## On the Relationship between Residential Property Rental Values and Infrastructure Provision in Abaji City F.C.T, Nigeria

**Sule, Abass Iyanda**

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**Zulkiflee Abdul Samad**  
**Faizul A. Rahim**

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On the Relationship between Residential Property Rental Values and Infrastructure Provision in Abaji City F.C.T, Nigeria

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ABSTRACT

Property value is dependent upon many features related with that property such as physical features of the property: location in relation to accessibility and other neighbourhood infrastructure does affect value. Those attributes are usually provided by the State in the case of a State and Local governments through their various policies and services. This study focuses on the relationship between residential property rental value and the available infrastructural facilities in residential properties in Abaji, F.C.T Nigeria and analysed their influence in the determination of the rental values of the properties. Data for this work were collected through structured questionnaire and administered based on stratified random sampling (i.e. zones of traditional and non-traditional residences). Data collected for the assessment include, house structural characteristics, in-house and environmental facilities. Analysis of data was done by factor analysis with statistical package for social science (SPSS 10.0) and excel package. The results depict that; compound houses and bungalows dominate Abaji City which together contributed about 66.1% of the total stock of houses. The study revealed that, there is positive relationship between the type of building and rental value, 36.4% variations in annual rental are predicted by building types and 28.4% variations in annual rent are predicted by the accessibility to houses in Abaji City. Based on the findings, one of the recommendations made is that, building regulations must be in operation or enforced by the appropriate officers of local
authority to prevent further development of ram-shackle buildings in the area. Secondly, constant improvement on the infrastructural facilities such as roads, drainage, water, waste disposal and electricity supply is necessary for sustainable development.

Keywords: Residential property, Infrastructural Provisions, Rental Values, Abaji Nigeria

INTRODUCTION

World Health Organization (1991) defines housing as residential environment which includes, in addition to the physical structure that man uses for shelter, all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and social well-being of the family and individual. Residential accommodation transcends ordinary shelter and thus comprises of the facilities and other aspects of the social environment which links man with his remote and immediate neighbourhood. It includes bedroom, toilet, bathroom, kitchen, open space, drainage, water supply, refuse disposal, good road networks, recreation parks, hospital and many more. The availability of some or most of these facilities, by and large, affects the rental value alongside other determinants. Residential properties are both consumption and investment good (Henderson and Loannides, 1987). As consumption good it is acquired for owner occupation. Also, the housing good (property) may be to maximize optimum return from outright sale or letting. If this is the case, the price of the residential property becomes very important to the landlord and the occupants. Hence investment in this type of property is regarded as a considerable source of wealth for many individuals (Hillard and Petersen, 1994; Reed, 2001). The physical characteristics of the property such as number of bedrooms, age, size, various amenities and services have been noted to help determine the rental price for landlords as they set rental prices for residential properties (YuZhou and Haurin, 2010; Sule, 2012). In addition, external factors such as population, income, traffic congestion, proximity to work, access to public transportation, proximity to higher institution and environmental characteristics may have significant impacts on rent (Simans et al, 1989; Bello, 2012). Therefore, any serious investigation into the nature and behaviour of residential
property price should recognize that property as a commodity is not a single good, but a complex bundle of services or potential services which operate in many dimensions (Greaves, 1984; Bello, 2012). Olujimi (2010) opined that improved infrastructural facilities would enhance the rental value of residential properties through which the invested capital could be profitably recouped. Therefore, it will not be out of place to assess the relationship between the infrastructural provision and the rental value of residential properties of Abaji City, F.C.T., Nigeria.

**Statement of the Problem**

Housing is one of the three basic needs of man. Yet housing need, more than most other human needs, largely remain unsatisfied in almost all developing nations of the world, Nigeria inclusive. The question is what constitutes an ideal environment for housing. Environment is said to be anything that can be seen, felt and touched and can influence individuals and likewise influence property rental values. Hence, the questions now are: Is there any association between the quality of a house and its rental value? Is there any relationship between accessibility and house value?

**Aim of the Study**

The aim is to assess the relationship between infrastructure and residential property rental value of Abaji city.

**Specific Objectives of the Study**

1. What are the types of residential houses in the study area?

2. To find out the type of infrastructure facilities available in the study area.

3. To find out the influence of infrastructural facilities of the area on property rental value.
CONCEPTUAL REVIEW OF INFRASTRUCTURE

The Oxford Advanced Learner Dictionary defines infrastructure as the basic systems and services that are necessary for a country or an organization for example buildings, transport, water and power supply and administrative systems. Onokerhoraye (1984) identified infrastructure as “a service in which the various levels of government in the country as well as the various communities are collectively involved in its provision”. He went further to state that it also includes the services provided by voluntary agencies and private individuals for the benefit of the community at large. Furthermore, infrastructure has been described to include the aggregate of all facilities that enable a society to function effectively. By providing the physical facilities, which move people, goods, commodities, water, waste, energy and information, infrastructure provides an enabling environment for economic growth and enhanced quality of life. Infrastructure is therefore universally regarded as the engine that drives the city. The linkages between economic activity and infrastructure continue to grow stronger and more critical as economic activity becomes increasingly more complicated and global in scope, (Babawale, 2004). William Morish and Catherine Brown (n.d.), as quoted in Akujuru (2004), described infrastructure, as “the systematic framework which underpins a community’s ability to fulfil its mission of providing a base for its citizens to be productive and to nurture social equity. Omuojine (1997), as also quoted in Akujuru (2004), described it as the stock of fixed capital assets in a country for example roads, railways, airports, hospitals, waterways, power stations, water works, and telecommunication network. It serves as a slender threads that weaves together human needs and values with those of the environment. Literally, it refers to fixed facilities or installations traditionally provided by the public sector. Omuojine (ibid), classifies it as follows:

1. Transportation, including roads, railways, airways, airports, seaports and waterways;

2. Water supply including water works and dams,

3. Electricity including power stations,

4. Telecommunications including postal, telephone, telex,
5. Health including hospitals, maternity homes and health centers,

6. Sanitation and solid waste disposal,

7. Drainages and embankments.

**State of Infrastructure in Nigeria**

The state of infrastructure in Nigeria has remained a matter of concern given the importance of infrastructure in the economic well-being of the populace and the growth and development process of the economy. It seems a well-known fact that infrastructural facilities in this country are grossly inadequate to meet the needs of industries both old and new and the population. Oke (1999) as quoted in Ogunyomi (2006), observed that existing industries have to provide their own water by digging boreholes, generate their own power through the provision of stand-by generators for electricity supply. For new investments, project cost has to include the cost of providing these utilities in the new factory site. Furthermore, some urban and most rural roads are in a state of disrepair and in consequence, not motorable. He revealed that Nigeria loses about N80 billion annually due to bad roads. Where some of these infrastructure facilities are available, they are epileptic in terms of performance therefore not reliable.

**The Study Area**

Abaji Area Council is one of the six area councils that make up the Federal Capital Territory (FCT). A greater part of what is now Abaji Area Council was excised from Niger and former Kwara States to form part of the FCT in 1976. The Area Council was created in 1986. It is made up of Abaji and Yaba Development Areas. The Council has a total land area of about 1,100 square kilometres with a population of over 58,642 inhabitants based on 2006 population census. The resident ethnic groups of the area include Egbira, Ganagana, Gbagyi, Bassa, Hausa and a significant population of other ethnic groups from all over Nigeria. They are predominantly farmers, hunters, fishermen, and traders. The Area Council is made up of 10 (ten) Political wards; Abaji North East, Abaji South East, Abaji Central, Nuku/Sabon Gari, Agyana/Pandagi, Rimba/Ebagi, Alu/Mamagi, Yaba, Gurdi and Gawu. The Council is made up of Executive and Legislative arm headed
by the Honourable Chairman. There exist seven Departments through which activities of the Council are carried out namely; Administration, Agriculture, Works, Education, Finance, Health and Environmental Sanitation Departments. There exists two Chiefdom in the Council; Abaji and Yaba Chiefdoms headed by the Ona of Abaji who is the President and Chairman of the FCT Traditional Council of Chiefs and the Etsu Yaba who has the third class status.

METHODOLOGY AND ANALYSIS

A structured set of questionnaires was used to gather information from the primary sources- the residents of the Area Council. This was compliments by the use of secondary data mostly from the author’s previous work. The sampling technique used for this research is stratified random sampling. Samples were drawn from two major zones, i.e. zone of traditional residence and zone of non-traditional residence (source: author’s previous work). These two zones represents four political wards that harbour- the seat of Abaji Area Council of FCT-Nigeria. Due to homogenous nature of traditional residence, the systematization had been each house in every five houses, while various type of residential houses were sampled from the non-traditional residence, 100 questionnaires were distributed in each zone. The data collected for the study had been analysed by SPSS (regression analysis).

Table 1: Distribution of Questionnaires and Percentage of Responses

<table>
<thead>
<tr>
<th>Zones</th>
<th>Number Of Questionnaire Administered</th>
<th>Number Of Questionnaire Returned</th>
<th>Percentage Of Questionnaire Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional residence</td>
<td>100</td>
<td>49</td>
<td>49.0</td>
</tr>
<tr>
<td>Non-traditional residence</td>
<td>100</td>
<td>56</td>
<td>56.0</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>105</td>
<td>52.5%</td>
</tr>
</tbody>
</table>

*Source: Author’s Previous Fieldwork Analysis (2012)*
RESULTS AND DISCUSSIONS

Table 2: Housing survey of Abaji City

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>bungalow</td>
<td>34</td>
<td>31.2</td>
<td>32.4</td>
<td>32.4</td>
</tr>
<tr>
<td>semi-detached</td>
<td>13</td>
<td>11.9</td>
<td>12.4</td>
<td>44.8</td>
</tr>
<tr>
<td>storey building</td>
<td>4</td>
<td>3.7</td>
<td>3.8</td>
<td>48.6</td>
</tr>
<tr>
<td>traditional compound</td>
<td>38</td>
<td>34.9</td>
<td>36.2</td>
<td>84.8</td>
</tr>
<tr>
<td>rooming (face to face)</td>
<td>16</td>
<td>14.7</td>
<td>15.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>96.3</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Previous Fieldwork Analysis (2012)

Interpretation: - Table 2 shows that traditional compound and bungalows dominate Abaji city, which together contributed about 66.1% of the total stock houses. Others such as semi-detached, storey building and rooming houses (Face -to- face) only contributed about 30.2%.

Infrastructural Facilities Available at Abaji City

Table 3: Sources of water supply available at Abaji city

<table>
<thead>
<tr>
<th>Source</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td>2</td>
<td>1.8</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>water tanker</td>
<td>25</td>
<td>22.9</td>
<td>23.8</td>
<td>25.7</td>
</tr>
<tr>
<td>stream/river</td>
<td>28</td>
<td>25.7</td>
<td>26.7</td>
<td>52.4</td>
</tr>
<tr>
<td>pipe borne water</td>
<td>4</td>
<td>3.7</td>
<td>3.8</td>
<td>56.2</td>
</tr>
<tr>
<td>water hawkers (mairuwa)</td>
<td>41</td>
<td>37.6</td>
<td>39.0</td>
<td>95.2</td>
</tr>
<tr>
<td>borehole dug in the house</td>
<td>5</td>
<td>4.6</td>
<td>4.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>96.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System</td>
<td>4</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>109</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Previous Fieldwork Analysis (2012)
Table 4: Road infrastructure at Abaji City

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid footpath</td>
<td>17</td>
<td>15.6</td>
<td>16.7</td>
<td>16.7</td>
</tr>
<tr>
<td>tarred road</td>
<td>45</td>
<td>41.3</td>
<td>44.1</td>
<td>60.8</td>
</tr>
<tr>
<td>un-tarred road</td>
<td>38</td>
<td>34.9</td>
<td>37.3</td>
<td>98.0</td>
</tr>
<tr>
<td>tar washed off</td>
<td>2</td>
<td>1.8</td>
<td>2.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>102</td>
<td>93.6</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing System</td>
<td>7</td>
<td>6.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>109</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Previous Fieldwork Analysis (2012)

Table 5: Waste disposal method at Abaji City

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid open space</td>
<td>92</td>
<td>84.4</td>
<td>87.6</td>
<td>87.6</td>
</tr>
<tr>
<td>collected by agent</td>
<td>13</td>
<td>11.9</td>
<td>12.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>96.3</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing System</td>
<td>4</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>109</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Previous Fieldwork Analysis (2012)

Hypothesis and Test of Correlation between Building Types and Rental Values

Hypothesis: 1

$H_0$: There is no significant relationship between building type and rental value.

$H_1$: There is significant relationship between building type and rental value.
There is significant relationship between accessibility (road network) and rental value. The correlation is significant at 0.01 levels. From this result, 36.4% variations in annual rental (ANUARENT) are predicted by building types (BLDTYPE). The correlation, which is negative, connotes that the building types determines the annual rental paid by the tenants.

**Hypothesis and Test of Correlation between Accessibility and Rental Value**

**Hypothesis: 2**

H₀: There is no significant relationship between accessibility (road network) and rental value.

H₁: There is significant relationship between accessibility (road network) and rental value.

### Table 6: Correlation between Building Types and Rental Value

<table>
<thead>
<tr>
<th></th>
<th>ANUARENT</th>
<th>BLDTYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANUARENT</td>
<td>Pearson Correlation</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>P-VALUE</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>54</td>
</tr>
<tr>
<td>BLDTYPE</td>
<td>Pearson Correlation</td>
<td>-.364**</td>
</tr>
<tr>
<td></td>
<td>P-VALUE</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>54</td>
</tr>
</tbody>
</table>

*Source: Author’s Previous Fieldwork Analysis (2012)*

**Interpretation:** Since the calculated correlation coefficient is less than the P-value, we reject Ho and accept H₁. It means there is significant relationship between building types and annual rental value. Correlation is significant at 0.01 levels. From this result, 36.4% variations in annual rental (ANUARENT) are predicted by building types (BLDTYPE). The correlation, which is negative, connotes that the building types determines the annual rental paid by the tenants.

### Table 7: Correlation between Accessibility and Rental Value

<table>
<thead>
<tr>
<th></th>
<th>ANUARENT</th>
<th>ACCESSIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANUARENT</td>
<td>Pearson Correlation</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>P-VALUE</td>
<td>.042</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>54</td>
</tr>
<tr>
<td>ACCESSIB</td>
<td>Pearson Correlation</td>
<td>.284*</td>
</tr>
<tr>
<td></td>
<td>P-VALUE</td>
<td>.042</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>52</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).

*Source: Author’s Previous Fieldwork Analysis (2012)*
**Interpretation:** Since the calculated correlation coefficient is less than the P-value, we reject Ho and accept H₁. It was discovered as shown in table 7 that 28.4% variations in annual rent (ANUARENT) are predicted by the accessibility (ACCESSIB) to houses in Abaji city. The correlation is significant at the 0.05 level.

**Compare Mean of Infrastructural Facilities**

**Hypothesis: 3**

H₀: There is no significant difference in infrastructural facilities available in the two selected zones of the city.

H₁: There is significant difference in infrastructural facilities available in the two selected zones of the city.

