SUDLiC
SUSTAINABLE URBAN DESIGN FOR LIVEABLE CITIES

Towards Building Greener Cities and Construction

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PROCEEDINGS OF THE 1ST INTERNATIONAL CONFERENCE ON SUSTAINABLE URBAN DESIGN FOR LIVEABLE CITIES (SUDLiC 2014)

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About SUDLiC 2014

The 1st INTERNATIONAL CONFERENCE ON SUSTAINABLE URBAN DESIGN FOR LIVEABLE CITIES (SUDLiC 2014) is held on 11-12 November 2014 at Menara Razak, Universiti Teknologi Malaysia (UTM) Kuala Lumpur. The conference is jointly organized by the UTM Razak School of Engineering and Advanced Technology, Green Cities and Construction Research Group of Construction Research Alliance and UTM SPACE with the theme of "Towards Building Greener Cities and Construction".

This conference aims to improve understanding and research in the field of sustainable urban design and green building construction, as well as from other related fields. Hence, this conference will establish the superiority of UTM as a university that pioneered the field related to urban design and urban planning, sustainability, architecture and construction in Malaysia.

As an international platform for sharing the latest ideas and technology between industry and universities, this conference has gathered invited distinguished speakers and prominence in the area. The conference has featured leading figures in various fields involving sustainable urban design and urban planning as well as green building construction.

A total of 33 papers that have been through blind review are accepted for the proceedings and the papers are grouped in three sub-themes: (1) Sustainable Urban Design and Architecture, (2) Sustainable Planning, Landscape and Environment and (3) Green Building, Construction and Project Management. An index of keywords from all papers is included at the end of the proceedings. All participants and readers can enjoy reading the proceedings and gain inspirations for further research and application into education and practice.

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I

SUSTAINABLE URBAN DESIGN AND ARCHITECTURE

REGENERATION FOR SUSTAINABLE MARKETPLACE: A LITERATURE REVIEW

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Urban marketplace (also commonly known as the bazaar, traditional market, public market, etc.) has been recognized in published works as an important economic and cultural place for a city. Iconic marketplaces that are rich with heritage values become significant attractions in urban tourism. The desire to search for local food, traditional crafts and observing the locals' way of life has attracted people to visit local markets and bazaars. Urban marketplace is more than just a venue for trading and commerce. Its dynamic, tangible and intangible qualities make it a vivid and inclusive public space for the local community and tourists alike. In Malaysia, a number of urban marketplaces possess cultural and heritage values, making them iconic urban attractions. However, they are facing challenges of redevelopment, gentrification and how to sustain their rich qualities, while thriving as successful commercial space for the local community. The aim of this paper is to give an overview of the qualities and characteristics of urban marketplace that are vital for cultural and economic regeneration. For this purpose, a literature review of books, journal articles and online resources are conducted to understand several terms and definitions pertaining to urban marketplace and urban regeneration. From this, the parameters of the qualities and characteristics of the marketplace which is important for cultural and economic regeneration in order to examine the study further are identified. Through urban regeneration, it is found that strategies can be formulated to rehabilitate and improve the physical, social and economic conditions of valued places in the city, such as the marketplace, as part of cultural and heritage preservation.

Keywords: marketplace; urban regeneration; culture; heritage; tourism

Introduction

The marketplace can be best described as a space, whether small or large, where goods, merchandise or products of the local community are traded. It is usually owned and operated by various types of organizations, such as the city governments or private corporations. The market is also a place where people meet and socially interact with each other while doing business or shopping. The localness of the marketplace is reflected by the local community's lifestyle, culture and heritage. Through this daily process, a sense of community is built and strengthened among the local community and the market traders. As a commercial space, the marketplace attracts a variety of local residents and visitors, appealing to a large mixture of ages, classes and ethnicities. Consequently, some markets that are experienced to be unique and possess rich culture and heritage eventually become a tourist attraction.

As a retail space, the marketplace is a conceptual or physical location where supply and demand of goods and products influence the decisions of buyers and sellers. The marketplace determines prices, provides product and price information, allows for transactions to take place, and provides distribution channels. In today's globalised world, various local and imported products can be found in the marketplace. Some products may be crafted or produced by the local residents, while there are those that have been transported from other regions, states and countries.

Weiss (1998) writes that the marketplace is 'a city within a city, with its own economy and a way of life'. It is not only a place where trading occurs, but where a sense of community is built between the market vendors and their customers. The sense of place that is present in the marketplace is vital in the discourse of urban regeneration and cultural conservation because this is a pivotal component of the user experience, whether for the market vendors, the local community and the tourists (Lekagul 2002; Moughtin et al., 1999; Ryan, 1995).

People's experience is considered to be one of the factors that contribute to the sustainability the urban marketplace. Verhoef et al. (2009, p. 3) write that the customer experience comprises of "cognitive, affective, emotional, social and physical responses to the retailer". On the other hand, the day to day activities of vendors at the marketplace also influence the operation of the markets, and whether the market is able to attract customers or not. The regeneration of the local urban marketplace is essential in conserving the city's heritage values, where they play a significant role as a 'place for commercial and cultural interchange' (UNESCO, 2013).

Essentially, the marketplace thrives in the first place because it serves the local community and has been a significant part of local traditions that is rich with arts and cultural practices (Khanian, M. et al., 2013; Pourjafar, Ebrahimi and Ansari, 2013; R. Siti Rukayah and Bharoto, 2012). Its localness and 'charm' inadvertently entice visitors from outside to come to the market, which gradually turn the marketplace into an urban tourist attraction.

Today, marketplaces are susceptible to the threats of modernization and gentrification, which eventually lead to the loss of the rich local culture. Thus, it is essential to analyse the qualities of the marketplace in order to understand the attributes that make them an attractive tourist attraction, while at the same time remain as sustainable culture and business for the locals. It is important to sustain the marketplaces and preserve their localness, culture and social attributes while regenerating and redeveloping the areas. The aim of this paper is to give an overview of the aspects traditional urban marketplace that need to be considered as part of the urban regeneration process.

Urban and Cultural Regeneration

Urban and cultural regeneration is an approach to revitalize social, cultural and economic resources that is pertinent in the development of cities, particularly for tourism (Lee and Said, 2012; Galdini, 2005; Wansborough and Mageean, 2000; Gunn, 1994). Through regeneration, strategies are formulated to rehabilitate and improve the physical, social and economic conditions of places that have significant values in the city as parts of cultural and heritage preservation (Roberts and Sykes, 2008; Galdini, 2005). According to Roberts and Sykes (2008), urban regeneration is a complex and dynamic process, which includes understanding the physical, social, environmental and economic needs of cities.

The marketplace can be viewed from this wide dimension, whereas Weiss (1988) elaborates, the philosophy behind the operations and constructions of the marketplace connects deeply with the historical and cultural contexts, societal meanings and experiences of its users. This suggests that cultural and social sustainability is also a significant part of regenerating tourist attraction, particularly for a multicultural country like Malaysia, on top of ensuring its economic viability.

According to Azmizam (2013), there are three approaches of urban regeneration:

A. Total re-development

This method will involve total demolition of the existing building and clearance of the site which include removal of existing business and residential occupants. The site/ area will totally be cleared for new development. This approach is mostly suitable to lighten up the dying area and turn it into positive and dynamic image of the town/ city. Using this method, the areas should be required to provide better facilities to the community and improved infrastructures.

B. Revitalization / Refurbishment

This method will involve upgrading of the existing building or site in order to rejuvenate and gives a new lease of life to the building or the site. The method is the combination of both preservation and redevelopment. It should maintain the area with a bit adjustments and considerations. The purpose is to rise up the image of the town by upgrading the area while preserving its local identity.

C. Conservation and Preservation

The method is particularly suitable for buildings or sites with historical value and has tourism potential. The area is preserved, without intention of upgrading or demolishes it for new development. The heritage site is precious and needed to be taken care properly.

Urban renewal has a big influence on the urban environment. Natural and built environment, culture, social- economy, lifestyle of local community and city's identity are the factors that need to be concerned in the process of urban regeneration:

A. Urban Identity

In the process of regeneration, the important factors of urban environment which must be conserved are the diversity and continuity appearance. As said by Holcomb and Beauregard (1981), through urban regeneration, by respecting the town and city's identity will rescue the cities from the 'placelessness' of mass culture homogeneous values and international architecture.

B. Environmental Concerns

The preservation of natural and man-made environments is another important issue which should not be overlooked in the process of renewal. The nostalgic environment, neighbourhood, old pattern of the town/ city, monuments and building give a unique character to the city and its image (Holcomb and Beauregard, 1981; Van der Ryn & Calthorpe, 1986).

As said by Wang (1992), in developing modern cities, it is important for the future generations to know and value their cultural heritage, therefore the historic core of the city should be preserved.

C. Social Concerns

Psychological and physical well- being of the individual and community need to be concerned as they are essential for sensitive renewal. Urban regeneration, in some cases, leads to the disbanding among the communities, also friends and relatives.

The bond among the people in the area is something special, thus it is an important aspect to be considered in the urban regeneration process of the area. Nozick (1992) stated that people need to know that their communities will continue to exist and be able to provide for the present and future needs of themselves and their children.

D. Cultural Concerns

Culture is not something that can be built in a day. It takes years and even decades, and is defined as the overall the community social mode of life, the collective expression of lifestyles, traditions and history. As said by Van der Ryn (1986), urban design and planning, architecture, as well as community life are the factors that carried the continuity of the culture. The advancement of the bond between social culture and urban development is closely related to the urban culture itself.

Marketplace Typology

The marketplace is a place where the local lifestyle and products are practiced and displayed by the community, which contributes to the richness of the local culture and heritage. There are many types of marketplace in the world. Even some were practiced almost hundreds of years ago. Several typologies of the marketplace can be identified as public market, the farmers market, shopping centre, bazaar, night market and the traditional market (refer Table 1).

