional houses. On the other hand, this interpretation allows for a better prediction of the quality of future spatial environments.

The preceding interpretation suggests the co-existence of both cultural constants and variables. Constants can be exemplified by the links with the past--the traditions--as sources of legitimacy and inspiration of actions. Variables can be exemplified by the degree to which the society is capable of adopting and incorporating new phenomena into those traditions. Concomitantly, several theorists argue, and rightly so, that cultural change is a natural social incident that occurs on different rates; slow, gradual changes on the one hand allow adaptation and integration to happen in a smooth process of synthesis between the old and the new, while rapid, abrupt changes on the other hand result in confusion and inconsistency.

Taking Cairo—the Capital of Egypt—as an example, it has historically evolved through a series of major political constructs. There are four main physical formations that constituted the city of Cairo, envisioned and initially carried out by great military political commanders of the empire builders; Al-Fustat (641), AL-Askar (751), Al-Qatai (870) and Al-Qahira – Cairo (969). These four settlements were later joined and fenced by Salah Eddin –the military commander- in 1187. Since then, old Cairo assumed its physical unity and functional integrity as one comprehensive entity. Much of these developments reveal physical and cultural influences that occurred within the confines of this city of about 5 sq. km., an area that persisted for the three centuries of the Mamluk dynasty until the Ottoman conquest of Egypt in 1517, when Cairo lost its political eminence and entered into a decline phase that affected all walks of life.

By the end of the French occupation (1798-1801), a sense of national dismay with respect to ignorance, illiteracy and deterioration has emerged. Afterwards, Mohamed Ali (1806-1848)–the ruler of Egypt- started a new progressive era basing his ideologies on the westernization of Egypt. This new paradigm has resulted in several rapid changes, some of which were the extinction of the typical traditional house type and the introduction of a new western model formulating a totally new residential concept.
that speedily became popular amongst the wealthy and the intellects finding it more convenient to their needs and the overall lifestyle adopted.

This transitional dynasty has caused a leap towards the western thought, thereby leading to the complete dependence on the western experience in all fields. Slow but confident changes took place in all walks of life until the reign of Ismail Pacha (1860s-1880s), the celebrity khedive whose project of Paris of the East has completely adopted the 19th century European model as a reference for inclusive development. Housing was one realm in which a new model has emerged, developed and continued until the traditional models have finally arrived at complete obscurity. By 1897, Cairo was split into two separate communities which when combined doubled the population.

Ismail's model dominated the opposing national movement in search for an Egyptian identity that was evoked by the 1919 revolution. Literature indicates that houses of this era either reflected the ideas of classical continuity and revival, or applied this comparable concept of re-introducing traditional architecture into Cairo. The later went by two approaches: the first was Islamic style revival and the second was Ancient Egyptian style revival. Both approaches were faced with the lack of plan stereotypes in the style of older Egyptian heritage for houses with new functions, there was no choice but applying decorative elements to the western house model introduced by Ismail Pacha as a mere surface veneer. Those diverse influences dominated the Cairene house model in the early 20th century, paving the way ahead for the introduction of modernism concepts in the architecture of Cairo. This resulted in the emergence of a new housing type that revealed the concepts of function, modularity and the international style based on the open plan concept and the avoidance of using ornaments while reducing detailing aspects to be minimal.

A sense of patriotism has emerged since the mid of the 20th century as a result of gaining independence. Adopting and adapting the socialist concepts of centralization, nationalization and targeting the newly emerged middle class sector of the society, the governing regime placed emphasis on cooperative and consortium housing projects. Further strategies were devised for economic and low cost housing for industrial workers for the hurriedly spread industrial units all around Cairo. Typical prototype blocks were scattered in the available unoccupied lands within and around the periphery of Cairo.

Shifting from socialist paradigm to openness policies in 1974 resulted in a sudden inflation, which extremely raised the land value. Accompanied by a parallel shift toward the western life-style, the courtyard house has completely disappeared from the housing arena, and the dominance of the apartment buildings took place all over the city of Cairo and its surroundings. Following was an economic reform era that started in 1981 and continued throughout the nineties to the present. With privatization policies being practiced, the re-birth of private houses was witnessed to spread all along the city suburbs and the new settlements, while ignoring the traditional courtyard type and any associated traditional elements, and willingly adopting global colonial
house models.

Linking the concepts of culture and cultural change to the influences and impacts on Egyptian traditional houses, it is believed that -all along its history- Cairo was exposed to a layer upon layer of imported cultures that have been localized over time and adapted to regional conditions and local taste. When colonization arrived with Ismail pacha in the late 19th century, a whole new set of cultural imports was introduced, developing Cairo into a typical dualistic pattern of the colonial city with its new house types. Progressively, paradoxically, and according to the successive awkward cultural and political circumstances, a new avenue was opened for a process of continuous experimentation of ideas, resulting in a mix of hybrid—in many cases—ambiguous thoughts. This was followed by oversimplification of traditions and a complete loss of identity, and in turn, it was dramatically reflected on the evolution of different house types. The work of Adele Picone paves the road to retrieve some of this lost identity by showing articulated examples of contemporary physical interventions in different regions within the Egyptian context. It is my firm belief that Dr. Picone offers lessons on how to relate to some of the missing links with the past while addressing the dialectic relationship between cultural constants and variables in the design of Egyptian houses.

While—typically—academics and practitioners voice the opinion that traditional elements of the old houses of Egypt should be retrieved innovatively in new housing projects the dominant approach was to consistently emphasize predetermined house standards built as cheaply as possible for lower income households. With this approach social and cultural values are disregarded and the house as concept was governed by economic norms only. Recently, emphasis is placed by decision makers on the value of adapting traditional elements of Egyptian traditional houses and incorporating them into new projects. However, this has not gone beyond political discussions and economic aspects continued to be important determining factors governing the production of houses.

An important assertion can be made within the context of this book; that is the continuous need for architects to understand the impact of cultural processes that influenced the transformation of traditional houses on the macro and micro scales. Aspects that pertain to urbanization, migration, westernization, and modernization represent impacts of cultural changes. Modernization and development must be considered as forms of cultural change and need to be investigated and carefully studied rather than automatically accepted. Westernization which is an impact of an acculturation process in the Egyptian society is a good example of this type of automatic acceptance. Thus, the examination—undertaken by Dr. Picone—of different physical elements of traditional houses and their spatial transformations sets the standards for understanding future perspectives that pertain to cultural changes and as a result of cultural processes.

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