**NOTE:** The full meaning of the variables in the compare mean table 8 are given below,

POWERSUP – Power supply
WATERSOUC – Water sources
WATSPEND – Water expenses
WASTDISP – Waste disposal

**Table 8: Compare Mean of Infrastructural Facilities**

<table>
<thead>
<tr>
<th>POWERSUP</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>105</td>
<td>2.9524</td>
<td>.3768</td>
<td>3.677E-02</td>
</tr>
</tbody>
</table>

**Table 8: Compare Mean of Infrastructural Facilities Test Value = 0**

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWERSUP</td>
<td>80.299</td>
<td>104</td>
<td>.000</td>
<td>2.9524</td>
<td>2.8795 - 3.0253</td>
</tr>
</tbody>
</table>

*Source: Author’s Previous Fieldwork Analysis (2012)*
On the Relationship between Residential Property Rental Values

One-Sample Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATSOURC</td>
<td>105</td>
<td>3.6857</td>
<td>1.3750</td>
<td>.1342</td>
</tr>
</tbody>
</table>

One-Sample Test

<table>
<thead>
<tr>
<th>Test Value = 0</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATSOURC</td>
<td>27.467</td>
<td>104</td>
<td>.000</td>
<td>3.6857</td>
<td>3.4196 - 3.9518</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One-Sample Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATSPEND</td>
<td>92</td>
<td>1.8587</td>
<td>1.1151</td>
<td>.1163</td>
</tr>
</tbody>
</table>

One-Sample Test

<table>
<thead>
<tr>
<th>Test Value = 0</th>
<th>t</th>
<th>df</th>
<th>P-VALUE</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATSPEND</td>
<td>15.987</td>
<td>91</td>
<td>.000</td>
<td>1.8587</td>
<td>1.6278 - 2.0896</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One-Sample Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASTDISP</td>
<td>105</td>
<td>1.1238</td>
<td>.3309</td>
<td>3.230E-02</td>
</tr>
</tbody>
</table>

One-Sample Test

<table>
<thead>
<tr>
<th>Test Value = 0</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>WASTDISP</td>
<td>34.796</td>
<td>104</td>
<td>.000</td>
<td>1.1238</td>
<td>1.0598 - 1.1879</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s Previous Fieldwork Analysis (2012)
**Interpretation:** Based on the result of analysis above, we do not reject Ho since T-cal (1.1238) is less than upper critical T-value (1.1879) and greater than the lower critical T-value (1.0598). Hence, we conclude that there is no significant difference in power supply within the Traditional and Non-traditional area. In addition, the result of analysis on water source revealed that there is no significant difference in the water source for residents of the Abaji city.

More so, the result of analysis on expenses incurred on water does not reveal any significant difference in expenses incurred by the residents of the Abaji city.

Finally, for waste disposal, the results of analysis show that the method of waste disposal in the two zones of the city does not differ significantly.

**CONCLUSION AND RECOMMENDATIONS**

From the analysis of findings, it was discovered that there exist a significant relationship between building type and rental value. 36.4% variations in annual rental are predicted by building types (See Table 6). Moreover, analysis shows that there exist a positive relationship between accessibility and annual rental value. 28.4% variations in annual rent are predicted by the accessibility to houses in Abaji city. This simply implies that the more accessible a building the higher the rental value and vice-versa (See Table 7). However, analysis as shown in (Table 8) that there is no significant difference in power supply within the Traditional and Non-traditional area. In addition, the result of analysis on water source revealed that there is no significant difference in the water source for residents of the Abaji city. As 37.6% depends on water hawker popularly called “Mairuwa” compare to people that dug bore in their house 4.6% and only 3.7 got their daily water from public pipe born water (See Table 3). Finally, for waste disposal, the results of analysis show that the method of waste disposal in the two zones of the city does not differ significantly. 84.8% dumped their refuse in an open space (see Table 5).

In views of the foregoing, the following recommendations are hereby put forward:
1. Government should provide a better road network (Tarred road) in which virtually all the houses will gain accessibility. That is building regulations must be enforced by the appropriate officers of local authority.

2. Drainages were seen to have been blocked by waste within the City; all stakeholders should take responsibility to evacuate these wastes in order to prevent flooding of the city during rain seasons.

3. More efforts on environmental sanitation of the city are necessary before the city will be consumed by its waste, calling on environmental unit of the Abaji Area Council to exercise their power and use the resource at their disposal to clean up the City.

4. No doubt, there is an acute water problem in Abaji City. The present administration of Abaji Area Council should intensify her efforts in provision of more boreholes and embark on more water projects.

5. In addition, there should be constant improvement on the infrastructural facilities to cater for population explosion in the nearest future.

REFERENCES


Indoor Environmental Quality (IEQ) and Occupant’s Perception in Malaysian Green Office Buildings

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ABSTRACT

Natural elements used as a part of sustainable building design have been known to improve the Indoor Environment Quality (IEQ) of a space, and enhance occupants’ physical and psychological well-being. This study addresses the impact of green office buildings on occupants’ perception of their working area, productivity, mood, sense of well-being, and work motivation, with the aim of understanding the workability of sustainable design employed in Malaysia. An embedded multiple-case case study was conducted. Pictures and data of the green building design were collected, and cross-case analysis was conducted to compare the design elements among the three buildings. A total of 210 subjects in the 3 buildings completed a questionnaire about their perception of the IEQ of their working space, and the perceived psychological impact. Finally, interviews were conducted on 5 subjects per building to further understand their perception of the buildings and how they feel like they are affected by it. The result showed that overall, the subjects perceive sustainable office buildings as optimal to their comfort level, and that the buildings affect their physical and mental well-being positively.

Keywords: Sustainable Architecture; Office Buildings; Indoor Environmental Quality; Psychological Response; Tropical Climate
INTRODUCTION

“We shape our buildings, and afterwards our buildings shape us”
(Churchill, 1943)

As had been excellently stated by Churchill (1943) during the House of Common Speech in 1943, a building has been known to have the ability to shape its occupants. It was proven in numerous studies that environment has the ability to manipulate occupants’ feelings, moods, and also has a direct effect on occupants’ physical and psychological health (Hanie et al., 2010; Singh et al., 2010; Thatcher, 2011). McAndrew (1993) defined the “ambient environment” in a built environment as the non-visual aspects around us such as sound, temperature, odour, and illumination, that we so constantly come in contact with, that it is able to affect our mental, and up to a point, our physical well-being. A study by Selye (1956) and Downey & Willigen (2005) revealed that constant exposure to negative ambient environment (stressors) causes detrimental effect to one’s psychological and physical well-being. Porteus (1977) claimed that both over-stimulation and depravation of stimulus in an environment may result in physical and psychological pathologies. Where environments with stressors lead to the decrease in occupants’ psychological and physical health (McAndrew, 1993), comfortable, restorative environment with optimal level of stimuli and low level of stressor creates a healthy environment. Such environment gives the occupants apposite setting for them to function properly, and is beneficial to their well-being. Human spend 90% of their time indoor, within a built environmental context. According to, Bennett (1977) indoor environmental quality (IEQ) is what surrounds building occupants at any time they are in a building, and is what affects their psychological and physical being in relation to their surroundings. For this reason, it is crucial that a proper environment for building occupants is created in order to improve their life quality.

Many existing studies highlight the benefit of employing sustainable building design as a mean to creating an optimal indoor environmental quality (IEQ). It had been proven that natural elements used within a built environment not only are perceived positively, but also affect occupants’ well-being positively. In residential areas, green building elements were shown to increase occupants’ satisfaction level with their living space. It is
Indoor Environmental Quality (IEQ) and Occupants’s Perception

also linked to the improvement of occupants’ living quality and well-being (Sanesi & Chiarello, 2006; Kyu-in & Dong-woo, 2011). In hospital buildings meanwhile, natural elements were observed to improve significantly the Indoor Environmental Quality (IEQ) of a space. Patients who are exposed to natural elements showed less depressive symptoms, improved moods, and fewer intakes of pain killers. It was also noted that exposure to natural lighting improves the level of Melatonin and Critosil in patients (hormones responsible for regulating immune hormones) (Ulrich, 1991; Diette et al., 2003). In school environments, the two most significant elements which affect the students the most positively are the natural day lighting and indoor air quality (Olson & Kellum, 2003). Natural lighting significantly improves the IEQ of a classroom improving dental health, physical growth, and attendance records among students (Hathaway, 1992). In addition to that, Heschong et al. (2002) had proven in his study that students exposed to abundance to daylight shows 20% faster learning progress compared to those exposed to less daylight. Other than daylight, exposure to natural ventilation was also proven to improve students’ alert level in class, work mood, energy and attention span (Bakó-Biró et al., 2007).

Parallel result can also be found in office buildings. Numerous studies had shown that green office buildings are perceived more positively compared to conventional office buildings, and are also perceived to improve work performance, physical well-being, and reduced absent rates (Abbaszadeh et al., 2000; Singh et al., 2010). However, according to Kato, Too, & Rask (2009), green office buildings are more beneficial psychologically (taking pride in their working environment) to occupants rather than physically (improvement in health and productivity). Based on the literature and studies done by previous researchers, it can be said that there is a positive relationship between sustainable architecture and its impact on its occupants (Paul & Taylor, 2008; Eichholtz, Kok, & Quigley, 2009; Deuble & de Dear, 2012).

Of late, sustainable architecture has started to be implemented in the construction industry in many developing nations, including Malaysia. The numbers of buildings certified by the Green Building Index are growing vastly within the country. There is a great need in a deeper understanding of sustainable architecture and its impact on both human and the environment, to be able to create a successful sustainable built environment. Although
there has been numerous studies done on the subject of green buildings and its impact upon its occupants, most of the existing studies are usually done in settings with different climatical conditions, where the occupants’ preference of building elements, comfort levels and way of life differ significantly to those in a more local, tropical context such as the ones available in Kuala Lumpur, Malaysia. Yuan (1987) (as cited in Khalil & Husin, (2009) asserted that the climate in Malaysia is characterized by high humidity and temperature, demanding a completely different design approach than the green building design in different climatical conditions. For that reason, this study is aimed to provide insights as to how existing green buildings in Malaysia are perceived by the occupants to see the workability of the existing design strategy. Other than that, it is also aimed to investigate whether green buildings in Malaysia had succeeded in providing the occupants with optimal environment, and is beneficial to their physical and psychological well-being, in the hope of further improving the sustainable development in countries with tropical climate.

METHODS

The purpose of this case study is to develop an explanatory model describing the inter-relationship between sustainable office buildings and the perception of the occupants towards it. This study consists of 2 types of variables; (i) Building elements in green office buildings, and (ii) Occupants’ reacting perception towards building elements. This study involves case studies conducted on 3 green office buildings (GOB) (Figure1).
Indoor Environmental Quality (IEQ) and Occupants’s Perception

Figure 1: Research methodology flowchart

Setting

Table 1: Case Study Buildings

<table>
<thead>
<tr>
<th>Building</th>
<th>Location</th>
<th>No. of Employee</th>
<th>No. of Survey Subject</th>
<th>No. of Interview Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Precint 1, Putrajaya</td>
<td>338</td>
<td>118</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>Precint 2, Putrajaya</td>
<td>178</td>
<td>62</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>Bandar Baru Bangi</td>
<td>75</td>
<td>30</td>
<td>5</td>
</tr>
</tbody>
</table>

As shown in table 1, the study took place in three office buildings in Malaysia in order to study the phenomena within its real-life context. All 3 buildings selected as the case study were fully certified green office building certified by the Green Building Index Malaysia. Green office buildings 1 and 2 are located in the federal administrative centre of Malaysia, Putrajaya, while building 3 is located in residential area in Bangi. The surveys and interviews were conducted in the office area of the building to gain a better understanding of how occupants perceive their working environment as close to the actual context.

Samples

1. “Green Building Elements” Samples
The sample subjects being interviewed about the building elements in green buildings are of purposive sampling, and consisting of the owners and the officials of the buildings selected.
2. “Occupants’ Perception” Samples
   The subjects selected to participate in surveys and interviews consisted of convenience sampling, involving the employees of the 3 selected buildings who have been working for over a year, where they have had the opportunity to settle down to be familiar enough of their surroundings to evaluate it.

Data Collection and Procedures

Data for the variables “green building element” and “occupants’ perceptions” were collected separately (Figure 2).

1. “Green Building Elements” Data Collection
   For data involving the variable “building”, a case study was done on all 3 buildings. Site visit to the 3 buildings was done, and documents related to the building design obtained from the designers and owners of the buildings were recorded and reviewed. Interviews with the building owners and officials were also conducted to obtain a thorough understanding of the building design of all 3 buildings used in the case study.

2. “Occupants’ Perception” Data Collection
   (i) Interview
   Interviews were conducted in each of the 3 office buildings, and included 5 subjects per building. The interview was conducted
individually for the duration of 25 - 30 minutes per person, and was that of structured, open ended nature. It was aimed at finding out how the subjects perceive their environment, and how they feel like they are affected by it.

(ii) Survey
A questionnaire developed from an existing post-occupancy evaluation survey was distributed among the occupants of the 3 office buildings. The elements measured was their satisfaction level of the IEQ (thermal comfort, air quality lighting, external views, and acoustic quality) of their working environments, and how they feel their productivity, well-being, moods and motivations are affected by it.

The survey consisted of 60 questions with answers in the form of 5-scale Likert scale, where -2 was the most negative response and 2 was the most positive. Pilot study was conducted in Green Office Building 1, involving 52 numbers of subjects. Alpha Cronbach test was conducted, and the alpha reliability of the 60 item scale was 0.773, indicating that the scale had a good reliability.

Data Analysis

1. “Green Building” Data Analysis
Documentation such as drawings and other documents were analysed and converted into text and descriptions of the green building elements available in all 3 buildings. The elements available were then tabulated to be cross compared with each other. Data collected through interview with the architects were transcribed and categorized in terms of research questions and emergent themes. Coding method were used to organize interview data into a limited number of themes and issues around the research questions.

2. “Occupants’ Perception” Data Analysis
For the interview method, subjects’ answers were transcribed and coded to be categorized according to research questions, and patterns emerging were observed, analysed and reported. Meanwhile, the statistical data obtained from the questionnaire were analysed with
the help of SPSS software to identify the measure of central tendency, and measure of variability for each category. Multiple Analysis of variance (MANOVA) was conducted on the variables to test the statistical significance of the result.

RESULTS

Green Building Element

The green buildings selected in this study employ both passive and active sustainable design in order to maintain optimal Indoor Environmental Quality (thermal comfort, air quality, lighting quality, acoustic quality, external view) while at the same time minimizing the usage of energy.

1. Thermal Comfort

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Orientation/Shape</td>
<td>1. North-South orientation</td>
<td>1. Diamond shaped building</td>
<td>1. North-South orientation</td>
</tr>
<tr>
<td>Window Types/ Shading Device</td>
<td>1. Shading mechanism; a) overhang &amp; lightshelves b) louvres 2. Punch hole windows</td>
<td>1. Shading mechanism; a) louvres 2. Floor-to-ceiling window</td>
<td>1. Shading mechanism; a) Integrated Blinds b) Reflective Mirror</td>
</tr>
<tr>
<td>Window Glazing</td>
<td>1. Light green tinted glazing</td>
<td>1. Low-E glass 2. Green tinted glazing</td>
<td>1. Double Glazing Window</td>
</tr>
<tr>
<td>Roofing</td>
<td>1. Insulation 2. Canopy &amp; Roof Garden</td>
<td>1. Insulation 2. Roof Garden</td>
<td>1. Insulation 2. River roof</td>
</tr>
<tr>
<td>Vegetation</td>
<td>1. Tall tree Lined Streetscape 2. Indoor Vegetation (atrium)</td>
<td>1. Tall tree Lined Streetscape 1. Kush Landscape around building on Ground floor (&gt;50%)</td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td>1. Roof &amp; Floor Slab</td>
<td>1. Roof, Floor slab &amp; Up stand Beam</td>
<td>1. External wall, Internal wall</td>
</tr>
</tbody>
</table>

All 3 buildings employ passive thermal design (table 2). Building A and building C employ orientation technique where the main façade are oriented facing north and south (Figure 3 (a) & (c)) in order to prevent direct solar radiation from entering the building. The number of windows on the façades facing south and west are minimized for the same reason. Unlike the
Indoor Environmental Quality (IEQ) and Occupants’s Perception

other 2 buildings, Building B does not employ orientation design strategy; however, its own inverted pyramid shape (Figure 3 (b)) provides shading for the lower floors, preventing direct solar radiation for the whole building.