Table 1: Marketplaces typology

Types of Market	Description
Public Market	A public market is municipally owned and operated in a building where vendors sell fresh food from open stalls. Public markets come in various forms and settings, offer a wide range of different products, and are owned and operated by various types of organizations, not just city governments. (Birmingham Public Market Study- Creating Healthy Food Hubs for the 'Magic City', 2011).
Farmers Market	A farmers market is a direct marketing by small agricultural producers to consumers. Farmer market activities usually occur in the morning and in open spaces. The farmers market can be claimed as one of the oldest institutions in the world, commonly occur since Roman times (Ashman et al., 1993).
Shopping Mall & Centers	The supermarket chain is often an integrated institution that incorporates the ownership and management of its own factory-farms, transportation, storage, processing, distribution, and retail facilities (Sommer, 1989).
Bazaar	A bazaar is defined as a marketplace or shopping quarter, a sale of miscellaneous contributed articles. In some countries, bazaar activities occur in city urban open spaces and in certain periods of time, once or twice a week (R. Siti Rukayah, 2012).
Night Market	A night market can be defined as a trading place during the evening where small business offered a variety of products and cooked food at a cheaper price (Huang, Liou and Tzeng, 2009). The night market is also known as street market. Mostly night market occurs once a week in Malaysia.

Traditional Market	Traditional market usually is the oldest marketplace in a town or city. Almost similar to public market, the traditional marketplace, however is very old, and countless such markets are still in operation around the whole world. Traditional local markets are one of the most visited tourist attractions, not just for shopping, but for enjoying local culture and food unique to the area.

Values of the Traditional Marketplace

The cultural and social value of a traditional marketplace makes it different from any other modern marketplace (shopping mall, supermarkets, etc.), other than physical appearances. Traditional marketplaces have unique characteristics that positions them differently from supermarkets and shopping malls because of the 'sensory experience' they offer through the physical characteristics, products and services, which reflect the local community's way of life (TRAX and Stead, 2010; Weiss, 1998).

Traditional marketplace represents the richness of socio- culture of the local community, which made it special and valuable in exhibiting a high cultural value of Malaysia. Although city development is significant and start to grow fast, it is important to conserve the value of the traditional marketplace as it is our cultural heritage.

Findings: Aspects of the Marketplace Essential to Urban Regeneration

A very successful marketplace can attract more tourists to come and visit and enjoying the local culture and the uniqueness of the town or city, in addition to contributing the economic growth there. From the literature review, some of the aspects of the marketplace that are important to be determined and examined in the urban regeneration process are physical qualities, socio-cultural qualities and economic qualities (refer Table 2):

Table 2: Marketplace qualities/ characteristics

	Description
Physical Qualities	• Building form • Building layout (outdoor & indoor) • Setting and atmosphere • Location • Accessibility (vehicles/ people) • Facilities
Socio- Culture Qualities	• Urban image & place identity • Interaction (people and people, people and environment) • Cultural significance • Historical significance (tangible and intangible) • Marketplace peak hour (on weekdays, weekend)
Economic Qualities	• How the marketplace generates the economic growth of the town/ city • Merchandise/ goods pricing (wet and dry goods) • Vendors income/ tourists expend

By using the suitable urban regenerations approaches in line with these aspects, the sustainability of traditional marketplace relies strongly on the social and cultural aspects too. These 3 aspects of marketplace characteristics are the qualities that need to be considered in conserving the traditional marketplace. Physical qualities lead to the socio- culture qualities as space determined the people activity there, which then generate the income of the marketplace itself (business, trading, etc).

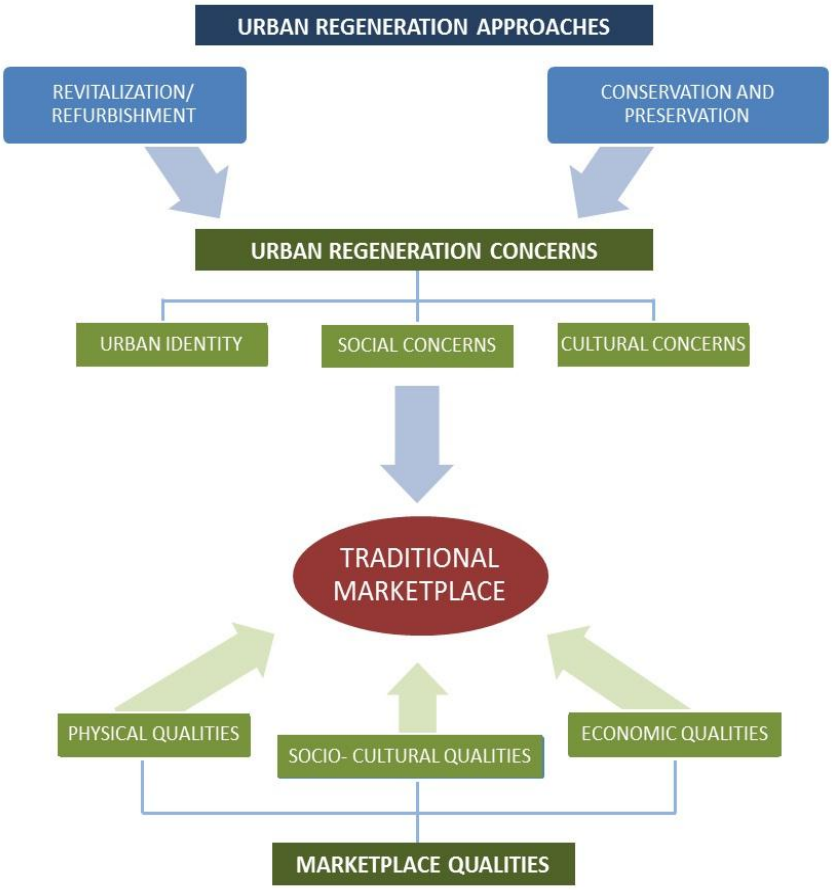

Figure 1: The diagram of approaches and marketplaces qualities essential to traditional marketplace regeneration.

Conclusion

With well planned preservation and conservation, traditional marketplace can be transformed to the most valuable heritage tourism site, based on the considerations of the qualities stated above. Based on the triangulation of the findings, the results shall be used to identify the qualities of urban marketplace that are important in sustaining its role as a tourist attraction that is culturally rich and economically viable for the market community in the long run. The model of qualities is significant in guiding future plans to improve or develop urban marketplace in Malaysia.

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TOWARDS SUSTAINABLE ARCHITECTURE: THE EFFECT OF THE SOLAR CHIMNEY MATERIAL ON THERMAL PERFORMANCE BASED ON CFD SIMULATION

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In Malaysia, terraced houses have been reported as the fast growing since 5 decades ago. However, the terrace houses consist of limited ventilation opening and only comply with minimum percentage of window-to-floor ratio determined by Uniform Building By Law 1984. This study investigates the indoor thermal performance in single storey terrace house in Kuching, Sarawak, Malaysia, by using field measurements to obtain the initial outdoor weather data and followed by CFD simulation to study the effect of the solar chimney material on the ventilation velocity and indoor air temperature. The results show that the effect of the copper material absorber induced higher velocity. Although the air temperature of the indoor environment is highest among all by using the copper absorber, the air velocity induced by the copper absorber to the indoor environment approximately 0.5m/s higher compared to others. Other than that, the comparison was made among the existing room without solar chimney and the room with varies absorber installed in the solar chimney. The air velocity of the room with solar chimney applied with varies absorber could induce approximately 0.25 – 0.55m /s air velocity for the indoor environment. The study found that copper could induce highest air velocity for indoor environment with value 0.502m /s and 1.16m ³/s airflow rate with outdoor air temperature of 35°C. From the study, solar chimney is proven to be an effective tool to induce the air velocity and reduces the air temperature of the indoor environment. The copper absorber is recommended for the solar chimney in order to induce higher air velocity to reduce the air temperature of the indoor environment.

Keywords: solar chimney, material, thermal performance, residential, tropical climate

Introduction

In Malaysia, terrace housing happened to be one of the common typologies of residential buildings. However, the overheating problem due to the high solar

radiation and high diurnal air temperature has caused the concrete modern terrace house become warm and thermally uncomfortable, even though during the night time. The high density building blocks and overcrowded dwellings in urban and suburban areas, the lack of greeneries at the housing compound, the terrace housing design layout which lack of openings for cross ventilation as well as the material of the dwellings are amongst the main factors contributed to the indoor overheated problem. According to (Hui, 1998), the indoor air velocity of low rise building in Malaysia ranged between 0.04m/s to 0.47m/s. The dilemma of poor air circulation in the residential building was always been solved with mechanical ventilation system, especially air conditioning system. The purpose of ventilation in the indoor environment especially housing is to remove the hazardous particles from the room However, the impact of mechanical ventilation system could increase the greenhouse gas effect which leads to the urban heat island effect in the urban area. In order to reduce the global warming, it is more effective to promote concept of natural ventilation from ground, which is domestic residential building. According to (Zaki et al., 2012), conventional terraced house with deep floor plans could not fulfil the needs of the local occupants, especially responding to thermal comfort since the maintenance of indoor thermal comfort involved high operational cost. The effort to reduce the usage of mechanical ventilation system could be replaced by the passive ventilation strategies, which has been wisely applied by ancestor for centuries.