![Building Orientation and Shape](image)

**Figure 3: Building Orientation and Shape of Building A(a), Building B(b) and Building C(c)**

Other than that, the 3 buildings use different sun shading methods. Where building A and C use overhangs and louvers as sun-shading, building B relies on Low-Emissive glass to keep the heat from the sun out. Window glazing is used in all 3 buildings, in order to minimize heat gained in the building. The roof areas of the buildings are also designed to allow for passive cooling for the building. In Building A and B, roofs are equipped with vegetation, which helps bring down the temperature by 5°C. In Building A, the roof is designed with canopy covering the roof surface (Figure 4), which prevents direct solar gain from the sun. In Building C, the roofs are used for harvesting solar energy. For that reason, the building is not equipped with roof garden like in Building A and B. However, chilled water is constantly flowed on the roof, creating a river roof, which helps eject heat, and cool down the building (Figure 5).
Trees are also planted around the building with the intention of giving the lower floors shading from the sun, while at the same time, enhancing the aesthetical values of the building. The buildings are also equipped with heat insulation on the floor slab and external walls.

Table 3: Active Thermal Design

<table>
<thead>
<tr>
<th>THERMAL COMFORT (Active Design)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Elements</td>
</tr>
</tbody>
</table>

Figure 4: Building A – Roof Canopy

Figure 5: Building C – River Roof
Other than passive design, active thermal design is also employed (Table 3). All 3 buildings employ Variable Air Volume (VAV) system, and thermal sensors to maintain thermal comfort in the building. The temperature of the buildings is constantly kept at 24°C – 26°C. Thermal sensors in the buildings senses temperature change, and the amount of cold air released into the building are controlled accordingly by the VAV system. The temperature in the buildings are kept at 24°C – 26°C for 2 reasons; to minimize energy usage for cooling purposes, and to keep temperature at a moderate level where it is neither too hot or too cold, creating a comfortable, conducive environment for the occupants. Building B and Building C are also equipped with floor slab cooling (figure 6) to further reduce energy used for cooling purposes, while improving thermal comfort.

![Floor Slab Cooling in Building B and C](image)

**Figure 6: Floor Slab Cooling in Building B and C**

2. Air Quality

Due to Malaysian climate, optimum working condition where the temperature is at 23-26°C, and the humidity 70-60% is nearly impossible to achieve. For that reason, working environment in Malaysia needs to be fully climatised, where the buildings are fully sealed to prevent outdoor climate from affecting the indoor climate and the comfort level of the building negatively. In the view of such matter, providing natural ventilation in Malaysian office buildings has been proven to be a tricky feat. Such happening can be observed in the ventilation design of Building B and Building C (table 4), where in order to not compromise the indoor comfort level, the buildings are both fully sealed, to create a fully climatised indoor environment, with optimal comfort level.
Table 4: Passive Air Quality

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrium</td>
<td>1. Thermal flue chimney effect in the atrium</td>
<td>1. Fully Climatized Indoor</td>
<td>1. Fully Climatized Indoor</td>
</tr>
<tr>
<td></td>
<td>2. Operable Windows</td>
<td>No natural ventilation is used</td>
<td>No natural ventilation is used</td>
</tr>
</tbody>
</table>

The design for Building A however, allows for natural ventilation. The building is equipped with water wall in the atrium area (Figure 7). It creates an area of indoor water feature in the building, which cools down the area by the act of humidification as well as providing the area with fresh air. Thermal flue stack chimney (Figure 7) effect meanwhile pulls the hot air out of the atrium, allowing natural ventilation to enter the building through the opening, leaving the area with cool temperature, and fresh air. Natural ventilation is also accessible in the work areas on the upper floors, where it is designed with operable windows.

![Figure 7: Building A – Thermal Chimney and Water Wall](image)

To maintain air quality, all the buildings relied on active M&E design (table 5). All 3 buildings are equipped with VAV system, CO2 sensors, and electronic air cleaners. The CO2 sensors detect the volume of CO2 in the building, and release fresh air accordingly. The greater the density of CO2 detected, the greater the intake of fresh air. Meanwhile, As, there is no natural ventilation to keep circulating the air inside the building, it is crucial to ensure that the air circulating inside the building is clean and free of all pollutants. The electronic air cleaners further improves the air quality in the building by reducing the level of airborne pollutants.
Table 5: Active Air Quality Design

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. CO2 sensors</td>
<td>2. CO2 sensors</td>
<td>2. CO2 sensors</td>
</tr>
<tr>
<td></td>
<td>3. Electronic Air Cleaners</td>
<td>3. Electronic Air Cleaners</td>
<td>3. Electronic Air Cleaners</td>
</tr>
<tr>
<td>3. Lighting Quality</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All 3 buildings optimize the usage of natural daylight, by employing 2 design methods; space layout and maximum usage windows on the building facade. The work area in Building A are concentrated along the building perimeter in order to obtain maximum amount of natural lighting. Instead of allocating work area along the perimeter of the building, Building B and Building C employs open-plan design for the work area, in order to uniformly distribute natural lighting within the work area. In Building A and Building C, which has a north-south orientation, work spaces are faced towards the north-and south orientation, in order to minimize glare and heat into the building. Light shelves and light reflectors (fig. 8 and 9) are also used in the 3 buildings in order to further distribute diffused dun light to the deeper end of the building.

Figure 8: Light Shelf and Reflector in Building A and C
The maximum usage of glass window in all 3 buildings optimizes day light usage. Similarly, atriums and skylights used in all the buildings (fig.10) help distribute natural lighting into the deeper ends of the building.
Having employed design elements which allows for usage of natural lighting in the building, artificial lighting only acts as a supporting lights in the buildings (table 7). The artificial lighting design are equipped with photo sensors, which controls lighting near the window automatically switch off when there is sufficient daylight (350 lux), occupancy/motion sensors, which automatically turns off the lighting when no movements are detected in the area. The occupants are also able to control the lighting in their work space with manual lighting switches.

Table 7: Active Lighting Design

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting System</td>
<td>1. Photo sensors</td>
<td>1. Photo sensors</td>
<td>1. Photo sensors</td>
</tr>
<tr>
<td></td>
<td>4. Use of energy efficient lamps and fittings</td>
<td>4. Use of energy efficient lamps and fittings</td>
<td>4. Use of energy efficient lamps and fittings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Task light</td>
</tr>
</tbody>
</table>

4. External Views

The difference in the type of external views accessible from the building can be seen in table 8. In Building C, the landscape is specifically designed to enhance the aesthetic values of the building, and provide a soothing external view for the building occupants. Building C is located in a residential area in Bangi, and the land area is able to accommodate landscape of more than 50% of the building footprint. However, for Building A and Building B, which are located in the government administration district of Putrajaya, are both built on the side of a busy road and are both surrounded by other buildings. For this reason, Building A and Building B have no landscaping planted around the building specifically for the purpose of creating a soothing external view or the building occupants. Turf and are planted around the building in Building A, while in Building B, landscape are planted around the building on the ground floor level to enhance the building aesthetics.
Table 8: External Views

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscaping</td>
<td>Turf planted around building</td>
<td>Landscape around building on ground floor</td>
<td>Lush landscape around building on ground floor (&gt;50% of building footprint)</td>
</tr>
</tbody>
</table>

5. Acoustic Performance

Table 9: Acoustic Design

<table>
<thead>
<tr>
<th>Design Elements</th>
<th>Green Office Building A</th>
<th>Green Office Building B</th>
<th>Green Office Building C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound proofing</td>
<td>-</td>
<td>-</td>
<td>Double glazed window</td>
</tr>
</tbody>
</table>

There is no special design provision for sound proofing in Building A and Building B (table 9). In Building C however, the windows are made out of double-plane glass with argon gas gap in between the 2 glass planes. This window design not only acts as heat insulation, it also acts as sound proofing for the building.

**Occupants’ Perceptions of Their Working Environment**

As the number of subjects who participated on the questionnaire differs from one building to the other, the statistical score used for cross-comparison of occupants’ perceptions towards their working environment are the mean scores of the questionnaire. The questionnaire consisted of 5 point Likert scale ranging from -2 to (+)2, where negative scores (-2 and -1) implies negative occupant perception, and positive score (1 and 2) signifies positive occupant perception. In such context, mean score of above 0 was considered to imply positive perception, while mean score of below 0 was determined to imply negative perception from the occupants.

1. Occupants’ Satisfaction Scores towards the IEQ of their Working Environment

From the >1 mean scores in the graph (figure 11), it can be seen that overall, the occupants of building A, B, and C perceive each of the
Indoor Environmental Quality (IEQ) and Occupants’s Perception

IEQ (Thermal Comfort, Air Quality, Lighting, External Views, and Acoustic Quality) of their working environment to be satisfactory. None of the mean scores fall below 0, and the mean scores that are below 1, are close to 1 at > 0.8.

![Occupants' Satisfaction Level of the IEQ Level Of Their Working Environments](image)

**Mean Score : (-2) Very Dissatisfied, (-1) Dissatisfied, (0) Indifferent, (1) Satisfied, (2) Very Satisfied**

**Figure 11: Occupants’ Satisfaction Level of IEQ Level in 3 Sustainable Buildings**

(i) Building A

The result of the questionnaire (fig.11) showed that overall, the occupants of Building A, rated their satisfaction level of all 5 IEQ elements (thermal comfort, air quality, lighting, external view, acoustic quality) in their working environment to be highly satisfactory with the mean score of > 1. The result also showed that the IEQ element that the occupants of Building A rated to be the most satisfactory was the thermal comfort of the building, followed by the air quality, and lighting condition.

The result from the interview revealed that the high satisfaction towards thermal comfort were due to the temperature setting of the building, where temperature is always controlled at 24°C - 26°C. The interview subjects revealed that the range of temperature in the building to be optimal, is neither too cold or too hot, and is suitable to their comfort level. Although 3 out
of 5 interview subjects were satisfied with the air quality of the building, 2 of them complained of minor fresh air insufficiency, and expressed the needs to have access to natural ventilation. As for the lighting quality, all 5 of the interviewed subjects expressed that they are very satisfied of the lighting quality of their working environment. This, according to them, is due to the fact that the maximum usage of natural lighting in the building creates a feeling of lightness in their working area, creating a comfortable space for them to work in. The response for external views satisfaction meanwhile was split into 2; where subjects with views of open spaces with grass at the back of the building claimed that they are satisfied of the external views. They expressed that the view provides them with distraction from work-related stress, and that it also gives them a sense of connection to the outside world. Meanwhile, those with views of building and roads, claimed that they neither feel positively nor negatively about the external views. According to them, the views does not affect their satisfaction level in any way. The subjects also considered the acoustical quality of the building to be satisfactory. However, they feel like the good acoustical condition of the building is due to geographical factors, such as the location of the building and light traffic, and not because of any building design.

Overall, the interview subjects in Building A, rated the indoor environmental condition of their working environment to be satisfactory. Other than that, they also responded that, of the 5 IEQ elements in their working area, temperature and lighting quality are the 2 elements that they are most satisfied of.

(ii) Building B

Similar to Building A, the mean scores in building B (Figure 11) implies that overall, the occupants of Building B have high satisfaction level towards the 5 IEQ elements of their working environment. The IEQ element that the occupants are most satisfied of was the thermal comfort of the building. However, where in Building A thermal comfort is closely followed by air quality and lighting quality, in Building B, air quality was rated to have the lowest satisfaction level. Although Building B
is surrounded by views of buildings and traffic, the occupants rated external view to be the second most satisfactory aspect of the indoor environment of the building.

The interview with the subjects in Building B revealed similar result for thermal comfort in Building A. According to the subjects, the reason that they perceive the thermal comfort in the building positively is because of the moderate temperature where it is neither too hot nor too cold. However, the same could not be said for lighting quality. The subjects expressed that the level of brightness of the space can be either too dim at one space, while too bright at another. For this reason, 3 out of 5 of the subjects interviewed perceive the lighting quality to be unsatisfactory. 2 of the subjects who responded to the lighting quality positively explained that their work stations are located near to the atrium, and they perceived that the diffused lighting from the atrium gives their work area a sense of lightness, and helps with their visual tasks. The occupants in Building B also rates air quality to be unsatisfactory. According to them, although they are aware that the air is free of pollutants, they experience dryness in the air, which results in sore eyes and nose. Similar to the subjects in Building A, the subjects in Building B expressed the need to have an access to natural ventilation. As for the acoustic quality of the building, all 5 subjects agreed that it is satisfactory, and that although the building is located on a busy junction, the sound of traffic does not penetrate into the building.

(iii) Building C
Similar to the other 2 buildings, the occupants in Building C rated all 5 IEQ elements in the building to be highly satisfactory, with the mean scores of above 1 (fig.11). However, unlike Building A and Building B where thermal comfort had the highest mean scores in both buildings, in Building C, lighting quality of the building was rated most positively out of the 5 IEQ elements. It is followed closely by external views, and thermal comfort, and finally, with the same mean score, air quality and acoustic quality.

The interview with the subjects in Building C revealed that the optimal use of natural lighting, which resulted out of
the usage of skylight and arrangement of workplace along the perimeter of the building, creates a pleasant and comfortable working area. Other than that, the interview subjects in Building C, also perceive the moderate preset indoor temperature ranging from 24°C to 26°C to be optimal to their comfort level, thus their high satisfaction levels towards it. The lush landscape area which covers more than 50% of the building footprint also contributes towards the occupants’ positive perception towards the building. According to them, the view of greenery has a soothing effect on them, and acts as a medium of stress relief. The fact that Building C is the building with the biggest area covered in vegetation may explain the significantly higher external view satisfaction score as compared to the satisfaction score of the other 2 buildings. The subjects perceived the air quality in Building C to be satisfactory, due to the fact that the building is completely sealed off, preventing pollution from nearby road to enter the building. However, as is the case with the other 2 buildings, there were comments of insufficient air movements and that the air felt “stagnant”. The occupants of the Building C also expressed the need to have access to natural ventilation. The interview also revealed that although the building is completed with provision for acoustical performance design (double glazed window), the subjects’ positive perception of the acoustic performance of the building is the result of the secluded location of the building, instead of the acoustic designs.

Although the satisfaction score of all the 3 building showed that the occupants of the buildings are highly satisfied with the IEQ condition of their working environment, significant difference was noted on the score of occupants’ satisfaction on the “Air Quality”, “Lighting Condition”, and “External Views” aspect of the building. The significant difference in the satisfaction score quality of air (\( p: .004 \)) among the 3 buildings may be caused by the difference in access to natural ventilation among them. Building 1 has operable windows in working area and natural ventilation on the ground floor, while the other 2 buildings are completely detached from natural ventilation. Access to natural ventilation in a building may be seen as the cause of significantly higher satisfaction score in Building 1.
in comparison to the other 2 buildings. Another significant difference ($p: .002$) was found in the satisfaction score of lighting among the 3 buildings. The difference in the building design that may have affected the significant difference in the satisfaction score was the orientation technique. It was observed that in buildings with North-South orientation (Building A and Building C), the occupants found the optimal usage of natural daylight in the building to be highly satisfactory. However, in Building B, where orientation technique is not applied, satisfaction score is significantly lower. This was further supported by the outcome of the interview where the occupants in Building B complained that the lighting can get either too dim or too glaring. Satisfaction score of external view was also found to be significantly different ($p: 0.46$) where buildings with abundance of greenery around the building (Building C) scored significantly higher than the building with less green landscape (Building A and B).

2. Occupants Perception of the Impact of IEQ in Sustainable Office Buildings on Their Physical and Psychological Well-Being

(i) The Impact of IEQ on Occupants’ Perceived Productivity

![The Impact of IEQ Perceived Productivity Graph](image)

**Figure 12: Occupants’ Perception of How the Buildings Affect Their Productivity**
From the questionnaire result (fig.12), a pattern can be observed, where in all 3 buildings, both lighting and thermal comfort were seen to be the IEQ element which affect occupants’ productivity most positively, while external view were seen to have the least positive effect towards their productivity. The occupants of Building A generally had the most positive perception of the effect of the building IEQ on their performance, followed by Building C, while occupants in Building B perceived their working environment to be affecting their productivity the least positively. Significant difference were found on the impact of air quality ($p: .001$), lighting ($p: .007$), external views ($p: .000$), and acoustic quality ($p: .013$) on the perceived productivity increase among the occupants of the 3 buildings. Occupants in the building with access to natural ventilation were seen to have significantly higher perceived increase in productivity than those who are not exposed to natural ventilation. In relation to the lighting condition, occupants in buildings with N-S orientation had higher perceived increase in productivity than those in the buildings without. Although the 3 buildings do not employ any acoustical design, significant difference were found among the score of perceived increase in productivity among the 3 buildings. This difference may be attributed to the geographical location of the 3 buildings, where Building C, located at the most remote place scored the highest, while Building B which is located next to a busy road scored the lowest.

70% of the subjects interviewed, perceived that their productivity were affected positively by their working environment. However, the remaining 30% perceived that their productivity was not the result of the condition of their working environment. Among the 30% that perceived that their productivity was not affected positively by the IEQ of their working environment were 50% of the interviewed subjects from Building B. They responded that they needed adaptation period in order to get used to what they perceive to be sub-par air quality and lighting condition in the building, and for that reason, perceived the IEQ to have no effect on their productivity at work. The subjects who perceived the IEQ of their working environment to be affecting their productivity positively, think
that it is the combination of optimal level of thermal comfort, and lighting that contributes to their increased productivity at work.

(ii) The Impact of IEQ on Occupants’ Perceived Mood

**Figure 13: Occupants’ Perception of How the Buildings Affect Their Mood**

With the mean score of higher than 0 (fig.13), occupants in all 3 sustainable office building perceived the IEQ elements in their working area to be affecting their mood in a positive manner. In Building A and Building C, thermal comfort and lighting condition were seen to be the IEQ elements perceived to be affecting occupants’ mood in the most positive manner, while in Building B, thermal comfort and external views were seen to have the most positive impact on occupants’ mood. The 3 buildings share similarity where acoustic quality was seen to have the least positive impact in affecting their moods. Significant difference was observed in how air quality ($p: .000$), lighting condition ($p: .000$) and acoustic quality ($p: .016$) were perceived to impact the mood among the occupants of the 3 buildings, where access to natural ventilation, and moderate amount of natural lighting was seen by the occupants.
to be contributing factors in the improvement of their mood. The interview however, showed a contrasting response to the questionnaires. 60% of the interviewed subjects claimed that the building does not affect their mood, and that their moods were only affected by external factors (workload, own mental state, etc.). The remaining 40% claimed that the building does in fact improve their mood, and that the improvement is caused by the feeling of lightness exuded by the building as a result of optimal usage of natural lighting. All of the occupants in Building C however, responded that the building has a positive impact on their mood. Similar to the occupants in Building A and Building B, occupants in Building C also perceive the feeling of lightness which resulted from the optimal usage of natural lighting to be one of the causes of the improvement in their mood within their work space. Other than that, occupants in Building C also attribute the sense of connection to the outside world (external view) and thermal comfort to the improvement of their mood in the building.

(iii) The Impact of IEQ on Occupants’ Perceived Well-being

![Figure 14: Occupants’ Perception of How the Buildings Affect Their Well-being](image)

**Mean Score : (-2) Really Disturbs, (-1) Disturbs, (0) Indifferent, (1) Improves, (2) Really Improves**

Figure 14: Occupants’ Perception of How the Buildings Affect Their Well-being
With mean scores of above 0 (fig.14), it was found occupants in all the buildings generally view the IEQ elements of sustainable buildings to affect their physical well-being positively. In all 3 buildings, acoustic quality was seen to have the least positive impact on their physical well-being. In Building B in particular, the mean score is nearing 0, which implies that the occupants in Building B perceive acoustic quality to have no impact whatsoever to their physical well-being. In Building A, air quality is seen to have the most positive impact on occupants’ well-being, closely followed by lighting in second place, and thermal comfort in third place. In Building C, thermal comfort comes first, followed by lighting condition and finally air quality. The 2 buildings showed similar pattern where thermal comfort, air quality, and lighting are in the top 3 reasons of improved well-being. Building B showed different pattern where external view was seen to have more positive impact on occupants’ well-being in comparison to lighting condition. Significant difference was observed in how air quality ($p: .000$), lighting condition ($p: .000$) and acoustic quality ($p: .000$) were perceived to impact the well-being among the occupants of the 3 buildings, where access to natural ventilation was seen by the occupants to be affecting their well-being positively.

The interview revealed parallel result as the questionnaire, where all the interviewed subjects responded that they perceive the building to be affecting their well-being in a positive manner. According to the interviewed subjects what was perceived to be affecting their well-being positively was the combined comfort level of all 5 IEQ elements; thermal comfort, air quality, lighting, external views, and acoustic quality. In their view, the optimal level of thermal comfort and the connection to natural element (lighting and external view) in their workspace creates a comfortable, restorative environment for them, and thus is viewed as having a positive effect on their well-being. 60% of the subject interviewed also attributed exposure to natural lighting and access to views of nature to the feeling of liberation (as opposed to feeling confined) which contributes to their increased feeling of well-being.
(iv) The Impact of IEQ on Occupants’ Perceived Motivation

Questionnaire result (Figure 15) showed mean score of above 0, which implies that occupants in the 3 sustainable buildings perceive the building to affect their motivation to work positively. It was found that what was perceived to affect the occupants’ motivation most positively differ slightly among the 3 buildings. In Building A, optimal lighting and thermal comfort was seen to be the factors which affect occupants’ motivation to work positively. In Building B, occupants claimed to be motivated by the optimal level of thermal comfort and air quality, while, in Building C, the occupants’ motivation were found to be most positively affected by the lighting condition and the external views of the building. Significant difference was found among the motivation score of the occupants in the 3 buildings on how the lighting and external views affect their motivation to go to work. It was found that the score is significantly higher in buildings with moderate level of natural lighting achieved by orientation technique compare to in buildings without it. Other than that, it was also found that exposure to views of nature significantly increases the motivation to go to work, as can be seen in Building C.
The interview revealed that occupants perceive attractive and comfortable working environment to be the core cause of their motivation to go to work. It was also found that natural elements used in the buildings are what make their working environment to be attractive and comfortable. The optimal usage of natural lighting and atrium in the building was seen to create “a sense of lightness” in the building, which the occupants attributed to be one of the leading factors in the increased level of motivation to work. Other than that, views to outside world (regardless of the type of view; natural or manmade) was perceived to rid the occupants of the feeling of being confined in an office building, thus is perceived to have a positive impact on their motivation to work.
DISCUSSIONS

Occupants’ Perceptions towards Green Office Buildings

Both data from survey and interview revealed that in general, occupants of all 3 GBI certified buildings have positive perception towards their working environment. Basing on such responses, it can be concluded that the sustainable design approach employed in local building in Malaysia was proven to be successful in creating a comfortable and restorative environment for building occupants. Overall, the occupants perceive the Indoor Environmental Quality (IEQ) which consists of thermal comfort, air quality, lighting quality, acoustical performance, and external view to be highly satisfactory.

Employing VAV system, floor slab cooling and fully climatised indoor environment succeeded in creating optimal thermal comfort for the occupants, while minimizing energy used in the building. The resulting moderate average temperature of 24°C was perceived to be highly satisfactory by the occupants. The same can be said with air quality, where in average, occupants are satisfied with condition of the air quality in their working environment. However, the buildings’ fully climatised indoor condition completely detaches building occupants from natural ventilation. This condition causes slight dissatisfaction among the building occupants due to the lack of air movement resulting from it. For this reason, occupants in building with access to natural ventilation (Building A) were proven to have significantly higher satisfaction score compared to those in completely sealed off buildings (Building B and C).

It was also discovered that building orientation is crucial in obtaining high satisfaction level in lighting condition. Although the lighting conditions are generally perceived positively in the 3 buildings, the occupants in buildings without North-South orientation perceive the lighting in the building to be either too bright or too dim at times. In moderate lighting condition, occupants associate the optimal usage of day light, with “the feeling of lightness”. Other than that, building occupants exposed to views of nature (trees, garden), were found to have significantly higher satisfaction of external views compared to building occupants who are not. It was observed and found that the higher the allocation of greenery outside the building,
Indoor Environmental Quality (IEQ) and Occupants’s Perception

the higher the occupants’ satisfaction of external view. The acoustic quality of the 3 buildings was also perceived positively. However, the occupants attribute the satisfactory level of the acoustic quality to geographic location of the buildings, rather than the buildings’ acoustic designs.

**Occupants’ Perception of How Green Office Buildings Affect Their Productivity, Mood, Sense of Well-Being, and Motivation**

Other than being perceived positively by the occupants, sustainable office buildings in Malaysia were also perceived to have a positive impact on occupants’ performance, and their psychological and physical well-being. It was found that occupants feel that their level of productivity at work, well-being, and motivation to go to work were significantly increased by the optimal level of indoor environmental quality of the buildings.

Of the 5 IEQ elements, moderate indoor thermal condition (ranging from 24°C to 26°C) and optimal usage of natural lighting was seen by the occupants to increase the level of their productivity at work. Meanwhile, the occupants perceived that their well-being is improved by the optimal comfort level of the building elements, which resulted from the combined comfort level of thermal comfort, air quality and lighting condition. Other than that, they also associate the improvement in their sense of well-being with the exposure to natural elements used in the building (natural day-light, and views to greenery). The motivation to go to work was also perceived to be improved by the IEQ condition of the building. Occupants claimed that the IEQ condition creates a comfortable and attractive working environment for them to work in, thus, improving their motivation to work.

**CONCLUSION**

Research showed that sustainable building design has a significant effect on building occupants in Malaysia. IEQ elements such as thermal comfort, air quality, lighting quality, external view, and acoustic quality all have positive impact on the occupants residing within the building. It was found that green building design creates optimal indoor environmental quality which provides occupants with comfortable working environment
It was observed that occupants of Malaysian green office buildings have high satisfaction levels of the IEQ of the buildings. In addition to their positive perception, they also perceive the green office buildings they work in to be affecting them positively, where it increases their productivity and motivation, while at the same time, improving their mood and sense of well-being.

Several points that need to be considered in designing sustainable office building is that, even though it is imperial to create a fully climatised indoor environment to achieve optimal temperature and humidity level, occupants expressed the need for access to natural ventilation. For this exact reason, a combination of both mechanical and natural ventilation needs to be introduced in sustainable building designs, to further improve the performance of the building. Other than that, it is crucial to incorporate proper orientation and shading design in the building. Although maximum usage of daylight is welcomed by the occupants of sustainable buildings in Malaysia, poor building orientation or shading design may result in extreme condition of lighting, where in some spaces, the lighting can get too bright or too dim, causing discomfort and to a point interfere with the occupants’ work performance. Greenery was also proven to have a positive impact on occupants’ satisfaction scores towards their working environment. Hence, incorporation of more greenery within a built environment is highly recommended.

It can be concluded that, sustainable building design employed in Malaysia succeeded in creating a comfortable, healthy working environment for its occupants, where they can thrive and reach their maximum potential, while at the same time reducing the negative impact on the environment. For that reason, it is crucial that measures are taken in committing to creating an improved sustainable built environment which cares for the well-being of both human and the environment, where both can co-exist in harmony.

REFERENCES


Role of Architectural Historical Precedent in Aesthetic Design of Contemporary Architecture: Safavid Architecture

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ABSTRACT

This study essentially examined the architecture of historical precedent of Iranian architecture, and focused on Safavid Architecture from experts’ perspective. The study is mainly qualitative in nature, and explained, why historical precedent is important and how it could be applicable to the formation of aesthetic design in contemporary architecture. We collected the data through semi-structured interview with experts, which were guided by the literature and theoretical foundation. The account of the interviews was recorded, transcribed and the content analyzed, examined and evaluated for evidence. Three themes emerged, including aesthetic design attributes, aesthetic design values and application of architectural precedent in the aesthetic design of contemporary architecture. We discussed the themes in the light of the research questions; following drew a conclusion, which recognized the most perceivable concepts as to be applicable in the design aesthetic of contemporary architecture. In addition, it has theorized that the reality and essence of a social phenomenon in the contemporary architecture is in the character of architectural precedent.

Keywords: Aesthetic design, Architectural precedent, Contemporary architecture, Safavid Architecture
INTRODUCTION

Safavid Architecture is one of the important eras in the evolution and history of Iranian architecture, which began with the rise of Safavid dynasty that ruled Persian territory between the years of 1501-1722 (Yalman, 2000). This prototype architecture recognized as the best-known example, in which some of the rich monumental architectural precedents have demonstrated an aesthetic contribution to the heritage of the nation’s cultural identity (Eimen, 2004). Evidence often has shown, the use of historical precedents offer important reference points to the proper architectural design (Padovan, 1999). It is now broadly accepted that aesthetic design is changing to the delight of our surrounding environment after realizing that perhaps it is refreshing our soul (Shiner, 2007).

Due to the complexity and various components, which exist in the nature of aesthetic design, numerous studies have revealed important roles of history in architectural precedent in a variety of contexts. A body of scholarship indicates the importance of Iranian architecture. For example, Yemen (2000) summed up with views on the way that Iranian architecture has had a long history of civilization and an extensively patronized field of architecture since the era of the Achaemenid dynasty (522 – 486 B.C).

The signature of historical precedent concepts is missing in the design of contemporary architecture (Naderi, 1996). The significance of Iranian historical architectural precedent has been neglected and requires to be reintroduced through the concepts of architectural precedent. This is possibly can concern by structuring the values, which is found in the historical precedents as a paradigm for the implementation of the aesthetic design in contemporary architecture.

The purpose of this study is to explore the historical precedent of Iranian architecture through experts’ opinion to elicit potentially applicable guiding concepts for the aesthetic design of contemporary Iranian architecture. Our study focuses specifically on the historical precedent of Safavid architectures (Fig.1) by posing the question of how historical precedent, particularly Safavid architecture can assist the formation of aesthetic design in contemporary Iranian architecture.
The significance of this study may arise because of the theoretical adaptation approach to the contemporary architectural design aesthetic based on historical precedent. Therefore, the eventual application of aesthetic design concepts from historical precedents in contemporary architecture may be a reality outcome from the evidence of this context. Although a multiple approach to data collection should be applied to a persuasive message to affect the outcome of this study, it is obvious that capturing experts’ opinion is the critical in the first place.

![Figure 1: Left: Dome of Masjid Shah (Imam) Right: Khaju Bridge](trekearth.com)

The structure of the paper consists of six parts, includes an introduction, which is already introduced the overall context of study. Following paves the way for the review of literature as a comprehensive picture of issues in the subject (Creswell, 2009). Next, devoted to the methodology, results and findings, discussion of findings and lastly concludes with specify some recommendation for further consideration.

**REVIEW OF LITERATURE**

The historical precedent of Persian architecture traces back to the ancient history of architecture for more than 3,000 years. The most outstanding principles was marked of feeling for many concepts in scale, proportion, geometry, space, colour, calligraphy, texture, figures, and line. Additionally, some features such as the use of simplicity, massive forms, and courtyards are ancient common features (Pope, 1976). Alexander (1987) refers to the history of urban aesthetic and stated that, a greater force and a greater purity have been found through the earlier times. He gave an example of
his statement about the bridge of Isfahan, Khaju Bridge, Iran, which was built by the Safavid dynasty, (Figure 2).

Alexander (1987) believed the aesthetic design of the bridge is a product of visionary character in an earlier time when many people of the city would enjoy the aesthetic of urban space. Alexander (1987) considered the vision as a factual thing, felt in the mind’s eye, perhaps as a dream, not a concept or an idea. The accumulation of evidence indicates that the necessity for social and psychological expression, profoundly affects the human desire to preserve the appearance because throughout architectural history, appearance was followed by custom and the evolution of the multitudinous styles of architecture (Allsopp, 1977). Alexander (1987) raised the issue of urban aesthetic design and stated that, this process is rooted in theoretical and practical innovation. He emphasized the significance of history in forming a pattern that indicates a special relationship of wholeness in guiding users to manipulate and take charge of their own environment.