There are various types of passive ventilation strategies for domestic residential building applied since centuries, such as: solar chimney, Trombe wall, wind catcher, courtyard, air well, and so forth. Solar chimney has proven as one of the effective passive solar-induced ventilation tools that widely applied and scientifically proven to be an effective passive ventilation tool. (Agung Murti Nugroho et al., 2006; N.K.Bansal et al., 1993; Jianliu and Weihua, 2013; Chungloo and Limmeechokchai, 2007; Chen et al., 2003; Tan and Wong, 2012; Leng et al., 2014b) Solar chimney utilised the solar radiation to induce the air flow from external environment, and pass through the internal room which to promote indoor air ventilation. The pull effect is complemented by the push effect from outdoor due to temperature and pressure gradient. Since solar chimney perform well under the tropical climate with abundant of solar radiation, it is suitable to be applied in Malaysia. Malaysia is one of the countries gifted with abundant of solar radiation and long solar hours. The magnitude of annual mean daily solar irradiation ranged from 4.21–5.56 $kWhm^{-2}$ while the sunshine duration is exceeding 2200 hours per year.(Muzathik, 2013). On the other hand, the mean annual temperature ranged between 22°C to 32°C with mean relative humidity 70% to 90%, which has meant that the manipulation of solar induced ventilation strategies has high potential to be occupied in tropical climate since the

solar radiation and outdoor air temperature is high throughout the year. Research that supports the application of the solar chimney in tropical climate has been proven and published. (Agung Murti Nugroho and Ahmad, 2006; Leng et al., 2014b; Tan and Wong, 2012)

Since the application of solar chimney is energy saving and cost effective, this type of passive ventilation strategy is viable to induce the natural ventilation for indoor environment in tropical climate. The research is focused on the experimental parameter, which is applicable and required less cost to improve the existing air well. The parameters investigated by researchers including the height, width gap, length, thickness, sizes and positions of inlet and outlet, orientations and materials.(Tan and Wong, 2013; Leng et al., 2014a; Punyasompun.S et al., 2009; Nugroho et al., 2007; J. Hirunlabh et al., 1999) In this study, the experimental model precedence a 3m (width) x 4m (length) and 3m (height) room attached with a 1m (width) x 2m (length) x 6.0m (height) air well in a single storey terraced house located in Kuching, Sarawak, East Malaysia. The comparison between the air velocity and air temperature of an existing indoor thermal condition and the enhanced version of air well were carried out. By minimizing the modification of the existing air well yet improving the effect of ventilation, the applications of few absorber materials were carried out in this study via computational fluid dynamic (CFD) model.

Literature Review

In general, solar chimney utilized solar radiation energy to heat up the upper cavity in order to induce the air movement from the lower room.(Agung Murti Nugroho and Ahmad, 2006) Various research paper had studied the advantages of solar chimney in tropical climate; however, the parameters which were widely discussed including the sizes and configurations of solar chimney. (Tan and Wong, 2013; O.V. Ekechukwu, 1997; K.S.Ong and C.C.Chow, 2003; Gontikaki, 2010) In this study, the construction materials which are applicable to the solar chimney absorber were studied: copper, cast iron, concrete, polyvinyl chloride (PVC), aluminium sheet and glass. Absorption and storage of thermal energy is important in the mechanism of solar chimney. Various researches have shown the effectiveness of several materials as solar chimney absorber, especially the metal. For instance, (J. Hirunlabh et al., 1999) has proven that the use of painted matt-black metallic wall as absorber material could significantly reduce the heat gain by promoting the air ventilation in a 2m height and 14.5cm gap solar wall. Aluminium has second highest thermal conductivity value (210 W/mk) after copper (401 W/mk), and widely utilized in industry due to their properties: lightweight, corrosion resistance, electrical and thermal conductivity, impermeable, good reflector, and low melting point. According to (Satwiko, 1994) the plain

aluminium sheet could not be heated up more than 27°C with solar radiation, however, the temperature could hit 45°C after painted black. The use of glazing as the heat transmitting component in solar induced ventilation tool is viable too. (Zalewski L et al., 2002) has conducted a simulation in Trappes (longitude: 2°01'; latitude: 48°46') and Carpentras (longitude: 5°03'; latitude: 44°08') to investigate the effects of glass materials on solar wall thermal performance and the findings revealed that the low-emittance double glazing effectively increase the energy collection. Among the solid thermal storage media studied by (Hasnain, 1998), the material which possess the highest ability to store sensible heat is cast iron, which has higher energy density level than water. For PVC, (Nugroho, 2007) found that the performance of PVC and aluminium was close in air flow rate aspect and air velocity aspect. The maximum value of air velocity could hit 0.8m/s and 0.018m³/s when both materials were tested.

Methodology

A case study house with existing air well was selected for the study of material configuration for solar chimney. The investigation of the thermal performance of solar chimney absorber material was carried out with Computational Fluid Dynamic (CFD). There are various ways to study natural ventilation and thermal performance in building, including small-scale experiment, full scale experiment, mathematical model experiment, multizone, zonal and CFD model (Mohammad et al., 2013; Chen, 2009). In this study, CFD is being chosen as the investigation tool to examine the performance of the absorber material. CFD is one of the popular methods in natural ventilation study since it is cost-saving in long run since it allowed unlimited repeatability to remodelling and simulation compared to scale and full experiment (Zhai et al., 2011). CFD has been widely applied in various industries other than building industry. In this study, DesignBuilder was utilised to simulate and compute the performance of the solar chimney absorber.

Verification and validation of Design Builder

CFD software was widely applied to investigate thermal performance, thermal comfort, HVAC system performance, the aerodynamics performance, thermodynamics modelling for mechanical industry, fire safety, indoor air quality and so forth (Chen, 2009). CFD software benefits designer and engineers to estimate and predict the building performance such as indoor air velocity, energy consumption, thermal comfort and so forth (Mohammad et al., 2013). Even though CFD simulation has a lot of benefits, but simulation software possesses strength and weakness, which meant for different fields. The reliability and viability of each CFD simulation software should undergo verification and validation (V&V) to ensure the software

validity (Oberkampf and W. L., 2002). In this case, DesignBuilder 3.1.0.080 with EnergyPlus version 7.2 built in as simulation tool and standard k-□ turbulent model for CFD (DesignBuilder, 2014).

Boundary condition has to be determined before carrying out CFD. EnergyPlus is the simulation programme integrated in DesignBuilder to generate the boundary condition. EnergyPlus developed by the United States Energy Department which promoted by the Building and Technology Program of the Energy Efficiency and Renewable Energy Office. Various studies have applied EnergyPlus for building simulation purpose and the validation has been proven in literature. (Fumo et al., 2010; Mohammad Baharvand et al., 2013; Zhai et al., 2011).

There are various types of turbulence model for CFD simulation engine, and out of many, the k- □ turbulent model family is the more preferable turbulence model, which have been proven to be generating accurate results and time saving compared to other turbulence model such as Large-Eddy Simulation (LES), Direct Numerical Simulation (DNS) and so forth. K- □ turbulent models families such as standard k-□ turbulent model, RNG k- □ turbulent model, and realizable k- □ turbulent model can predict airflow pattern accurately. According to (Mohammad et al., 2013), (Chen, 1995) has compared five types of different models in order to investigate the best airflow pattern by using a simple room. He concluded that standard k- ε and RNG k- ε give closest airflow patterns to the experimental model. Other than that, previous research paper have applied and proven that standard k- ・ turbulent model can predict the indoor air distribution with high accuracy (Cheung and Liu, 2011; Nahor and M. L., 2005; Yang, 2004).

Model Specifications

The case study house consist of a master bedroom, dining cum living space, two units of bedroom where one of the bedroom attached to 2m x 1m air well with external window. The bedroom attached with air well was selected as case study room for modelling. The external window of the testroom and the air well glazing is facing South, while the opening of the external window is casement window that operable 100%. Similar size as external window, the internal window that connected to the air well is a wide opening that positioned 0.9m from the floor with size 1.5m height as well as 1.2m width. The terrace house consists of brick infill and concrete structure where the party wall made from 230mm thick solid wall. The total U-value for red brick wall is 0.55 W/m²K while the clay tile roof U-value is 1.17 W/m²K. The activity in the building was set as domestic bedroom activity for ventilation purpose. The overall building run longitudinal, and the house frontage (6m) facing North while the East-West part sandwiches by adjacent units. The height of the air well is 6.0m from

ground to roof top with dimension 1m depth and 2m length. The building is assumed to be well-infiltrated. The four design days in 2013 were chosen as the investigation days for 24 hours (20 March, 21 June, 22 September and 21 December) while the CFD calculations were run at the hottest hour out of four selected day, which is 15:00hr of 22 September. The external window of testroom is assumed to be opened at 100% and the door was tightly close. A layer of adiabatic component was modelled to assume the transmission of adjacent room's heat to be zero. In this study, only the air well and testroom were modelled and ventilation performance of the air well assisted by varies material were investigated. The study concentrates on diurnal (8:00hr to 19:00hr) thermal performance since solar chimney applied principal of temperature differences to generate air movement. The CFD grid system with total amount of 30 X-cells, 54 Y-cells and 59 Z-cells were applied. The max aspect ratio was 2.0 with two monitoring points (x= 1.17, y=0.643 and z=4.5 & x=1.66, y=2.16, z=1.5) was defined at air well and room centre point respectively.

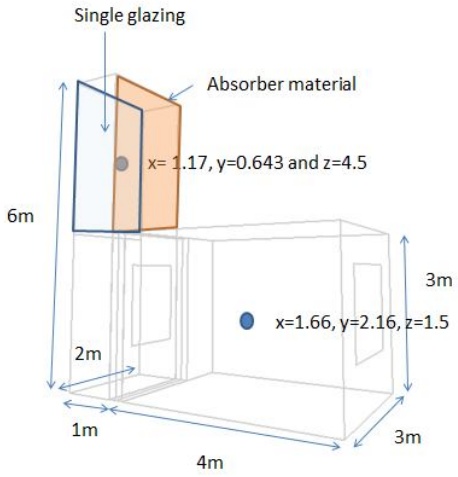

Figure 1: Testroom and air well dimension modelled in DesignBuilder for absorber material

In order to obtain the boundary condition for CFD simulation, the weather data year 2013 of Kuching, Sarawak is utilised. The data set collected by Malaysia Meteorological Department includes hourly dry bulb air temperature, relative humidity, wind velocity, wind direction, solar altitude, direct normal solar and diffuse horizontal solar radiation, wet bulb air temperature, air pressure and precipitation were used to run the simulation in DesignBuilder for four design days, which are March equinox, June solstice, September equinox and December solstice falls on 20 March, 21 June, 22 September and 21 December respectively. In order to investigate the performance of the absorber material, 22 September was chosen for CFD boundary condition since it has the highest air temperature (35°C at 15:00hr) among all days.