The underlying principles of aesthetic designs of ancient architecture were found to produce a theoretical basis for the practical design of modern architecture Allsopp (1977). Such findings guide the research to explore factual evidence of aesthetic design sense through the process of time. Allsopp (1977) believed the evidence of architectural precedent should be examined through the history of architecture because one of the primary functional aspects of history is to examine the evidence and set it in a proper social context (Allsopp, 1977). The significance of history is in its aesthetic function, which be used to discover and examine the factual evidence in a disciplined theoretical manner. Thus, investigation of architectural precedents revealed the events of society over a long time span and provided an appropriate approach towards solving the problems in the aesthetic design of contemporary architecture. Allsopp (1977, p. 17) indicated that, the “History of architecture helps us to place the right interpretation upon the built evidence in looking for constants and variables in contemporary aesthetic design values and by trying to recognize the architectural fact of life” (Allsopp, 1977). Architecture precedent have placed the sense of aesthetic in a set of principles in the practical order (Winters, 2007, p. 149). This has been fundamental to architectural design throughout history. If any changes were made to the structure, materials and technique, then a social-emotional adjustment has to be made by preserving the idea of a usable
past to produce a new trend while a new transition takes place gradually over time (Allsopp, 1977, p. 26). In addition, Allsopp (1977) emphasized the importance of history as an intellectual instrument is tested and placing the building to discover its reflection of a cultural aspect of the particular period, and for the furthest development in technology of the time.

Figure 2: Khaju Bridge throughout history


Although, aesthetic design in architecture has gone through many changes throughout history, it remains as architecture. Past aesthetic features will always continue to change, while we think about the events and needs of our times. The concepts of design in architectural precedent framed and achieved by enduring design values. By looking at the past, one may think that the objectives of architecture is to create great buildings (Allsopp, 1977).

METHODOLOGY

Understanding the experts’ opinion on historical architectural precedent relative to contemporary Iranian architectures necessitate choosing participants purposefully in this study. Experts who agree to participate
in the interview were invited and considered as special knowledgeable people (Vicsek, 2010). The key participants who were involved in the interview were architectural practitioners, critics, and academicians, who was holding the position as former director of Isfahan’s cultural heritage and director of the tourist and tourism.

The methodological procedure followed by semi-structure Interview as a mean for the process of exploratory findings to decide about the solution to the research questions. In order to enhance the credibility of the results, interview questions were addressed and framed around the five open-ended questions and prompted by supplementary questions with open character to adopt a qualitative data approach (Gillham, 2000, pp. 60,67). Interviews were conducted purposefully with the experts (Creswell, 2009, p. 178) to enhance the credibility of the results (Chan & Cheuk, 2009 ) in an informal manner and were personally one on one format (Stake, 2006).

Collecting data through a semi-structured interview gave the freedom to the researcher to probe the interviewee to elaborate on his response and generate more information to compile (Hancock, Ockleford, & Windridge, 2009). For accurately of evidence the data were transcribed into the written form. All interviews, regardless of setting, conducted in person, recorded on a digital audio tape and written in Persian language. We translated the most relevant items and wrote up the research results and findings in English.

Qualitative direct content’s thematic analysis is used in this study to explore the latent concepts and themes that experts brought to the underlying structure of the research (Schwandt, 2007, p. 291), (Zhang & Wildemuth, 2009). We were reviewed the interview transcripts for a number of times. Throughout the review, re-occurring or domain’s categories that emerged from the data were identified (Spradley, 1979). In order to find out which category appears to be more important, we identified the number of message sentences that referred to certain categories. Moreover, we considered the overall most frequent amount of space, which appeared on the particular category as well. The following steps were taken sequentially through the analysis of data. To know the data; the voice recorder was played for several times on different days. By listening to the voice, we identified the most relevant data. In addition, certain of the segments were standing out, felt and gave the impression of signing statements. The voices transcribed
verbatim and check for the quality to be complete and understandable. Furthermore, check to make sure collected in the unbiased. We read the transcript repeatedly for relevant and interesting information about the initial list of categories. As a result, substantial statements revealed through the transcript (Gillham, 2007, pp. 121-125)

The experts’ opinion provided a supportive claim to the development of aesthetic design concepts as a high degree of validation. We established the accuracy of qualitative procedure to obtain evidence in the sequential linear and hierarchical approach as illustrated in (Figure 3).

![Diagram](attachment:Figure_3.png)

Figure 3: Stages in validation of accuracy of information data
*Source: Adopted from John W. Creswell, Research design Qualitative and Mixed Methods Approach*

**RESULTS AND FINDINGS**

In order to provide a rich picture of the qualitative findings, the overall results through the coding process is presented in Table 1, as tabulation of the most frequent categories of responses mention in the response. In addition, the most frequent of space number of message sentences where the most important categories are mentioned in the response are shown as appearing categories in Table 2.
Table 1: Tabulation of the overall frequency of the categories mentioned in the responses

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Categories</th>
<th>Frequency of Categories being Mentioned</th>
<th>Total Documented Co-Mention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IR-1</td>
<td>IR-2</td>
</tr>
<tr>
<td>1</td>
<td>PP</td>
<td>Paradigm</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>IM</td>
<td>Identity / Meaning</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>P&amp;P</td>
<td>Policy and Practice</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>IC</td>
<td>Interaction with Context</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>RA</td>
<td>Rationalism</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

1. The appearing categories are not suited to statistical analysis, but they only can reveal general pattern in the data” (Powell & Renner, 2003)

Table 2: Tabulation of the overall frequency of sentences where the most important categories are mentioned in the response

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Categories</th>
<th>Frequency of Sentences that Mention the Categories</th>
<th>Number of Message Sentences in the Text</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>IR-1</td>
<td>IR-2</td>
</tr>
<tr>
<td>1</td>
<td>PP</td>
<td>Pattern, Paradigm</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>IM</td>
<td>Identity / Meaning</td>
<td>10</td>
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<tr>
<td>3</td>
<td>IC</td>
<td>Interaction with Context</td>
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<td>4</td>
<td>P&amp;P</td>
<td>Policy and Practice</td>
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<tr>
<td>5</td>
<td>RA</td>
<td>Rationalism</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

The experts’ transcripts provided extensive information and evidence to support the significance of historical precedent and revealed three themes namely aesthetic design attributes; aesthetic design values, and aesthetic application of architectural precedents as shown in Table 3.
Table 3: Overall structures of results and findings associated with each theme

<table>
<thead>
<tr>
<th>Key Themes As The Main Findings</th>
<th>Categories</th>
<th>Data Set</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aesthetic Design Attribute</td>
<td>Feature and quality</td>
<td>Interview with experts</td>
<td>Transcriptions of audio tapes</td>
</tr>
<tr>
<td>2. Aesthetic design values</td>
<td>Design values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The aesthetic application of architectural precedent in</td>
<td>Architectural precedent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>contemporary architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These themes, which are contribute essentially to the practical inquiry of the study is developed in the process of transcription as follows.

**Aesthetic Design Attribute**

One of the predominant areas, which are pointed out in the interviews was connected to the design feature and quality of the historical precedents. In this setting, the experts were familiar with the area and had connection with the subject discussed during the interview with the historical architecture precedents and particularly with the city of Isfahan. The frequent amount of space and co-mention of the text documents indicates many of the statements declared by experts described the attributions of art and architecture of historical precedent as a central core for this study. Experts delivered the following accounts across the interviewees talk as follows.

Architecture precedent cannot be in a simple meaning, we should refer to spatial and physical set of properties. … You can consider those as a better indication for aesthetic qualities… as a matter of fact, one of the features of architectural precedent is about the articulation of space…….. which are depicting the combination idea of spatial and physical quality of forms and space.

Spatial characteristic and visual aspect of form and space in building and urban scale have been found to be an important characteristic of historical precedent to the interviewees. Qualitative analysis revealed that, the attribution of historical architecture relies on many patterns such as
geometry, rhythms, scale, proportion, etc. It is clear from the interviewees’ evidence that experts were looking at similar formal attribution of the architectural precedent features to make their judgments. These similarities found as a common thought about a variety of aspects in a different approach. For example, duality is found as a criterion of aesthetic design features. One of interviewee indicates, “the duality plays its role again”. Given the nature of qualitative interview, how these attributions have functioned through the sense; it is found that, tangible quality can be perceived as a rational relationship between aesthetic components of Safavid Architecture. Surface treatment, shape, and in general the physical artifacts throughout sensory factors are found as the most distinguishing design feature and quality. The representative remarks are as follows.

If you ever pay attention to the Khaju Bridge, the rhythms of movement creating a rational tension and unity within the sequential elements that fall into the aesthetic quality. ...These types of architectural perceive tangible and arise from the rationalism relation to the design… its ask for aesthetic awareness of materials, building surfaces, shape, colour and our sensory factors such as hearing, feeling, seeing, touching and smelling.

The experts had generic comments about the feature and quality of architecture precedent. However, the interviewees raised an issue and explains that, exploration and richness of local and traditional materials tended to focus on the monumentalize character rather than folklore architecture. Additionally, architectural precedent deemed not given the feeling of folklore architecture. However, the concept of the courtyard as a predominant feature in architectural precedent is adopted as a national concept in a variety of scales. This appeared to be a clear contrast between experts as described.

The aesthetics of architecture precedent are a monumentally architecture and it does not give you a feeling of folk architecture. …Traditional brick masonry, stucco ornamentation, glazed tile demonstrating the most features of architecture precedent. …. In the Masjid-e- Imam (Shah Abbas or Blue Masque) expresses the richness of exploration and presenting one of its particular characteristics of its traditional style in a variety of scales.
This contrast can take as an indication of the particular characteristic in traditional monumentalized architecture, which emerged through the perception of an interviewee. Nevertheless, many of the co-mentioned documents were concerning the aesthetic character of architecture precedent. The indication of a turning point in Iranian architecture by manifestation of architecture precedent particularly Safavid Architecture made this period to be an uplifting among other styles.

**Aesthetics Design Values**

Aesthetic design value is a further theme that emerged from evidence, which represents its properties through categories. The experts viewed the vision of aesthetic design value as significantly related to meaning, principles, morals and ethical issue. This view expressed that the adoption of custom, tradition and social interaction in relation to architecture provided a definition and an expression for the constitution of symbolic aesthetic design values. The following quote from interviewee display their opinion.

I refer to this adoption such as acceptance of religion, custom, traditions; social interaction ideology, rituals, dress, music, art and architecture define and construct values, symbolic and aesthetic design expressions.

This finding supports the idea of aesthetic as being a mother of ethics and deeply relates to the people’s beliefs, ideology, morality, philosophy, principle, values, manifest, and guideline. Furthermore, the property of design values and quality in architecture precedent are found to be predominant feature, which defined the meaning and aesthetic values of architecture. An explanation, which is provided by interviewees on this subject, sets out,

There are principles exist in every aspect of architecture precedent not only in the physical aspect of the buildings but in a plan, section and elevations….Nowadays, the values of aesthetic design developed into meaningful architectural language and meaning such as cultural, perception, and traditional design values.
The importance of architectural precedents is about the establishment of meaning and conceptions described as meant to be for contemporary life of the people. These findings point out the importance of the link between the architectural precedents and contemporary architecture. There is a diversity of the point of view represented through the interview data. These perspectives refer to the civilization, history and the pattern of Iranian architecture as the sign of cultural aspects. Responses that reflect this personal connection are as follows.

Let me start with Iranian civilization throughout history of Iranian architecture, which has a lot of expression of aesthetic architectural values in each era. ..... To my knowledge, architectural precedent developed some kind of intellectual pattern of its architectural aesthetic design values, rather than emphasizing merely on surface and material qualities. However, the concept of aesthetic in architecture precedent applied to the integration of physical characteristics of its buildings.

Experts believed, the aesthetic of architectural precedent has a universal meaning, and to some degree, it is unclear to some people. The values of architecture precedent are identified as the culture and tradition as the society’s belief. Further, purity and honesty related to the nature of materials enhance the value of its architecture. This viewpoint was particularly a unique noticeable comment as it cover many ideas regarding culture, ethics, beliefs and science. Interviewees described their general views as follows.

Nowadays, the word aesthetic is a universal language with lots of meaning. However, the meaning of the word is vague about some people..... In the Safavid period; architecture was harmonious with society’s custom and integrated with cultural aspects. ..... Traditional and natural materials are given character and value to Safavid Architecture.... They had a moral obligation to perform architecture efficiently. Moreover, this is what we call multifaceted prism because Safavid architects communicate with culture, ethics, beliefs and science. ..... Safavid period demonstrated a kind of moral and doctrinal toward Idealism.
One of the significant findings revealed through interview data in relation to the aesthetic design values refer to experiencing architecture through the value of hearing architecture. The cultural value of architecture has a relationship to our sensory factors such as hearing, smell, sight, touch and taste. Interviewees described it as follows; we experience our traditional architecture by our sensory factors, smell, sight, touch, taste and hearing (Khaju Bridge, Masjid game Abbasi (underneath the dome) Ali Qapu, palaces, (Music rooms) and Bazar-e-Mesgarha (Market Place).

**Application of Architectural Precedent**

The application of Architectural precedent is identified to be laid based on rationalism. Interviewees pointed out that architectural precedent is a fact and mainly emphasize on the many intellectual devices. These comments have the indication of the recognition of many items in the Safavid Architecture as well, which contribute to the aesthetic design values. The following quotes illustrate interviewees’ opinions.

The profiles architectural precedents laid based on rationalism. I have noticed that in our past architecture, and this is a fact”. ..... Indication of architectural history mainly emphasizes meaning, space conception and articulation with the last period… Tangible aspects of historical proceeding should recognize…. Understanding of precedent’ is going back; analogy may help, going back to the treasure of rules in design concepts.

The interviewees frequently highlighted some criteria to suggest and remake their point of views. They made some remarks and suggestions to ensure that, further and accurate attention should paid in the contemporary Iranian architecture. Interviewees indicated that, since, the architecture is a social instrument related to the people’s tradition and cultural background, the necessity of aesthetic design as a representative of a social asset becomes important to be demonstrated in building industry. The two interviewees’ vivid accounts of this expression are as follows.

The spirit of contemporary Iranian architecture relied on the tradition, and cultural background based on the architectural background of this nation. Creating aesthetic design value in contemporary architecture
is an important issue in a design of any buildings…we should demonstrate aesthetic design values in architectural industry.

The interviewee’s perspective leads into the recommendations, which clearly focused on the concepts of historical buildings as a starting point for the development of a theoretical framework. The feature of the aesthetic design value highlighted as the main source available through historical building. The following quotes illustrate participants’ opinion concerning this matter.

The concepts of historical building should develop into a form of the theoretical framework in contemporary architecture. We should establish some kind of manifestation… Theoretical approach to this issue defiantly would be helpful to reveal the significance of Safavid Architecture. Architectural precedent, which we can discover in this period, would create many concepts in contemporary Persian architecture.

Regulations and rules are indicated as the most effective way that would change the image of the physical characteristics of the cityscape. In addition, interviewees presented a few phrases to describe their perspectives on the aesthetic valuable in the city that should be preserved through the similar regulations to protect the valuable features of the people and quality of the city. The following quotes demonstrate the visions of the interviewee.

Authorities should identify and come up with some kind of regulation or policy to preserve and protect the valuable features of people and city identity…. Preservation of architectural aesthetic design value should develop in a frame of government policy. Any contemporary building with high architectural aesthetic design values, features or elements should identify and preserve in good condition.

Other interviewees gave the generic comments about the issue. A strategy development of was found as a supportive approach for making reasonable architecture. Representative responses indicated that, “strategy would support to make some kind of approach that contributes to the contemporary architecture, creating at less a reasonable architecture…. What we do and how we do in practice of architecture is related to the social structure of society”.

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DISCUSSION AND CONCLUSION

The discussion of themes fall into the following themes, aesthetic design attribute, aesthetic design values, and application of aesthetic design of architectural precedent in contemporary architecture. Aesthetic design attribute: In light of cultural aesthetic variations, architectural precedent presents the features as a social instrumental, which connect to the people’s ideology. There is no fix indication of an attribute or meaning of aesthetic quality found by experts. However, expert’s personal views provide different aspects of spatial and visual quality of architectural precedent, especially in the context of Safavid Architectural. Although the similarity of statements about the attribution of the historical architectural precedent indicates a common thought about experts’ judgments, experts’ attention to the aesthetic design values and attribution in contemporary are different. The symbolic meaningful relationship between architecture and nature, surface, and shape through sensory experience is a result of aesthetic quality expression of natural light in the context of Islamic eastern aesthetic patterns.

Aesthetic Design Values: The issues of meaning, principles, morals and ethic perceive as the vision for the aesthetic design value. These viewpoints are expressing the structure of symbolic aesthetic design values. These values are the result of adaptation in custom, tradition and social interaction of the society. This interpretation strength by literature that shows a link between the study of architectural precedent and architecture over a long time – span, provides a basic approach to think about the issues in modern architecture.

Application of Aesthetic design precedent in Contemporary architecture: There is a potential development for improvement of the contemporary architecture through Safavid of historical precedent because seemingly experts have confidence that historical precedent of Safavid Architecture is relying on the pattern of many features and aesthetic order in the geometry, scale, proportion of building components etc. The diversity of historical pattern is a signature of cultural aspects in the pattern of Iranian architecture. This opinion highlights the geometric pattern as standing on the platform of style and feature of built form. The imitations of physical characteristic are no longer and have ever been successful in contemporary
architectural phenomena because apparently they do not follow the full society’s test whereas the concepts of historical precedents are delivered as the central core of the invention as a paradigm in contemporary architectural phenomena.

The discussion of the above findings on the following conclusion provide an opportunity to seek answers to the research questions as how historical precedent can be assisted the formation of aesthetic design in contemporary architecture. The results suggested that, architecture of historical precedent has a tendency to inject the cultural and traditional values to the contemporary development process. Architectural precedent is producing a monumental prototype architecture, which explores the richness of local and traditional materials. The historical precedent has embedded with a diversity of ideas, values and attributes, which aesthetically boost to improve contemporary architecture. This research theorizes that, the reality and essence of the social phenomenon in architecture are in the shade of characteristic of architectural precedent. This is a phenomenon, which is revealed through the history of great ancient architecture, such as Safavid Architecture.

RECOMMENDATION

Any design of architectural place must aesthetically be valuable to a society’s culture. The spirits of cultural context ought to be developed in the architectural elements. Every work of art and architecture should suggest a representation of the full constitution to generate the communicative form, which interconnect to the people with cultural means. The perspectives of experts through suggestions and remark add a new dimension to ensure that, further and accurate attention has to be paid to the concepts of contemporary architecture. In addition, aim can be consider for further elaboration in a detail to investigate the validity of the design concept.

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Housing Projects in Algeria: Which Context for which Consequences on Built Environments? Case of Zerhouni City in Algiers

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ABSTRACT

The term sustainable development includes human development, values and cultures. We are referring to sustainable human development in order to emphasize issues such as the importance of housing quality and participation in decision-making process. Offering many dwellings, the new urban spaces in Algeria are supposed to respond today’s population needs, their construction capacity is important, they are aired and endowed of important facilities. But, are they really a place where people want to live, now and in the future? What about urban harmony and wellbeing in this case? Starting from the macro to arrive to the micro, we will consider, in this paper, housing projects in Algeria while analysing the old and the new built environments in Algiers, a representative example at the national scale when it comes to housing and the case of Zerhouni city in particular, one of its nearest and recent suburban area.

Keywords: housing, built environment, heritage, sustainable development, welfare
INTRODUCTION

The 21st century urban life cannot be considered without taking into account the sustainable development, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987). This is the most widely known definition coming from the Brundtland Commission, but what does it recover in Algeria? Indeed, the evolution of the last decades generated many problems. The socio-economic development associated with the demographic expansion generated a considerable urban development with an overload in the downtown areas and tendencies of urbanization without infrastructures and services in the suburban areas. Today, changes in rhythm and scale, growth of the urban population, multiple illegal implantations, produce a blurred image and discontinuities prevail over adjustments. The result is the development of towns that answers with difficulty to the demands and aspirations of their inhabitants. But what are the actual needs of the population? And where are the prerogatives of our decision-makers?

ALGERIA: URBAN DEVELOPMENT AND HOUSING EMERGENCIES

Housing is a basic requirement for everyone. In Algeria, housing shortage gets the political powers to intervene, launching important programs of housing, achieved in the briefest delays. Residential development takes more and more extent in urban periphery. However, housing shortage is far from being resolved. According to the Ministry of Habitat and Urbanism, the first economic plan launched between 1999 and 2003 permitted the realization of 693,800 housings with almost a half million in rental public housing and social-participative housing, with an average cadence of 140,000 housings realized per year. A good performance when one knows that the independent Algeria never passed the rate of 100,000 housings per year. The supplementary programs (1999-2003) recorded more than 1,250,000 housings (32,000 for the South, 37,000 for the High Plateaux and 56,000 various). If the rate of occupation by housing decreased distinctly between 1998 and 2003, while passing from 7.2 to 5.5 people by housing, the situation stayed nevertheless critical.
To face a deficit estimated to 1.1 million of housings, the government announced a new program that spreads from 2005 to 2009 with:

1. 24.9% of rental public housing, (a group of block of flats built with public money for low-income families).

2. 20.9% of social-participative housing, (this category of housing is based on the claimant’s financial participation: 30% advanced by the claimant, 30% as a banking loan and 30% as a non-refundable help from the Algerian State).

3. 10.3% of renting-sale housing, (this category of housing allows the claimant to pay his dwelling by easy terms: 10% to begin, 15% when the block of flats is achieved, and the rest payable monthly during 25 years).

4. 3.1% of promotional housing, (realized by property developers, promotional housing is characterised by its high quality, its big surface and its good finishes, the access to this private property being truly out of range for a lot of households).

5. 40.8% of rural housing, (a group of small homes built with public money to encourage low-income families to stay in the countryside instead of moving to the nearest towns).

6. Without forgetting the private housing, otherwise said, the whole individual homes constructed by Algerian citizens by using their own financial means.
The construction of more than one million housings was expected therefore for 2009 by the Ministry of Habitat and Urbanism. The new quinquennial Plan (2010-2014) intended to reinforce the intention of the Algerian State to continue its intense answer to housing demand according to the speech of the President of the Republic. Another million of various categories of housings will be delivered during these five years. The new Prime Minister added last 16 October 2012 that a complementary program of 1,450,000 housings has been launched. In all, 2,450,000 housings will be achieved during this quinquennial.

Today, an intense real estate development advocates a collective habitat. The latter consumes less space and generates collective displacements,
articulates itself around a setting aiming all social categories, encourages the diversification of housing models and encourages the participation of citizens. However, the acuteness of the residential crisis doesn’t stop persisting despite the efforts of the State to attenuate it. Indeed, 199,653 housings have been delivered in 2009, 179,112 delivered in 2010 and more of 181,829 housings delivered in 2011. In the same way, the Algerian State launches every year new housing projects. Let’s mention for instance, the 324,402 housings launched in 2011. Graphs below represent the different categories of housings and therefore the different households targeted.

![Graphs realized on the basis of data collected by the Ministry of Habitat and Urbanism)
](image)

**Figure 3: Statistics concerning achieved/launched housing projects in 2011**

To build blocks of flats is, for our decision-makers, a good answer to housing shortage, despite the fact that the inhabitants denounce the formal and architectural poverty of these innumerable buildings of concrete. Certainly, housing being above all an object defined by its spatial dimension, it is characterized by three attributes: the metrics, the scale and the substance. Nevertheless, housing constitutes also the concrete matter of the social space and contains the material contexts of the social life, in its contemporary as well as historic dimension. Elementary form of territory, housing crystallizes stakes of societies and institutes itself as basis of every projection towards the future, a spatial reality at the same time material, immaterial and ideal, from where the importance of the individual, of the subjectivity, of representations, in every housing analysis.

For the present as for the future, the local authorities must learn to put the inhabitants first, not fees or speed of construction, while going beyond the
simple information of the population, while accepting to approach “topics that annoy”, while admitting the contradiction and while accepting to be disavowed sometimes, because that they do want it or not, the adherence of citizens to projects that concern them is, in the present context, the key of a sustainable urban development. Creating buildings and urban environment that people enjoy living in and working in requires best practices at the same time economic, social and environmental. Building and strengthening a sustainable community imposes to improve the quality of life of the population and to consider the longer term implications of decisions. A quick survey of the medina of Algiers will help to recognize the existence of a particular context and the necessity of a set of principles for building the basis of a sustainable built environment.

OLD BUILT ENVIRONMENT IN ALGIERS: BETWEEN A HERITAGE IN STATE OF RUIN AND THE LOCAL POPULATION NEEDS

The medina of Algiers (commonly called the Kasbah) is characterised by tiny teeming streets inextricably linked and by places which are submissive to sunniness and climate. It juxtaposes spaces having each a specific function (residential, economic, religious or military) and structures the surrounding urban districts. However, its importance is related to the activities of many merchants. A powerful commercial device of old vocation, composed of a juxtaposition of stalls and shops, forms the basic principle of the central network. The creation of specialized *souk* is again a characteristic of the medina. Let’s mention for example: the streets of coppersmiths. However, the localization of the different professional groups obeyed certain imperatives: servicing, presence of water, evacuation of waste and degree of nuisances.

Indeed, this heritage constitutes an inexhaustible source where one can draw teachings concerning architectural and urban production and at the level of which one finds a harmony between the society, the cultural identity, the daily practices, the lifestyle and the physical and natural environment. Let’s mention for instance, its public spaces which are characterised by a traditional urban structure, associated to a big sense of community. They constitute the support of district life and have a regulating function of
pedestrian flows, in the sense where these define and filter the passers-by, make all activities linked, form the setting of their exchanges, while preserving the intimacy of the residents and while conferring conviviality between neighbours. With the hierarchy of the road network, one passes from the public to the semi-public to arrive at the private (is considered like private, the dead end giving access in quibbling to the dwelling).

The Arabic-Moslem residence becomes this way a real endogenous bubble and contrasts with the animation that spreads beyond its perimeter. This endogenous architectural conception allowed the residents, merchants and passers-by to coexist while avoiding interfering with one another. Moreover, beyond its Arabic-Moslem identity, Algiers is rich of its colonial inheritance. The French interconnected the neuralgic points of this capital by conceiving the town in a systematic way, hierarchized and interdependent. The colonial core is composed of a succession of closed islets in coherence with the Haussmann conception. A rigid street alignment is respected with a real homogeneity of construction that gives its consistency to the whole. Algiers is the expression of the culture that constructed the town, a prolongation that proves to be complex.

![Figure 4: The central core of Algiers: a heritage in peril](image)

Today, numerous are those who denounce the dilapidated state of built heritage and fight for the safeguard of these spaces which date from ottoman epoch, fissured by the absence of management and maintenance on behalf of authorities and occupants. They aim to valorise the heritage, not for commercial or touristic aspirations, but in the objective to protect a collective memory. Let’s underline that the natural fragility of places, the rainwater infiltration and the dilapidation of the adduction network in drinking water, provoked landslides which damaged the foundations,
causing the downfall of a certain number of dwellings (Figure 3). Today, while construction develops along with any style, this medina stays the symbol of a previous way of life that remains meaningful. Today, for a sustainable urban development, the preservation of heritage for the future generations becomes indispensable. Improving the quality of life in the city centre of Algiers includes certainly social and economic aspects, political and institutional intervention, but also and especially cultural components, otherwise, what kind of heritage are we going to leave for the future generations?

Certainly, good housing strengthens communities and provides a better setting in which to raise families. It improves health, educational achievement and employment opportunities and provides a long-term asset to be passed on the future generations. In order to ensure a better quality of life for everyone, now and for generations to come, it is necessary to renew with larger social problematic such as to accommodate the population. However, the action of authorities limited itself to the rehousing of some truly damaged inhabitants. Indeed, the emergencies encountered in the city centre brought the political powers to intervene, launching important programs of social housing, achieved in the briefest delays.

If it is therefore possible to rehouse, in a few months, a certain number of inhabitants, the danger that abandoned dwellings represent must be managed. Besides, the inhabitants delighted, in a first time, to find in these social housings modern comfort of which they had been deprived until then, mentioned problems of bad workmanship, not waterproof roofs and bad plumbing. Indeed, as regards finishes, the inhabitants estimate that the quality of finishes is unsatisfactory and required some works at their expense. This kind of problems comes back constantly to the centre of proceedings, and complaints are addressed to the Public Office of Real estate Management (OPGI). This fact reflects the state of emergency of construction operations and of assignment of housings. However, the appreciation of the quality of life in the new built environment cannot be associated to the only assignment of housing and to the only logic of its market, except to accept a reduction of its complexity.
NEW BUILT ENVIRONMENT IN ALGIERS: BETWEEN HOUSING PRODUCTION, SERVICES OFFER AND TRANSPORTATION MEANS, CASE OF ZERHOUNI CITY

These last years, Zerhouni city involved a major transfer of the population guaranteeing everyone the right to a home in optimal living conditions. The city of Zerhouni (called Les Bananiers, otherwise said, Banana trees) is situated in the commune of Mohammadia in the nearest periphery of Algiers (Figure.4) and symbolizes a residential zone par excellence. The figure.6 shows in the foreground private housing, in the second one promotional housing, and in the background the renting-sale housing realized by Housing Improvement and Development Agency (AADL). The agricultural vocation has been completely changed in aid of different housing projects. The city corresponded to a big place of accommodation. But did the local authorities grant a particular importance both to public facilities, to infrastructures and to their realization, in order to ensure a balanced situation on the social as well as the economic plan?

Figure 5: Zerhouni city (called Les Bananiers) in the periphery of Algiers

Impact of Urban Development on Inhabitants’ Quality of Life

Zerhouni city has been achieved progressively following a general plan, in order to realize a coherent assemblage of various districts, of different types of architecture and dwellings. However, urban planners thought that a satisfactory life quality got itself thanks to a strong population density, solely capable of guaranteeing services, transportation and animation of the district. One finds thus constants features: the density of housings, the presence of facilities, the whole lot connected by public transportation; the
objective being the will to arouse a feeling of city, to create an animation. But today, as the city tries to define its role, it undergoes periodic adjustments, taking into consideration the social disparities and lifestyles, makes feel itself more and more. The worry of the proximity of trades, for instance, is raised by the modest populations, in particular by the non-motorized people. The supplying of appropriate public services implied a great concern too; let’s mention the absence of a local post office, what is not practical for retired people who are obliged to go at least 10 kilometres away to get their pays. Is the new built environment badly connected with good transport services linking people to jobs, schools, health and other services?

The residential life, work, purchases, leisure and activities take place henceforth in separated places, within agglomerations always more vast. If this picture is also worth for Algiers and its suburban areas, the more active families disperse themselves daily between different places. To satisfy the basic needs of the inhabitants of Zerhouni city and to achieve a better quality of life in this new built environment, planners put in service scholar facilities since the arrival of the first inhabitants. These last, find close to them, primary schools, colleges and trades of first necessity. While moving a little away, they reach high schools. By bus they can join the banks, the universities and the hospitals. It was the diagram that prevailed in the entire city. However, the perception of this city is bound to the logics of action and interests of all concerned actors, from where the difference between inhabitants and the other users.

Indeed, in Algiers, the transport system suffers actually from overcrowding, congestion, delays, pollution and everyone can easily observe a predominance of individual vehicles demonstrating a lack of choice over how to travel, and Zerhouni city doesn’t escape this rule. The inhabitants needed a step change in transport planning in order to deliver a system which meets the needs of all of them, because that one does want it or not, a good transport system is essential both for a strong economy and a better quality of life. Let’s mention the presence of a new line of Tramway, linking this city to the downtown of Algiers and also to the nearest communes. A first section 7.2 Km in lengths linking Bordj El Kiffan commune to Zerhouni city (both situated in the Eastern part of Algiers) has been put in service since May 8, 2011. It has been extended with 9 other kilometres to “The Executed” Multimodal Station in the downtown area this time. This
second section has been put in service on the 15th of June 2012, offering principally an interconnection with the subway. In total, the tramway line spreads actually over 16.2 Km with 28 stations. A third section from Borj El Kiffan commune towards Dergana commune (always in the Eastern part of Algiers) is currently under construction and could be opened soon.