As stated in figure 2 and 3, basically the diurnal air temperature for four design days fluctuated between 24°C to 35°C while the air velocity between 0.36m/s to 1.72m/s. The highest solar radiation and air temperature recorded as 1029Wh/m² and 35°C respectively, and both happened in 22 September. This fact has revealed that September was the hottest month of the year. However, the wind velocity fluctuated within high range, where the consistency of the ground wind is lesser. The scenario has revealed the major problem of the ground domestic building, which is lack of ventilation. The hottest hour of the four design days were extracted in order to obtain the performance of the absorber material in accelerating the air movement with temperature gradient.

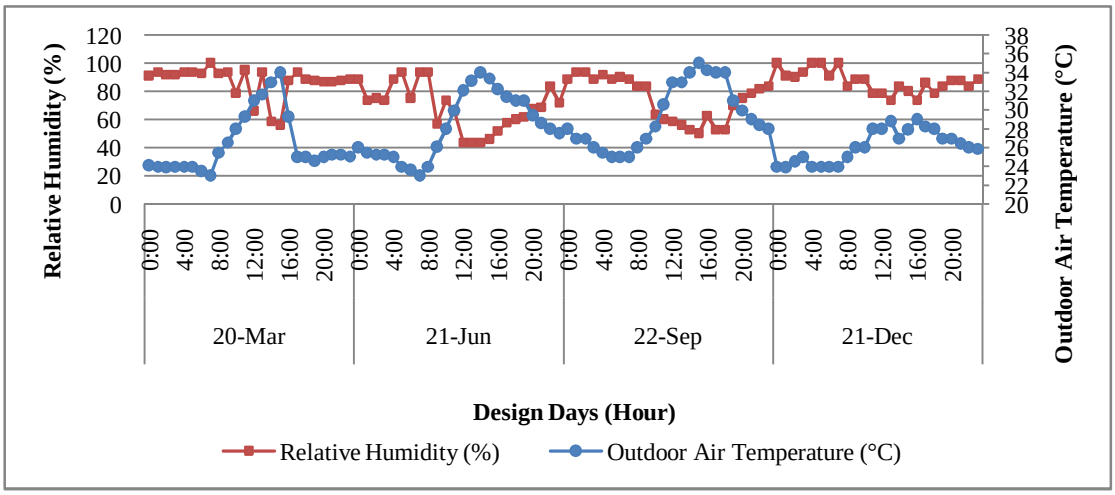

Figure 2: The outdoor air temperature and relative humidity for four design days in year 2013

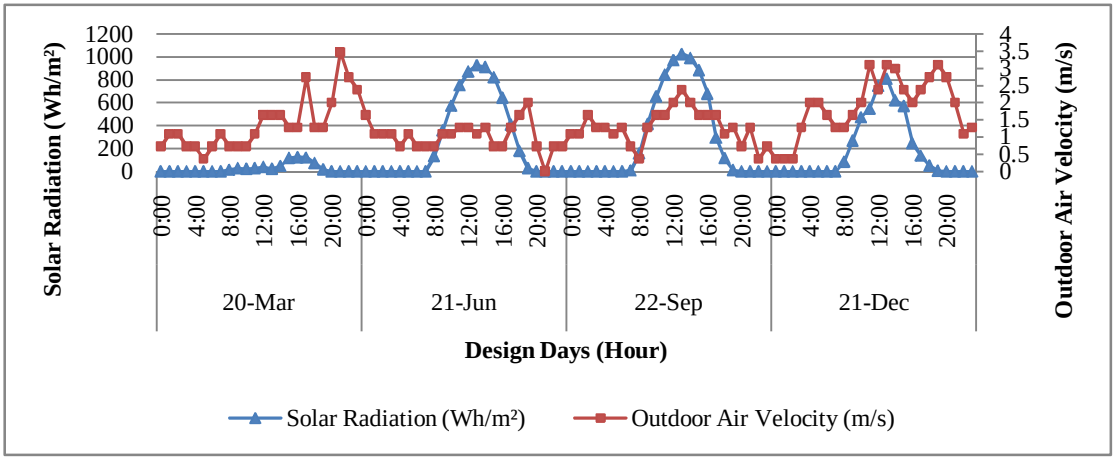

Figure 3: The solar radiation and outdoor air velocity for four design days in year 2013

Table 1: The design days hottest hour and solar radiation

Design Days	Hour	Outdoor Air Temperature	Solar Radiation
20 March 2013	15:00hr	34°C	119 Wh/m²
21 June 2013	14:00hr	34°C	914 Wh/m²
22 September 2013	15:00hr	35°C	887 Wh/m²
21 December 2013	13:00hr	28.8°C	812 Wh/m²

Table 2: The thermal conductivity of absorber material

Materials	Thermal Conductivity (W/mk)
PVC	0.19
Aluminium	205
Cast Iron	55
Cast Concrete	0.6
Glass	1.05
Copper	401

Results and Discussion

In this section, the performance of the listed materials: copper, cast iron, PVC, cast concrete, aluminium and glass as the absorber would be discussed. The influential of the absorber material to the room temperature is important, since it would determine the thermal comfort of the occupants. The absorber materials temperature is regulated by the material properties. The surface temperature of the absorber material becomes the monitoring aspect for the respective material. According to figure 4, the listed materials give the ranges of room temperature from 26.023°C to 30.985°C among the four design days. Based on Table 1, 15:00hr of 22 September recorded as the hottest hour (35°C) out of four days with solar radiation 887 Wh/m² while 13:00hr of 21 December recorded as the lowest temperature hour (28.8°C) with solar radiation 812 Wh/m². Since the North East Monsoon in Malaysia happened between November to March, the weather turns windy and the rains getting frequent. Thus, the overall air temperature is low compared to other months.

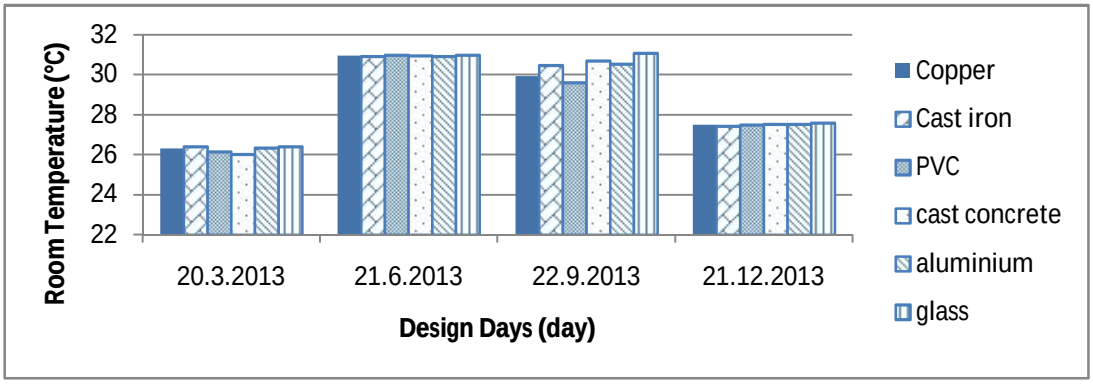

Figure 4: The room temperature of the test room with varies solar chimney absorber

According to Figure 4, cast iron gives the lowest differences between the outdoor air temperature and the room temperature at 20 March, with differences of 7.594°C while the cast concrete gives the greatest room air temperature with differences of 7.977°C. This indicated that concrete has higher ability to store heat and the heat release frequency is less compared to metal. Thus it reduces the heat release and air temperature in the indoor environment. However, in general, out of four design days, glass as the heat reflective material has caused the indoor room air temperature become the highest in each of the design days from March to December. Glass does not transmit solar radiation, however, it reflects the heat directly into the cavity and thus it has caused the indoor room air temperature increased. The absorber materials effect towards the indoor room air temperature ranged from glass, and followed up by aluminium, cast iron, copper and PVC as the material which caused the least heat to the indoor room.

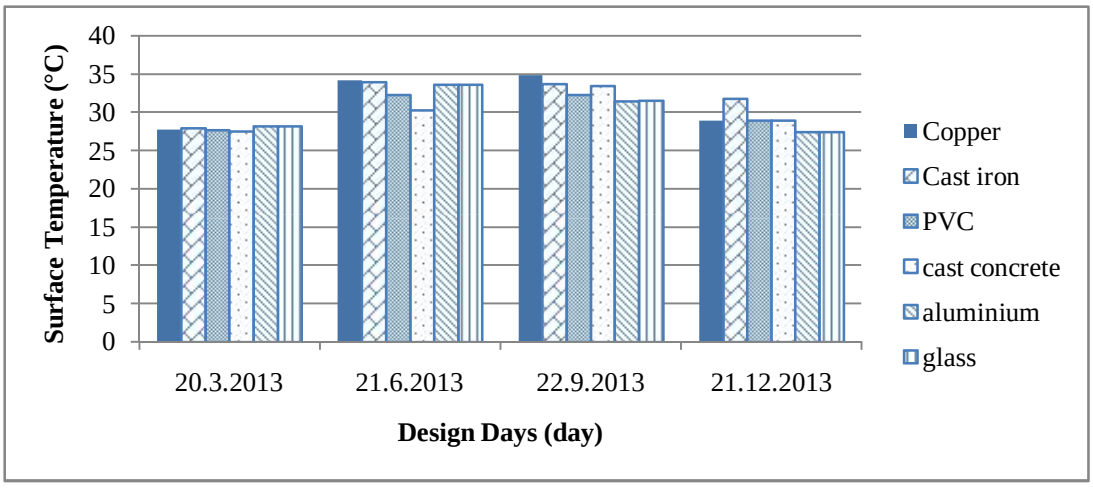

Figure 5: The surface temperature of the absorber wall

According to Figure 5, in general the surface temperature of the absorber material should be increased in order to heat up the solar chimney. Out of six listed material, copper surface has higher temperature compared to the rest. In March, although glass

has the highest surface temperature but the differences between the outdoor air temperature and glass surface temperature is 5.806°C, while between indoor room temperature and surface temperature is 1.791°C where the gradient temperature is still insignificant. For copper, the surface temperature is 0.228°C and 0.082°C higher than the outdoor air temperature at 21 June and 22 September. The cast iron marked the highest surface temperature in 21 December with value 31.826°C compared to copper which is only 28.919°C since 21 December has the lowest air temperature among all and caused the copper could not perform optimally under insignificant surrounds temperature. Thus, copper hypothetically considered as the good thermal conductor material since it appear to be the hottest surface during the hottest hour out of four days, which is 35.09°C.

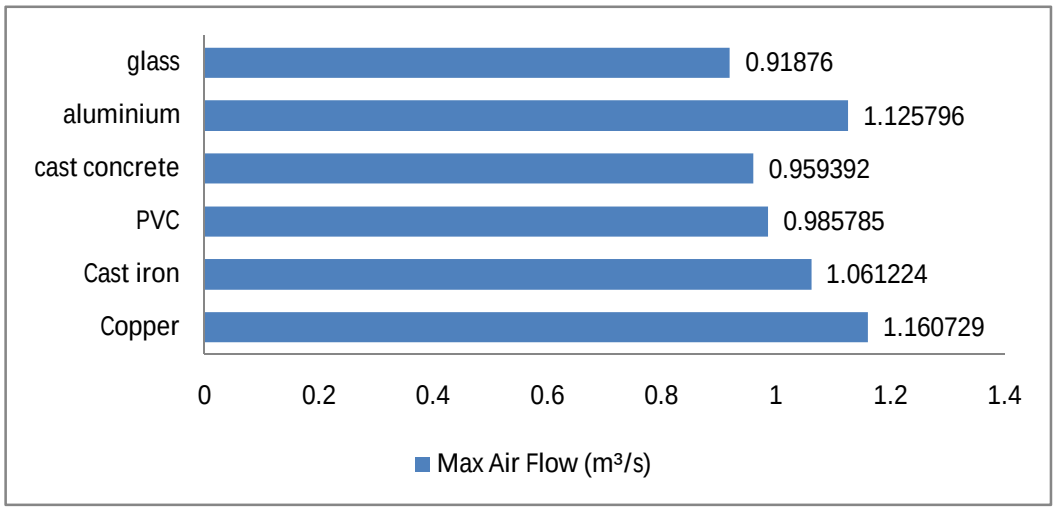

Figure 6: Maximum indoor room air flow resulted by listed absorber materials during 22 September 2013, 15:00hr with outdoor air temperature 35°C

The maximum air flow rate generated by the EnergyPlus in DesignBuilder has shown in Figure 6. Copper could induced the highest air flow rate compared to glass, even though as stated in Figure 4 glass could reflect more heat and lead to high temperature of surrounding. Even though glass could generate high temperature on top of solar chimney but the reflective heat spreading to indoor environment and it does not store the energy. In this case, copper, aluminium and iron shows better result in accelerate the air flow rate (1.061 – 1.161 m³/s) compared to pvc, concrete and glass since these material has lower sensible heat storage strength compared to metal. In general, shiny surfaces are best reflectors of heat radiation while black surface good as heat absorber. The applied metal should be matt surface rather than shiny surface for better heat absorption.

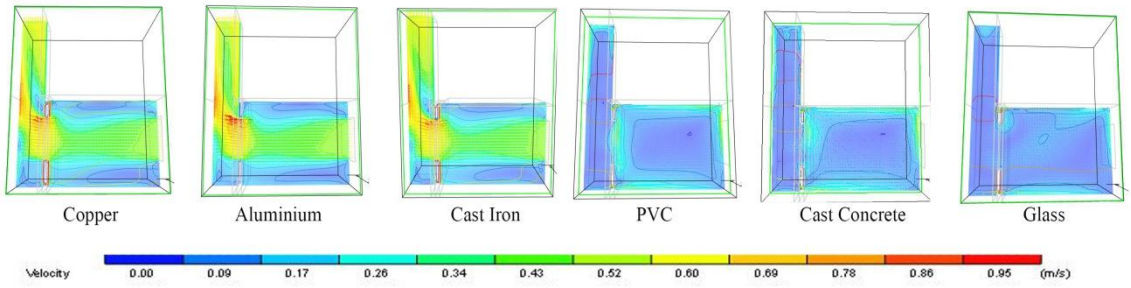

Figure 7: The air flow pattern and air velocity of different materials by CFD simulation

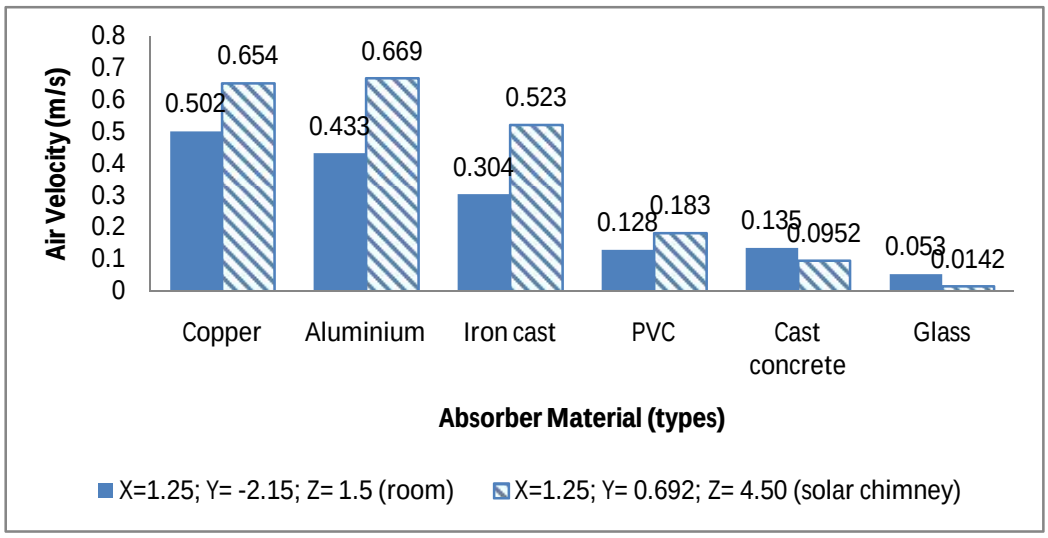

Figure 8: Air velocity of indoor room resulted from listed absorber materials

According to figure 7 and 8, copper, aluminium and iron could induce the air velocity ranged from 0.304 to 0.502m/s in room height while for the solar chimney height; the air velocity could hit 0.669m/s by aluminium. Since copper is better at conducting heat than aluminium, the gradient temperature in room resulted by copper is higher, which is 7.7°C compared to outdoor temperature. However, aluminium is able to radiate the heat into the air better than copper because of its lower density. The radiated heat by aluminium has caused room temperature higher 0.037°C higher compared to copper, according to Figure 4. For iron, the room air velocity induced is higher compared to PVC, cast concrete and glass even though it is ranged after copper and aluminium. In general, metal is good sensible heat material which could absorb and release radiation heat in short time. The gradient temperature between room and solar chimney become lesser when the sequences go from copper to glass.

Conclusion

The performance of absorber materials in solar chimney was researched based on a case study house air well model located at Kuching, Sarawak, Malaysia. It was

observed that the performance of the absorber material is based on its thermal conductivity. The findings show that metal absorber materials thermally perform better compared to PVC, glass and concrete. Out of four design days, 22 September 2013 recorded the highest air temperature of 35°C at 15:00hr. The six listed absorber materials were examined with the hottest air temperature. The result shows that copper could induce highest air velocity for indoor environment with value 0.502m /s and 1.16m ³/s airflow rate with outdoor air temperature of 35°C. Glass appears to be good in heat transmission via radiation but it is not suitable as the heat absorber material for solar chimney. Concrete appear to be good in heat storage; however the speed in absorption and releasing heat is not as fast as metal. Copper and aluminium is suggested to be applied in solar chimney in order to increase the airflow rate and air velocity in room environment. Solar chimney is an important device to induce natural ventilation systems, thus the different parameters such as the configurations of solar chimney should be studied furthermore.

Acknowledgement

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PHYSICAL APPEARANCE AND ITS ROLES IN INFLUENCING THE SENSE OF PLACE OF COMMERCIAL STREETS IN MOSUL CITY CENTRE

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Some places are distinctive through their physical appearance, but nowadays, the lack of building and non-building elements and even changing the existing elements with new, different ones of poor design reduce the significance in recognising or recalling the streets of city centres by the streets' users. As a result, the street has no coherent character and sense of place. The objective of this paper is to identify building and non-building appearances and their roles in giving the sense of place to the commercial streets of Mosul City Centre, Iraq. The case study was conducted in Nineveh Street which is identified as the main commercial street in Mosul City Centre. A mixed method approach is used in this study involving 330 respondents of the survey questionnaire, 30 respondents for in-depth interviews, field observation, and photographic recordings. The result shows that the age, height, and architectural style of buildings in Nineveh Street were the most noticeable aspects of buildings recognised by the respondents, while the location and materials of non-buildings were the most noticeable aspects by the respondents. All these aspects of building and non-building appearance played an important role as a landmark, node, and clarity of direction, as well as in identifying the beginning and ending of the street. These physical appearances and their roles consequently give and enhance the sense of place of Mosul City Centre.