![Figure 6: Tramway at Zerhouni city](image)

For the inhabitants the displacements to Algiers are indispensable for reasons as working, shopping or visiting family, but the observation of the places which are frequented for other reasons demonstrate that it is never very distant from the district of origin. Actually, the frequent round trips between the previous and the actual place of residence don’t permit to speak about two distinct territories. On the one hand, in the time, since one corresponds to the past, bygone, and the other to the present and to the future, and on the other hand, in the space, seeing that to each one correspond representations and practices spatially determined. Does the residential move hinder the inhabitants’ welfare?

**Impact of Built Environment on Inhabitants’ Welfare**

In Zerhouni city, the material and symbolic effects of the residential transfer came out to a modification of the combination that settles between, on the one hand, the relation of the inhabitants to the space, and on the other hand, the practices that take place in this space, otherwise said, at the transformation of the territorial system: a new type of housing (apartments in towers or bars), a new lifestyle, another spatial configuration of the private space, a new use of the public space, without forgetting the new geographical situation which implies new forms of reports with the district of origin.
Rehoused by the local authorities, some inhabitants are from the central districts of Algiers as well as from its shanty towns. For a lot of households, these districts are the places of their installation since their arrival to Algiers. Consequently, we analysed the city starting from its residents which besides, practise and live the space in a subjective and personal way.

The treated sample (100 people constituting a representative sample of the inhabitants) is not stratified rigorously, nor completely random. The people were interrogated because of their inscription in the considered spaces and their availability, first condition of the exchange. Indeed, at first, we interviewed the inhabitants while going from one house to the next, however we encountered multiple refusals. Therefore, we addressed our questions to different school establishments (primary schools and secondary schools), to offices, without forgetting people practising in a private capacity (doctors, dentists, pharmacists, varied shopkeepers). Let’s underline that all the persons that we interrogated lived in Zerhouni city since a few years. Above all qualitative, the committed survey justifies well that it is less the static representativeness and the mathematical rigor that prevail than the capacity to seize the problems that inhabitants meet as individuals and as community in their new built environment. However, the distortions of the sample owed to absences or refusals are frequent. Cases of non-answers can also depend on the asked questions, of the implication level of the interrogated people and of their socio-cultural features. The results have been interpreted while using the software Sphinx version5.

While observing the inhabitants of Zerhouni city and what they had converging, while admitting their oddness appeared “common features” like the installation in the city, the learning and the experimentation of the new housing, but again and especially the residential stability in Algiers, from where the importance of the opinion of these persons. According to our investigation, 77% of the interrogated inhabitants find Zerhouni city troubling. According to the interviewed -let’s underline that we won’t unveil the identity of our interviewed in this paper, anonymity being thus respected- coming from the medina: « we find the city worrying […] the strong presence of people coming from shantytowns justify this judgment ». Indeed, this population is judged socially « undesirable » and the authorities must be attentive to the evolution of this attitude that we can qualified as hostile towards poorest inhabitants.
Nonetheless, this fact doesn’t prevent the investigated to mention the lack of life. Indeed, the interrogated find their new district un-lively and monotonous (60% of the investigated), and when we asked them their impression concerning the city, 69% of the investigated have responded: “we don’t like it”. For these inhabitants, to lodge is necessary, but not sufficient. Around that, they expect to find a district, with its exchanges, a city full of life. Besides, in Algiers, a district is defined by its built homogeneity or merely by its toponym. In Zerhouni city, the built homogeneity results in some identical blocks signalling paradoxically who lives there and why and unveiling the social group heterogeneity. According to the interviewed: “the attachment to Algiers is bound to its atmosphere, its setting of life […]”, which assigns to these central spaces a range of values and representations that interact on the perceptions of the inhabitants, in particular those that live there since several generations.

In this sense, the old Algiers with its history, its borders, its emblems, its social relation type, its lifestyle, constitutes the territory of reference. This territory of origin, of identity, of representations and also of practices, takes all its sense because it is constantly put in interactions with the space henceforth inhabited, also represented and lived, namely Zerhouni city. The latter defines itself therefore, from its social actors, their representations, their behaviours and their practices. Let’s join Michel Pinçon and Monique Pinçon-Charlot to say that there is hardly way to be that doesn’t send back, at variable degrees, to the place where the social being formed itself (Di Meo and Buleon, 2005).
Indeed, the identity forms the major tie between the human beings and their setting of life. It is a powerful motor of the production of the social space. For the inhabitants, the references of identity towards the district of origin are omnipresent in the constitution of new social relations. Space of origins, the initial district becomes a distinctiveness reference of “before the move”, a place of identity; according to the interviewed: “to refer to it allows to say from where we come ourselves but also to know who the neighbour is”. However, that construction process of territorial system deserves to be shaded. What we observe is an experimentation, a learning always in development, of a new city that builds itself from representations of its inhabitants: representations of oneself when it’s about lifestyle, representation of the living space, representations of the new built environment (by opposition to the old centre of Algiers) and that implies, according to the inhabitants, some new norms to fit, some new behaviours to adopt.

Following the absence of a collective memory or a collective identity, this city appears like a heterogeneous territory, marked by the incoherence, at the same time spatial and social. In Zerhouni city, the planning operations are put back notably because they grant the collective space a unique vocation: the automobile circulation. Let’s recall that public spaces constitute a permanent element of the urban environment, at the same time for inhabitants and passers-by. Inhabitants spread around their housing, they refer to the district, pay a particular attention to streets, places, centres and settings of their daily life. Therefore, a reflection on the space must facilitate the establishment of social relations between inhabitants and also of neighbourhood. Let’s mention, for example, the extra-curricular activities in the city. According to our investigation, children remain near to their building or go to playgrounds. According to the interviewed, what was missing lies in: “places edged with boutiques […] a garden where to stroll or to eat lunch, a market where to go shopping, places of meetings and exchanges, crowded day and night […] well planted trees, correctly fixed lamps, …all that has been neglected”, from where the necessity of qualitative interventions and operations of planning that aim at the improvement of living conditions in this new city.

In order to make some fully-fledged life places, it is necessary to go beyond the creation of numerous parklands and varying the real estate offer,
in the aim to renew the public spaces, while distributing arcades at the ground floor level of the buildings, while creating several commercial streets, while working on the site and its landscape. The accent has to be put on these places of meeting and exchange which are the public spaces, because that one does want it or not, beyond the simple addition of housing, of services, of streets, the city defines itself by its districts and its characteristics, the animation, life that results from the combination of all these elements. That’s why effective inhabitant participation will be indispensable in years to come.

CONCLUSION

The goal of sustainable urban development is to enable all people to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations. The reflection on the new built environment in Algiers leads to the definition of the pros and cons, to a hold of position towards these big housing projects and the challenge that they raised. For the inhabitants, the events that had enameled the history of the old built environment made of it more than a space, a territory apart, probably exceptional and in any case distinctive from others, the residential history being really meaning because it is discerned by its inhabitants like a common history, an attachment founded on a collective memory. In the new built environment, one can regret a proof of identity, of anchorage in the territory and therefore the absence of a feeling of adherence in a newborn territory. “The possibility to identify us positively to a place […] to develop the pride to live in”, this is the essential stake for the new residents.

Therefore, housing projects cannot conceive themselves outside of their context and must define themselves according to the existing situations, to the population needs, to the will of the local actors and their prerogatives, because they must answer first to the needs of the present. Today, for a sustainable built environment, a broad view of inhabitants’ welfare is necessary, a long term perspective about the consequences of today’s actions of our decision-makers is required and the full involvement of civil society to reach viable solutions is becoming more than ever imperative. For the present as for the future, the local authorities have to spread best practices to achieve economic, social and environmental objectives at the same time,
and consider the longer term implications of decisions. That’s why all citizen participation must be significant, committed and constructive.

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Conservation of Heritage as a Non-violent Resistance against Foreign Occupation

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ABSTRACT

The conservation of old buildings and monuments with heritage value around the world is implemented as an effort to preserve, highlight and honour historical, cultural and religious significance. But it is entirely different in Palestine today. Here, the process of conservation took on a more drastic task of being a tool of resistance against foreign occupation. Building conservation becomes a necessity for much needed economic and social development. This article focuses on politics and space in Hebron (Al Khalil) city, one of the victims of the ongoing Palestine-Israeli conflict. The research methodology adopted followed the adaptive and analytical methods to analyse the urban space creation in old Hebron, a conflict of two entirely different objectives from two opposing political divides; colonializing projects of dismemberment by a foreign power and conservation as well as revitalization attempts of oppressed, rightful citizens. These conservation and revitalization projects target the rehabilitation of the social and urban fabric through spatial analysis of maps between 1994 and 2007. This article will show that illegal Israeli settlements created a splitting built-up geography which successfully isolated people according to ethno-national, gender and social classes. Their main aim is ‘urbicide’. However, to a certain extent, the rehabilitation projects in 1996 managed to foil this insidious attempt, blocking or redirecting the Israeli occupation sprawl.

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INTRODUCTION

The structure of urban cities is a dynamic one as it is related to changes in the population and economy; which in turn are related to technological innovations within the urban area. In the Palestinian context, whilst these factors are important, the primary influence on urbanization is the political situation, which is a key factor in determining the degree of economic growth. During the 46 years of Israeli occupation, Palestinian urban growth was limited in its extent and rate due to the significantly proliferation and expansion of Israeli settlements in all over Palestine, especially Hebron city.

Hebron, founded in the first half of the second millennium, is proclaimed as one of the oldest and most sacred cities in Palestine. Situated 32 km south of Jerusalem, Hebron is an important centre for three of the world’s great religions; Islam, Judaism and Christianity (Simon et al., 1996). Although Hebron does not have outstanding palaces and monuments, with only a coherent traditional vernacular architecture, it has great religious significance. Hence it was listed in the tentative list of UNESCO’s World Heritage Site on 2nd April 2012 (David C. Natcher, 2012). Hebron has a past full of important religious events related to the Abraham Mosque, around which the city developed and grew. However, for the last thirty years, to the utter consternation of the Palestinians and the whole world, the ancient city became a target of merciless, aggressive, forceful, inhuman, unlawful, Israeli occupation (Effarah, 2007). The original inhabitants were harassed, threatened and forced to flee the city for their very lives. These catastrophic events inevitably led to the urgent need for a massive rehabilitation exercise, to stop the rampant tearing down of the city to make way for even more Jewish settlements.

Surrounding the Abraham mosque is a dense historic fabric consisting of groups of houses which organically grew around patterns of irregular, narrow courtyards, and fragmented by zigzag vaulted paths and small routes (Figure 1). It is the soul and the most beautiful part of Hebron; known as
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*qasaba* or old *sug*. However, its contemporary history was shaped deeply by Military war machine, giving rise to a profound uncanny and desolate quality, lingering in the empty, silent streets, further marked by unwanted military presence. These are some of the sad aftermath of urban conflict and forced displacement of former residents.

![Figure 1: Compact urban tissue in Hebron old city](image)

**THE PROJECT OF DISMEMBERMENT**

Since the invasion by Israel in 1967, the Palestine has been a goal of several settlement projects in breaking of international laws and against the United Nations Resolution No. 242 (Tomeh et al., 1999). The Oslo Agreement 1993 did not end occupation and illegal settlement activities. In fact Israeli settlers significantly doubled since 1990s, reaching more than 500,000 people in West Bank today (Samman, 2013). The outlook analysis (Figure 2) clearly reflect the non-stop rate of expansion, and illustrates the estimated annual increase in the Israeli colonies’ area (about 523 dunums/year) which will definitely increase four times by 2020.
West Bank Settlements

![Graph showing the growth of Israeli settlements and military bases in the West Bank from 1985 to 2025.](image)

**Figure 2: The rapid growth for the Israeli settlements from 1989 until 2020**

The West Bank was transformed into a series of disconnected cantons by the rapid evolution of these settlements, also by creation a side roads network for Israeli only. These disconnected areas are comparable to the South African Bantustans which may never reach the status of a viable, sovereign polity. The current Israeli policies towards Palestinians are labelled apartheid by many across the globe (Beinin et al., 2006; Hilal, 2007; Misselwitz and Rieniets, 2006; Sorkin, 2005). At the centre of the Palestinian-Israeli conflict was the problem of the crafting of space. In Palestine, space has a substantial flexibility conceptualized as “constantly transformed, morphed, claimed by action” rather than with respect to the static background of the conflict (De Cesari and Anthropology, 2008).

In 1981, more than 3,000 dunums of land were expropriated to construct houses for the Jew settlers brought in from other countries (Nakhleh, 2004). Militarization of the city by Israel to protect their settlers’ safety led to further segregation and the proliferation of borders, imprisonment, fear as well as humiliation for Palestinians. 4000 Israeli soldiers were stationed there to protect only about (200-400) settlers (Swisa, 2003). A manner of daily abuse by these soldiers and limitation of movements emerged disrupting Palestinians in the city, making life unbearable. This then pushed many Palestinians to flee causing a dramatic deterioration of the socio-economy.
In late 1967 there were about 10000 inhabitants in the Hebron city center. In 1996 it dwindled down to a mere 400 (Bishara, 2013). The drastic reduction of the local residents and the evacuation of 85% of homes in the city centre came about from the Israeli policy of discouraging people from living there. Amidst fighting and harassment, all entrances to the city were walled up except one (Figure 3). Extended curfews from ten to twenty days were imposed in the city (De Cesari and Anthropology, 2008). Arab families of questionable backgrounds were however encouraged to reside there. Empty houses were torn down. These soon forced home owners as well as tenants to get away en masse from the city centre which retained 99% of its old buildings (Tarākī, 2006).

All these, especially the construction of separation barrier, checkpoints, bypass tracks, and new settlements resulted in two overlapping but hierarchically organized various spatial shapes on same West Bank hills; the enclave and the archipelago (Petti, 2007). The former was topography of correlating Jewish settlements. The latter was the patchwork of Palestinian urban spaces and villages with main features of increasing disconnection, fragmentation and camp-like character.

The Oslo Agreement intensified segregation in Hebron instead of preventing further Israeli encroachment. Due to the settlements, the Palestinians and Israelis signed a Protocol of Hebron in 1997. The protocol states: “The city is divided into two areas; New City under Palestinian administration and the Old City under Israeli military control (Upper and Lower Hebron also called H1 and H2)” (Gordon, 2008, Jones and Pedahzur, 2013) (Figure 3). In the area of H2, the protocol places a double legal authority where settlers are liable to Palestinian Authority civil law and Israeli military. This research shows a vivid connection between the close proximity of Palestinians houses to those of Jewish settlers and the number of Palestinian inhabitants who left the area.
Figure 3: Geopolitical Map of Hebron Old City
The conglomeration of dismemberment and restoration in Hebron led to a vicious cycle of unending repetition without a way out. It got worse in this city with routes far from straightforward. Sociologists freely labelled this city as being stoically against modernism. Hebron did not reach the level of a modern city and urban space in sociologists’ eyes, and to Palestinians, the city represented a locus of backwardness and tradition (Tarākī, 2006). Hebron today is the production of the heritage and space policies in volatile territories. In certain aspects, things went backwards, an example being the reinforcement of customary laws to address conflicts and produce resolutions, which altogether hastened the post 2000 collapse of the Palestinian Authority. In accordance with Hebron agreement, Palestinian policemen that localized in the Old Hebron City must not be armed nor equipped with cars and other facilities in carrying out their duties. Hence, these personnel were able to only use outdated, hardly effective tribal ways to enforce law and order (De Cesari and Anthropology, 2008).