Keywords: Building appearance, non-building elements, commercial street, sense of place, legibility.

Introduction

In terms of physical characteristics, appearance plays an important role in supporting the sense of place in streets (Ujang and Shamsudin, 2012). According to Shinbira and Sulaiman (2010), appearance is one of the characteristics of the physical environment, especially buildings, which are distinctive and easily recalled (Shinbira and Sulaiman, 2010; Appleyard 1979, Rapoport 1977). This paper is to identify the role of the physical appearance of commercial streets in influencing the sense of place. In this paper, 'role' means a function or the degree to which someone or something is involved in a situation or an activity and the effect that it has on it (Oxford, 2012). Sense of place is defined as qualities that differentiate between one place and another, and therefore the discussions will centre upon the street's qualities that create the sense of place for a city (Relph, 2007; Shamsuddin and Sulaiman, 2002).

According to Rappoport (1977) as quoted by Shinbira and Sulaiman (2010), buildings and non-building differences must be noticed by the perceiver. These physical differences include: shape, size, height, colour, materials, texture, architectural style, and location. Buildings with distinctive visual features (colour, shape, etc.) that differ significantly

from the appearance of other buildings in the local area are likely to be remembered as landmarks (Grabler, F. et al., 2008).

According to the existing scenario of Mosul city, the new buildings and their street facades in the streets do not emphasise the character of Mosul city. Some have changed the physical appearance by using different materials and colours. Moreover, the haphazard design of signages and billboards on the building facades reduce the significance of these facades in enhancing the character of Mosul city, making them unnoticeable (Jawad, S. A., 2011; Haider, A., 2012). These result in the street losing its sense of place. According to the Kharofa and Bashi (2013), the emergence of the contemporary urban environment in the old Mosul city is totally different from the traditional environment. This phenomenon has resulted in this historic traditional Islamic city, once known for its distinctive identity, now gradually losing its character and sense of place. The other problems are the rapid decay of the historic buildings due to neglect and the use of modern building materials that disrupt the continuity of the streetscape in terms of its character. Mustafa (2013) mentioned that the existence of the negligence and the destruction of what remains of a large urban historical pillar in the city led to the collapse of the traditional environment in the Mosul City Centre.

The Study Area and Justifications

A street located in the city centre of Mosul was selected as the setting of the investigation. The street is one of the main commercial streets named 'Nineveh Street' which is the busiest part of Mosul City Centre (see Figure 1). This street was chosen based on the physical, social-cultural and historical characteristics that represent the character of Mosul City Centre. It was built during the British occupation of the Mosul city after the first decade of the last century. Simultaneously, this street shares the following characteristics (Al-Badrani, 2008; Al-Nuami, 2012; Al-Janabi, 2013):

(a) Located in the core of Mosul city.
(b) Located within the main commercial/shopping district of the city centre.
(c) Identified as the main street and well-known as a popular shopping street.
(d) The highest concentration area of pedestrians, shoppers and visitors.

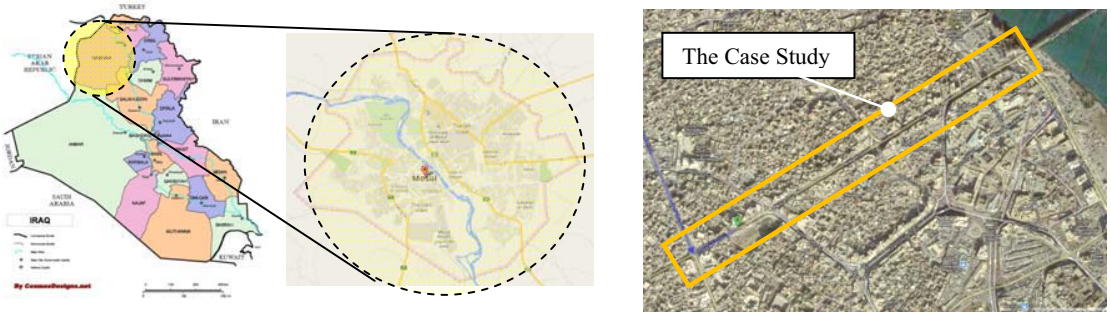


Figure 1: Nineveh Street, Source: Google Earth, 2014

Methodology and Research Procedure

This research employed quantitative and qualitative techniques. The first stage of the techniques was a survey questionnaire. The quantitative method was used to identify functional characteristics of commercial streets. Specifically, 330 questionnaire surveys

were used based on a 5.5% sampling error at a 95% confidence level, which are employed by many researchers (Mijan, 2000; Ujang, 2008; Ja'afar, et al., 2012). After that, the role of the functional characteristics was measured using the qualitative method which included 30 in-depth-interviews, observations (Ujang and Shamsuddin, 2008; Mehta, 2007), and a photos recognition task. Based on previous research used, this study identified two types of street users, static and mobile users. The static users comprised of ship-owners, shopkeepers, vendors, office workers, residents, and students. The mobile users comprised of shoppers and visitors (Mijan, 2000; Ja'afar, et al., 2012).These two types of users were selected as respondents to the survey.

Analysis

This section is divided into two parts which identify the role of building and non-building appearance respectively. According to the above, the physical appearance plays an important role in the legibility of the Nineveh Street, which contributes to its sense of place. From the survey findings, most of the respondents recognised the name of the street more than its building or non-building elements (see Figure 2).

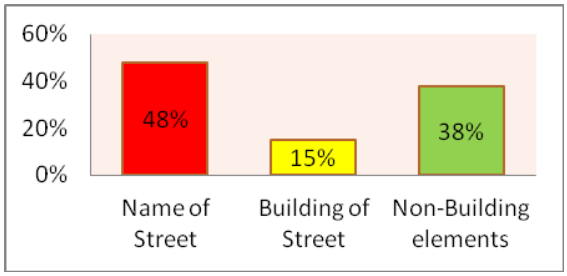


Figure 2: Elements and features that used to recognize Street.

Perhaps, one of the most important reasons is that this street is among the oldest streets in the city and the first main street that was opened in the Mosul City Centre. Many of the events and meanings in the peoples' memory are associated with the name of the street. Thus, most of the respondents recognised the name of the street more than its building or non-building elements. Respondent 6 emphasised this point in recognising the name of the street as shown below:

'I recognise the name of this street because it is the first and the oldest street in the City, which has held the name of Mosul City name, "Nineveh".'

This is contradicting with the findings of the study by Shinbira and Sulaiman (2010), and Appleyard (1979). They mentioned that building appearance plays the greatest role in the recognition of a street more than any other physical elements of the street. As well as non-physical elements, particularly the old bridge was perceptible by people more than buildings (see Figure 2). This is in line with Kharofa and Bashi (2013) who stipulated that the buildings of Mosul City Centre suffer from the problems of continuous change, removal and erosion due to negligence. Thus, it is difficult to use a building to recall a street by respondents as long as these buildings keep on changing continuously. Indeed, it was observed that many of the desolated buildings in Nineveh Street have a negative impact in recognising the street (See Figure 3).

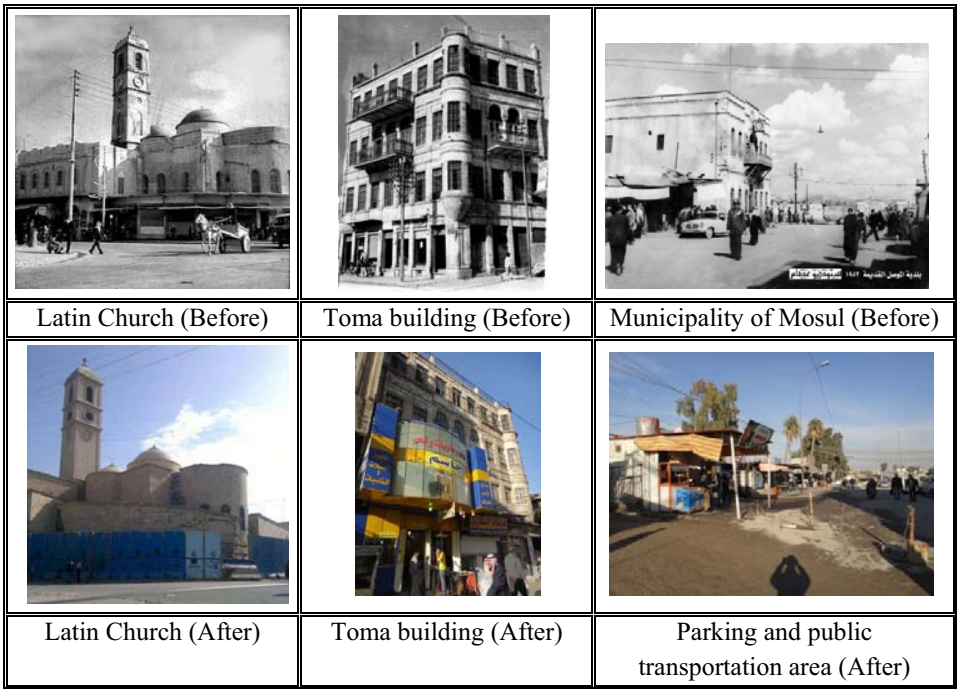


Figure 3: Changing and erosion of the buildings on the Street

1. The role of building appearance to make the street legible

According to the conducted survey, the appearance of the building played a minimal role in recognising street. This is in contrast with the data conducted from photo recognition interview, whereas most of the respondents managed to recall street buildings through eight features, namely: height, size, colour, architectural style, lighting at night, age, the location, and building materials.