THE RESTORATION PROJECT

Hebron Rehabilitation Committee (HRC) had many objectives. The major and most important objective was to counteract political pressure on local residents to vacate the Old City as well as to prevent the erection of more Jewish settlements. Projects were geared towards the resistance of Anti-Colonialism, elaborating via spatial methods to hinder the sprawl of Jewish settlement in Hebron. It also targeted the conservation and rescue of the old Hebron fabric based on scientific criteria and international charters (Nigro, 2006). The main idea was to make the old city livable once more. An intensive rehabilitation program was drawn up to facilitate the process of making existing dwellings on par with contemporary standards of habitation, to attract the return of former inhabitants including other homeless Palestinians. In the endeavour, the project preserved the cultural as well as the religious significance of Hebron. This effort of course inevitably overlapped with the sensitive position of the Palestinian Authority which was at the threshold of becoming a sovereign state (Weizman, 2012). Land, property, identity and cultural awareness were of paramount importance. Thus HRC collaborated with and administered the city instead of Palestinian Authority whose powers were extremely restricted due to full control of Israeli army in H2 area.
The HRC restoration projects followed neatly the political central events of last years. It all started in late of 1970s in the same time of the initial colonization of Hebron. A municipal board -elected by people- attempted to fix the derelict and decaying buildings besides providing basic essential services like clean water supply and electricity to residents. However, all these were put to a stop hastily by the dismissal and exile of the municipal council. An Israeli appointed body replaced the democratically elected members of the council (De Cesari and Anthropology, 2008). The Israeli military in 1980 authorized new settlements and Jewish inhabitants in Hebron heart. In 1979 illegal settlements actually began. The new Jewish settlers released Hebron master plan in 1984, calling for recovering the alleged Israeli assets relinquished from 1929 to 1936 (Ibid); these efforts aim to Judaize the whole city by displacing the original residents gradually. Finally in the late 1980s a group of brave young Palestinians stood up for their nation. They took up arms not on the battlefront but they utilized their knowledge and expertise in various disciplines. Together they began a series of important architectural and social surveys in Hebron. These young architects and scholars of the Hebron Polytechnic had a noble ambition to restore, preserve and conserve the historical, cultural and religious significance of their beloved Hebron. The spirit of the First Intifada gave them added strength when Palestinians as a whole began a much awaited march to save the Old City.

The status of Hebron then was on the negotiating table, excepted in the latest moment from Oslo accord II, the case of Hebron went on to become isolated due to Israeli’s refusal to deploy its settlers. President Yasser Arafat’s main goal was to present credible facts before signing the agreement (Payes, 2005). He particularly wanted the Palestinian citizens to be increased in areas under the Israeli control. The Palestinian Authority gave strong political and financial support to the rehabilitation projects in Hebron as well as in Bethlehem. Hebron then became a major heritage project site, a symbol of the re-birth of Palestine itself while Bethlehem geared more towards opportunities in tourism.

**Battlefield Language**

HRC focused in the initial years on the concept of ‘first circle’. Employing the language of battlefield HRC referred to zones directly
surrounding the Jewish settlements where the goal was to restore ruined buildings and to provide basic infrastructure and basic amenities. Recently however, the organization adopted a more comprehensive developmental approach. Work on the ‘second circle’, further down from these settlements, started soon after with efforts to break down the wall separating the Old and the New City, thus physically linking both parts (Figure 4). While abiding by international conservation charters and standards, the HRC undertook a few alterations and improvements in old houses to adapt current requirements of inhabitants. These modifications cover the division of large clusters into smaller units, normally two-room with kitchens, bathrooms and separate entrances (De Cesari and Anthropology, 2008). These spatial alterations indicate the social changing in the Old City landscape, foremost a marked transformation in the families from extended to nuclear. Poor nuclear families without solid social relationships replaced extended families that used to live in relatively homogeneous quarters. Those extended families had then partly reorganized their neighbourhoods that based on kinship in the New City.

Figure 4: Stages of Rehabilitation as a Priority of its Proximity to Settlements
To counter this collective exodus, the Old City residents were given attractive offers; they include appropriate systems for rent as well as a number of free services like various tax reductions, health insurance, water, and electricity. This subsidization was stimulants to encourage the area repopulation and to reward Palestinians’ service to the nation, living on the very battlefield. In order to reduce the impacts of boosting unemployment and deterioration of the social and economic situation, Old City’s families were given additional food supplies per month by the International Committee of the Red Cross (ICRC) since the Second Intifada. Although there were no new surveys for Old City population to affirm the de facto latest inhabitants’ number, HRC succeeded between (1996-1998) in returning back about (3000-4000) people to stay in the Old Hebron City (Dumper and Stanley, 2007, Platt, 2012).

The 1999 survey indicated that between (60-70%) of residents were living under poverty level. Two families only were incomes more than USD1000 per month (Tamari, 2008). This survey also showed that more than half the residents, 58%, owned their residential units, while the other 42% rented from absent owners. According to information provided by HRC’s social unit, the number of tenants had increased after 2000 to nearly 60% of the residents of Old City (Qawasmeh, 2007). These data highlighted the continued departure of indigenous people, replaced by a flow of poor newcomers. It was also noted that most of tenants in 1999 were either native Hebronites or their immediate relatives.

Spatial Analysis for the Maps from 1994 Until 2011

According to the maps, there are 5 colonies surrounded the built-up areas in Hebron old city (Avraham Avinu, Beit Romano, Beit Hadasah, Tel Rumeida, and Kiryat Arba) with an area of 22.2 dunums (Swisa, 2003). Kiryat Arba settlement was set up in the eastern portion in 1970, starting the unwanted sprawl in the city. In 1980 things took a serious turn as efforts were made to quickly strengthen Jewish presence and settlement in the heart of Hebron. The Beit Hadassah settlement was immediately established near A-Shuhada Street in the centre of the Palestinian commercial district. A colony of Tel Rumeida to the south west followed, accompanied by the Avraham Avinu settlement in the south and the Beit Romano in the west (Ibid). This obvious sequence indicated a well thought out plan of firmly establishing the settlements. It was not done at random.
The Israeli colonies are scattered all over the city but are concentrated at the south, the colonies growth is fundamentally geared to the formation of blocs (they expand outwards and also toward each other). The colonies are administered by Israeli Council through a quite different operation and the settlers have been controlled by Israeli law. In 1994, it was estimated that the Israeli colonies population in the old city was around 200 Israeli colonists (David C. Natcher, 2012). The year 1994 has experienced a remarkable increase in the colonists’ population where at least three of Hebron’s illegal colonies have undergone expansion. It is noteworthy that a discrepancy has been between the average annual growth rate for Israelis in Israeli settlements in Palestinian territories (8.0%), and that in Israel (2.0%) (ARIJ, 2006). (i.e. Israeli growth rate in the colonies is four times more than in Israel).

It was a natural urban expansion and population increase in Hebron before 1967, where according to (PCBS, 2010) the population in Palestine have doubled every 25 years. Logically this increase should be outwards, However, the presence of settlements and Israeli army around the city has prevented this normal sprawl. The expansion had continued inwards until it arrived to the moment that cannot be tolerated, then many families left the old town towards other places. This departure was to the area H1, which is under the control of the Palestinian national Authority and thus the Israel government and settlers had achieved their goals of emptying the old town.

After the Oslo agreement (1993), Hebron was separated into two areas, area under the Palestinian authority (PA) control and area under the Israeli control as previously mentioned. Israeli colonies and their expansions, segregation walls and fences, by pass roads, military bases, observation towers and land levelling have been violating the Palestinian lands, separating the Palestinian communities from each other and from their lands. Confiscation of approximately 32% of Hebron land under various pretexts has imposed enormous limitations on Palestinian development (Samman, 2013). Significantly, the Israeli colonization has raised the population density in Palestinian built-up areas to reach 969 capita/km² of the area under Palestinian control when compared to the population density for Palestinians under Israeli control which decreased immensely to only 18 capita/ km² (Feuerstein, 2007).
It is worth mentioning that most of restored units were in the south of the city (the most dangerous part), thus they reserved the core of Hebron from any external risk. The result is no changes have occurred on the shape of the city from 1998 until now, but the majority of alterations had been on the surroundings. Actually, the Israeli army and settlers have attempted many times to break into the city but the presence of citizens prevented them. Between 2002 and 2011 the direction

Figure 5: Settlements Sprawl and the Impacts of the Rehabilitation Project
It is worth mentioning that most of restored units were in the south of the city (the most dangerous part), thus they reserved the core of Hebron from any external risk. The result is no changes have occurred on the shape of the city from 1998 until now, but the majority of alterations had been on the surroundings. Actually, the Israeli army and settlers have attempted many times to break into the city but the presence of citizens prevented them. Between 2002 and 2011 the direction of expansion was in different ways, and the Harassments increased; more roads were closed, a lot of lands were confiscated, and checkpoints were established. These Actions reflect the state of anger and frustration happened to the settlers due to their inability to control the old town. The researcher believes that the accelerated changes during the past ten years prove the continuous Israel’s intention to control the urban fabric of the city. If not for the Hebron Rehabilitation project, the city would have been now purely Jewish city without any Palestinians.

It is clear from the previous maps analysis that the Hebron Rehabilitation Committee succeeded in preventing Israeli settlement expansion and changing its direction although the expansion continued in other ways and forms. The HRC also provided much needed accommodation to more than 800 families at a minimum cost while taking into consideration closely the future needs of the occupants (Tamari, 2008).

The lack of available space for urban development due to the Israeli government’s prevention of the city’s master plan expansion and improvement created a situation where decision makers had to carry out restoration works on ancient buildings fast before the Jewish settlers got hold of them. In this context, Palestinian urban development differed greatly from Israeli colonial activities as urban development was urgent and necessary to accommodate population growth, while Israeli occupation was meant to divide Palestinian territories with malicious intents including destroying the geographical unity and depleting the country’s natural resources.

Most important was the fact that HRC prepared a master plan for conserving Hebron Old City and devised mechanisms to guarantee its socio-economic revitalization including integration among different portions of the city (Qawasmeh, 2007). HRC aimed to conserve the historic fabric while simultaneously planning for future developments in tourism. The master plan of HRC however hinted at a contradiction, a steady
characteristic of heritage in Palestine generally, that HRC functioned at the same time non-governmental and governmental. In normal circumstances, preparing the master plan of a city is carried out by the local government. In Hebron it was implemented officially through international funding by a semi-governmental organization dedicated to heritage preservation. Due to its nature as a heritage non-governmental organization, HRC had successfully carried out a series of governmental functions in the fields of statistics, mapping, survey; state control (giving certificates of residency, surveillance, planning) and welfare (counselling, distributing health certificates, and public housing). In the beginning HRC was funded by the Palestinian Authority and Arab donations. Later the infrastructure of financial support diversified extremely towards major variegation due to its good reputation from successful, effective, humanitarian scientific projects. From the late 1990s, a number of increasing European donors contributed financially. Twelve million US dollars have been spent to date for the various projects (Laidi-Hanieh, 2006). A comprehensive conservation master plan is currently being developed by HRC, aided by the Swedish Cooperation Agency (SIDA) and the expertise of the Palestinian NGO Riwaq (Qawasmeh, 2007).

**Deconstruction Out of a Reconstruction**

An astonishing fact was that the new urban geography seemed to have too many pitfalls. If Oslo Agreement years saw the reproduction of invisible and visible barriers, others were seen to divide Palestinians amongst themselves. This was evident in H1 and H2 where residents were divided according to class and social standing. With the collective departure of the families who could bear the higher prices of real estate elsewhere, the dismemberment converted Old Hebron City to a place of miserable and poor, stigmatized as a place filled with utter backwardness, crime and danger. The majority of those who remained in the City and newly moved to the restored houses were the typical exhausted Palestinian families.

The relationship between those two parts of the city was severed in a way so pervasive that HRC had to spend much energy to organize workshops and activities on social coherence issues. Conventional family visitation did not occur anymore and almost all new city residents have not travelled to the Old City for years in spite of being born in the Old City and still
owned the abandoned houses there (Gordon, 2008). Marriage, a prominent component of social integration had also in recent years been decreasing in number between residents of the two parts of Hebron due to the present stigma of the Old City.

This peculiar phenomenon arose which resulted in the social coherence dilemma that baffled the social workers and architects of HRC. The other critical problem was raising awareness among the people to generate a sense that they were living in a place with a significant history to the Palestinian nation and the world, hence to instil in them a strong obligation to their City. The HRC then initiated activities related to the concepts and all facets of development, an effort to check social erosion as Hebron became more and more fragmented. The committee began to look into broader spatial and social concerns to restore the city’s social perspectives as relations were fostered again between all areas of Hebron. To cater to all these, a research centre, a social unit and a lawful department were set up together with a various social program of development. The social development agenda included diversified courses for training the unemployed, women; enjoyment events for kids; outreach actions like seminars, lectures on integration and heritage as well as school trips to the Old City to instil its value and great significance especially on the younger generation.

Factors That Determined the Success of Rehabilitation Projects At Hebron

The achievements and outstanding experience in Hebron were due to:

1. Acknowledging the truth however painful, addressing issues directly, recommending answers based on the truth instead of on hypothesis and analysis; and assessing based on communal investigations;

2. A good comprehension of the disposition of the outdated houses and the requirements of modernlodgings which then gave rise to the implementation of suitable solutions with the wants of the people uppermost as well as restoring the ancestral structures by emphasizing on utilization;
3. The inhabitants of the Old City as the focus group in the rebuilding exercise which then commenced with the handling of personal interior open areas being the main target in the homes rather than the exterior;

4. A speedy response towards the growing threat and fast proliferation of Israeli outposts;

5. Most importantly, the collaboration with and willing involvement of the dwellers as well as the different local organizations in a concentrated, joint effort with a single, common objective;

6. An efficient administration that obtained and capitalized on general consensus and unanimous decisions, which in turn garnered public interest, rather than focusing on separate actions that would not bring much impact;

7. Finding feasible answers to one of the most crucial problems in rebuilding – the proprietorship issue, where the solution was to hold on to original residents and landlords as legitimate owners;

8. The implementation of the rehabilitation works on houses that were empty first so that the task ran smoothly and fast without disturbances and having to house occupants temporarily at another building;

9. Financial assistance from third parties besides full government support; this led to achieving commercial success and generating jobs;

10. The rehabilitation work being done by the Restoration Committee proper with relevant experts, and not the by the ordinary populace, thus creating massive public awareness, solving problems well and getting the right solutions.

**CONCLUSION**

The Hebron Rehabilitation Committee’s successes did not automatically arise from a vacuum but they were the product of immense, concentrated efforts laced with plenty of suffering as several serious problems cropped up during implementation of the projects. For instance, the Israelis
blocked and prohibited entry to the clusters of houses in the city, creating such difficult working conditions where workers had to move into the buildings to be restored with their families, working from within. Between 1996 and 1997, a total of 416 workers were arrested forcing restoration work to be stopped 108 times (Yavuz, 1998). In some buildings next to or in the vicinity of the Israeli settlers’ apartments, the spaces facing these apartments could not be restored or worked upon at all.

The HRC projects were characterized by the simultaneous implementation of multiple tasks, showcasing the flexibility of heritage technology as is the norm with such projects elsewhere in the world. However, a difference here is the linkage to justice and life. Although doing a lot of things at one time, HRC architects did a good job restoring and preserving a very significant aspect of the national heritage whilst trying their best to halt Israeli settlement expansion by the repopulating of old city, maintaining the identity of Palestine as well as developing and managing Hebron.

HRC’s technology linked to life was a direct response to the urbicide and frequent process of dismemberment (a technology of destruction), the bulldozers literally obliterating Palestinian urban fabric along with multi historical layers. This technique is spatio-political for it seeks to organize the social relationships via their spatial configuration as “Rehabilitating houses is rehabilitating social life”. Heritage conservation technology transforms relations between humans and objects. In Hebron it attempted to reconnect people with their historical past besides tracing the organic relation in the new city to create a conducive, livable environment. The past gives people roots with a sense of continuity and stability.

Therefore this case proves that the process of rehabilitation of historic buildings anywhere in the world can take on another dimension, another purpose pertinent to the survival of a very race; that of being a peaceful means of blocking the lawless, unprecedented, persistent invasion and encroachment of a sovereign land; of halting the rampant demolition of existing buildings and monuments; of preventing further illegal occupation and settlement sprawl; of maintaining the urban and social fabric of an ancient city; in actual truth, of trying courageously to hold on to the very soul of a people and a place of significance!
In 1998 HRC was awarded the internationally acclaimed and prestigious Aga Khan Award for Architecture, in recognition of its outstanding contribution to the preservation and rehabilitation of Islamic architecture in the Old City of Hebron. It also won the World Habitat Award in 2013 according to its efforts in rehabilitating more than 1,000 units and housing almost 6,000 people (Habitat, 2013).

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