According to the conducted survey, the Latin Church, Al-Aghawat Mosque, and Al-Rafidain Bank were the most distinctive buildings mentioned by (35%), (25%), and (19%) of the respondents (see Figure 4). It was observed that all these buildings are located in the street junctions. In other words, they are located in the strategic spots which help respondents to recognise them easily. Nodes were, according to Lynch (1960), strategic spots or intensive foci, which a person can enter and had a concentration of activities or thematic characteristics.

On the other hand, the highest percentage of respondents (48%) mentioned the age of buildings as the reason why a building was considered unique (see Figure 5). This suggests its importance in the legibility of buildings as seen by the respondents. This was followed by the height of buildings which covered (29%) of the respondents' answers and architectural style (28%). Other features of the building such as size, location, materials, colours, and lighting at night were mentioned by few respondents. It was apparent that many respondents found the age, height, and architectural style of a building more important compared to other aspects.

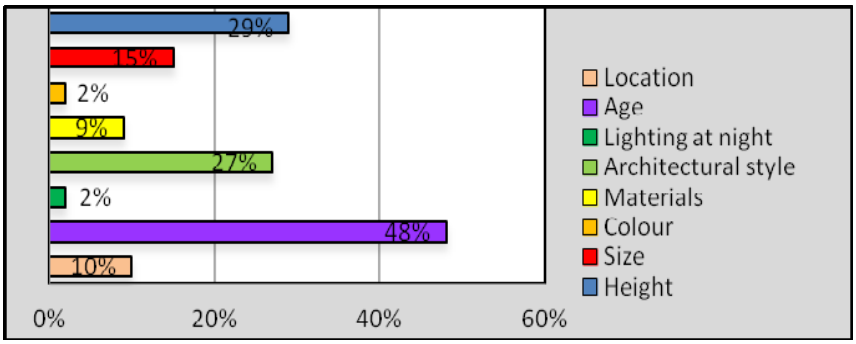


Figure 5: The most distinctive aspects of building on the Street.

In the interview, these reasons were further elaborated by the respondents in explaining why certain elements were considered to be distinctive. From the interview response, it was clear that the age and height of the building were the most common characteristic mentioned, which influenced the streets' users to recall the buildings as shown below:

Table 1: The most distinctive aspects of building on the Street by Respondents

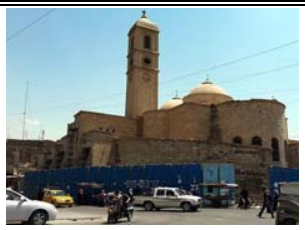
The distinctive building	**The most distinctive aspects of the building**						
	Age	Height	Arch. Style	Size	Location	Materials & Color	Lighting
Al-Agawat Mosque	54	17	23	2	7	1	1
Toma Building	10	0	6	0	0	0	0
Al-Rafedain Bank	4	8	16	17	3	7	8
Latin Church	66	63	31	10	9	8	0
Modern Multi-Storey Parking	4	10	23	23	6	5	1

a) Age

In the survey, age was the first aspect mentioned by the respondents in recognising five buildings along the Nineveh Street, especially the Latin Church and Al-Aghawat Mosque (see Table 1). These buildings have been built since the late eighteenth century and before the opening of Nineveh Street. Most of the interviewees considered these buildings as heritage buildings (see Figure 6). Age become a recognizable feature because of these buildings being very old and belong to a certain period like the colonial buildings.

Modern Multi-Storey Parking was also recognised by many of the interviewees because it is new. The presence of a new building among many old buildings in the street makes the former also recognizable because of the contrast in terms of age and upkeep. Thus, very new or very old buildings were recalled and recognised because of their contrasting conditions with the surrounding buildings. Thus, it was apparent that the age of buildings and their conditions were identified in relation to the age of surrounding buildings. In general, this suggests that the historic streets with a concentration of old buildings were distinctive to the users and gave a reason for their conservation.

Latin Church (Al-Sa'a Church) - 1940



Latin Church (Al-Sa'a Church) - 2013

Al- Aghawat Mosque - 1920

Al- Aghawat Mosque - 2013

Figure 6: The age of the Latin church and Al-Aghawat Mosque on the Nineveh Street.

b) Height

The height of the building was the second aspect which characterised four buildings, namely the Latin Church, Al-Aghawat Mosque, the Modern Multi-Storey Parking, and Al-Rafedain Bank. It was apparent that most of the respondents found the height of the Latin Church to be more important than the other buildings. The Latin Church, that was constructed with a bridge resembling a tower, became the tallest building in Nineveh Street. It dominates the skyline when viewed from the other sides or from far (see Figure 7). This issue was also asserted by many interview respondents.

The height of the bridge of the Latin Church and even the minaret of Al-Aghawat Mosque were noticeable to the streets' users because of the lack of tall buildings in Nineveh Street and even in the whole of Mosul City Centre. These buildings have a tendency to be used by many respondents as a landmark.

Latin Church (Al-Sa'a Church)

Al-Aghawat Mosque

Figure 7: The height of the Latin Church and Al-Aghawat Mosque

It is apparent that from the interviews, observation, and photo recognition task, the Latin Church is also one of the tallest buildings in the Nineveh Street. Its height makes

the Latin Church easier to be appreciated from a distance. This implies that the settings have an influence on the legibility of the buildings in Nineveh Street.

c) Architectural style

Architectural style was the third feature used in the survey to recall buildings such as the Latin Church, Al-Aghawat Mosque, and the Modern Multi-Storey parking in Nineveh Street. It was also apparent from the interviews that many respondents considered the Latin Church and Al-Aghawat Mosque as unique buildings because of their architectural style reflected in their exterior facades such as decorations, inscriptions, domes and arcs (see Figure 8). One interviewee illustrated that the Latin Church was recalled because it is different in exterior shape and it is not like the typical Church design compared with the other churches in Mosul city.

On the other hand, Al-Aghawat Mosque was recognised because of its distinctive architectural features. The architectural style of the Multi-Storey Car Park also recognised by interviewed respondents because it is a new construction and its architectural style imitated the surrounded buildings in details of elevations and form.

Figure 8: Architectural style of Latin Church

Al -Aghawat Mosque was recognised because of its distinctive architectural features (see Figure 9). Age is the other factor that made the mosque distinctive because the new building is architecturally different than the old one, as mentioned by some interviewees. Respondent 12 strongly felt that the old Mosque should have been retained rather than demolished and replaced with a new design. This is because the design of the old Mosque was considered unique compared to the other mosques in the country.

Figure 9: Architectural style of Al-Aghawat Mosque

This indicates that the architectural style and design of the buildings along Nineveh Street enabled the respondents to recognise the place. Hence, the architectural style of

buildings related to a certain period or having a distinctive style was a feature that was used to recognise a place.

d) Size

According to conducted survey, size was the fourth aspect used to recognise four buildings, especially the Multi-Storey Parking. Its size was noticeable to the respondents because of the lack of large buildings in Mosul City Centre as mentioned by many interviewees. Thus, large size was a noticeable feature because of its contrast with the size of surrounded buildings.

In the field observation, it was observed that the Multi-Storey Parking played an important role in drawing the path of Nineveh Street because its elevation extends for a long distance on the street. This is in contrast with the other buildings on the Street, which are often small and extend for a few meters. Thus, the size of this building was clearly recognised by the respondents.

e) Location

The location of a building was mentioned by a few respondents to recognise street buildings. In fact, some buildings were identified by the respondents by their official or local names, or other features such as height, size, architectural style, and age instead of location. In contrast, many interviewees identified buildings through their location in the street, especially those that are located at the street junctions as the location of all buildings.

Thus, these buildings were noticed clearly because of their location in the Nineveh Street junctions with other streets. At the same time not all buildings located at the intersections were recognised by respondents. For example, Toma Building and Khatoon Mosque were not recalled although they are situated at the same point with Al-Rafidain Bank. This shows that the building's location at a certain strategic spot is not the only reason that makes them noticeable, but there are also other features of the building such as size, colour, height, materials, and so forth that contribute to making a certain building more important than others.

f) Materials and colours

Material and colour are mentioned here together because they are considered to be interrelated by the respondents. They were mentioned in fewer buildings by a less number of respondents and thus considered to be a less distinctive feature. For instance, Al-Rafedain Bank was recognised because of its new building material, which is made of aluminium. The type and colour of the material is different from the material that covers the surrounding buildings. It was observed and indicated by some interviewees that the colour of this material is red and grey, which was a contrast to the surrounding beige coloured buildings.

This implies that material and colour are also distinctive features that relate to buildings. The findings suggested that the material and the colour of buildings were only noticeable when there is a contrast.

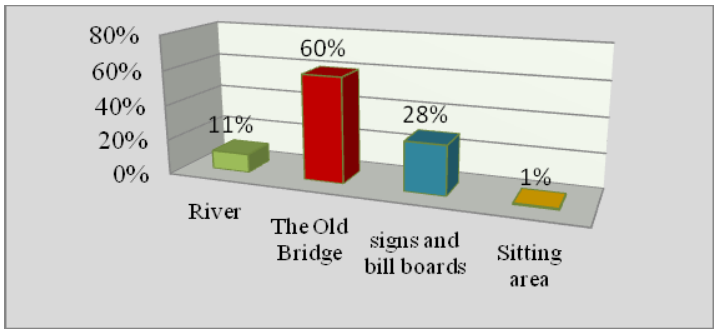


Figure 11: The distinctive non-building elements of the Street

2. The Role of non-building elements to make the street legible

According to the survey conducted, the Old Bridge, signs and billboards played an important role in recognising Nineveh Street. The Old Bridge was the first non-building element mentioned by the highest percentage of the respondents (60%) (see Figure 11).

It was observed that the Old Bridge is located at the strategic node, and acts as a landmark because it was seen from far through various locations. This bridge links the two sides of Mosul City, called the left and right sides, thus it was seen from two sides and even from very far distances. That is also stated by the interviewees.

Billboards were the second important non-building elements mentioned by (28%) of respondents. These elements that are mounted on the building's facade indicating the name of the retailer, the types of sold goods, the name of the pharmacy, medical clinic, and doctors.

Among non-building elements, age, materials, and location were the most important features that elaborate why the Old Bridge, billboards, and river played an important role in recognising Nineveh Street by the respondents (see Table 2). These aspects will be clarified as below:

Table 2: The most distinctive aspects of building on the Street

The non-building elements		The distinctive aspects of the non-building elements by number of respondents					
	Age	Material	Location	Lighting	Size	Height	Color
River	0	0	24	0	15	0	0
Old Bridge	98	80	11	37	12	5	1
Billboards	25	5	15	3	12	10	5
Sitting area	0	0	3	0	0	0	0

a) Age

According to the survey, the age was the first feature mentioned by the highest percentage of respondents in recognising the Old Bridge and street billboards. Most of the respondents recognised the Old Bridge because it is very old and is located on one of the oldest areas in Mosul City Centre (see Figure 12). This bridge was opened in 1935. This status is also informed by many interviewed respondents.

Some of the street billboards were also recognised because of their age. These billboards have become well known and recognizable because of their location and

names that have not been changed at all. For example, some of the names of the doctor's clinics or pharmacies were used as a guide as illustrated by one interviewer.

The Old Bridge is opened by the King Ghazi in 1936

The old Bridge in 1970

Figure 12: Photos show the age of the Old Bridge.

The concentration on the age of non-building elements was seen as a distinctive feature of the street. This suggests that historic streets with a concentration of old non-building elements were distinctive to the street users and gave a reason for their conservation.

b) Materials

'Materials' was the second feature that was used to recognise the Old Bridge. It was mentioned by (83%) of the respondents, thus it was considered to be a distinctive feature for the Old Bridge. The material of this bridge is made of iron, although concrete is the most common bridge material used in Mosul City. As a result, the material of the Old Bridge was considered unique compared with other bridges in Mosul City (see Figure 13).

The Old Bridge (The First Bridge)

Al-Huria Bridge (The Second Bridge)

The Third Bridge(Al-Shuhada'a Bridge)

The Fourth Bridge

Figure 13: photos show the materials of the Mosul City's bridges

It was observed that the respondents recognised the material of the Old Bridge because it is different compared with others. Thus, a contrast in bridges' materials was distinctive when there is uniformity in bridges' materials used in the whole of Mosul City.

c) Location

Location was the fourth feature that was used to recognise the billboards. It was also mentioned by a few respondents to recognise the river and the Old Bridge. The presence

of billboards frequently on the building facades made them recognizable by the street's users as they distort and covered the building facades view along Nineveh Street. The exciting scenario indicated that the distribution of billboards in the street was fitted randomly and there was no systematic method followed to fit them on the building facades. The continuous presence of the billboards along the street encouraged the street users to use them as a guide to recognise and notice the street. It was observed that the location factor of non-building elements was mentioned by a few respondents compared with the age, materials and lighting.

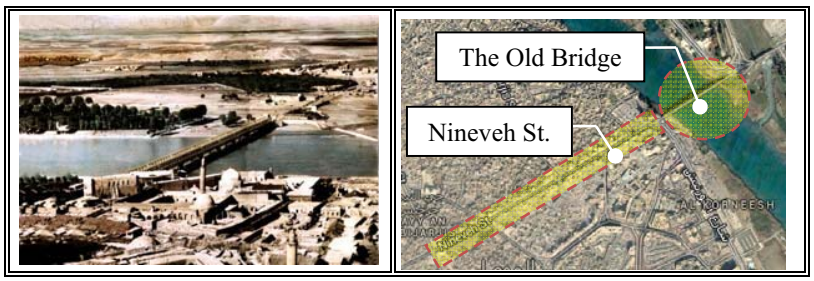


Figure 14: photos show the location of the Old Bridge.

d) Lighting

The presence of lighting in the Old Bridge was also noticed or recognised by the respondents. It was mentioned by (40%) of respondents. In recent months, coloured lighting has been added on the iron trusses of the Old Bridge, thus making it aesthetically pleasant, especially when its lighting is reflected on the Tigris River at night (see Figure 15). The dancing and waving of colours of lighting made the Old Bridge very distinguishable and recognizable as mentioned by some interviewers.

Figure 15: photos show the lighting of the Old Bridge at night.

It was apparent that the Old Bridge played a dominant role as a non-building element in recognising Nineveh Street. Moreover, the billboards and the river played some role in making the street recognizable, while the sitting area did not have such a role. On the other hand, age was the most distinctive aspect of non-building elements that respondents noticed. This finding suggests that the presence of the Old Bridge was a very important element to recognise Nineveh Street compared to others. Since non-building elements contribute to make a street unique in terms of character and sense of place, attention should be given to the aspects of non-building elements, especially age, material, and location in the design of the commercial streets.

Conclusion

This paper concludes that the role of building and non-building appearance as one of the physical characteristics of commercial streets is strongly linked to the sense of place. According to the results, age, height, and architectural style of buildings, and age, materials, and location of non-building elements played as influential keys of physical appearance in recognising Nineveh Street. It was also found that a uniformity of physical characteristics in certain locations was also distinctive to the street users. Thus, uniformity and contrast of physical characteristics are important factors in influencing the distinctiveness of these elements as perceived by the street users. Hence, elements that provide a contrast to a uniform background strengthen the sense of place.

This paper found that there is a need to improve the physical appearance of the street, especially buildings, by focusing on the characteristics that contribute in recognising the street such as age, height, and architectural style. The designers, architects and planners should take into consideration the importance of the physical appearance in Nineveh Street as a landmark and node that helps in recalling or recognition the street, thus giving a sense of place. With the poor quality and poor design of new buildings and the lack of non-building elements in Nineveh Street, this paper appeals designers, architects, and planners to make a decision in improving the quality of the physical environment that can strengthen the character and identity of Mosul City Centre.

Significance of Findings

Nowadays, with serious efforts to revive and regenerate Mosul City Centre by a French company and an Iraqi company, this paper can introduce some findings and solutions in terms of urban studies. This paper confirms that the importance of physical appearance in recognising commercial streets is one major factor in making a sense of place in Mosul City Centre. Moreover, this paper diagnoses weaknesses and strengths of the physical environment in Mosul's streets that enhances the character of Mosul City.

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THE CONTRIBUTION OF STRUCTURAL LAYOUT TO CAMPUS SUSTAINABILITY: THE CASE OF IRAQI CAMPUS

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Given the role of universities in the progression of societies, creating sustainable campuses has become an urgent requirement to promote this role. Many studies on campus planning, campus sustainability, urban design and urban sustainability indicated structural layout of a campus could influence numerous issues of sustainability. However, this relationship could be differ from one country or region to another. This could be attributed to aspects such as culture, history, climate and so on. Iraqi university campuses suffer problems regarding structural layout, which in turn, affects negatively their pursuit towards sustainability. Using Iraqi campuses as case studies, this study investigates how structural layout of a campus affects sustainability aspects. It assumes that structural layout elements such as street pattern, buildings configuration, campus size and so on, have an important role in promoting sustainability on these campus. The aim of this study is to determine the sustainable character of campus structural layout for Iraqi universities using quantitative and qualitative methods. Compactness and identity issues were the key findings of this study. The findings of this study can contribute to create sustainable university campuses in Iraq and elsewhere globally

Keywords: sustainability, campus, structural layout, Iraq

Introduction

Structural layout of a campus is one of the principal components that configure its physical character. Therefore, it is important to focus on this aspect when designing or planning a university campus. This is because it is concerned with the organization of the campus environment or its physical form. The way the buildings are arranged and how paths are designed and linked are the main aspects that the campus layout might encompass (Dober, 1992, Ebrahimabadi, 2008, Strange and Banning, 2001, Eckert, 2012).

In this regard, DETR and CABE (2000) divided the physical layout into two: urban structure and urban grain. While the first is related to the basic master plan of the built-up area that includes the configuration of the routs and open spaces as well as how they are connected to each other, the latter deals with the arrangement of the blocks and buildings in the area(DETR and CABE, 2000, Cowan and Rogers, 2005). Thus, campus layout could include variety of aspects regarding physical campus, which is based on the 'dots' and the'lines'. Where according to Bentley *et al.* (1985) the urban layout encompasses any aspect concerning form, structure or recurring feature. These aspects are associated with design and planning qualities of campus environment such as accessibility, legibility and car usage pattern, which are linked to sustainability values on campus such as

walkability. This study, therefore, assumes that campus layout influences numerous aspects of sustainability trying to ascertain this role in the Iraqi university campus.

The Role of Campus Layout in the Transformation Towards Sustainability

University campuses design as essential organizations for the society cannot ignore sustainability issues in order to be able to support the teaching and learning processes. It is well accepted that the built form will influence the behavior within it and hence the way it is being used. The plan of a campus affects all other aspects of the built form and uses (DETR and CABE, 2000). It is concerned with the arrangement of buildings and spaces (Rani, 2012), which in turn, determines sustainability aspects such as its compactness, accessibility or legibility. Compactness, for example, is seen as a concept that is closely associated with creating a sustainable built environment (Jabareen, 2006b, Jenks and Jones, 2010, Oktay, 2004, Ferriter, 2008). This applies to many other features of physical character related to campus layout and design. In addition, features of campus layout such as paths organization, accessibility and physical form could influence campus walkability and its pedestrian-oriented dimensions(Sisson *et al.*, 2008).

Furthermore, layout is seen as a function of spatial configuration for a built area, which influences pedestrian movement and their accessibility into different uses (Dempsey *et al.*, 2010, ODPM, 2005). According to them, how spaces and places of a built area are connected to each other is determined by the configuration of the structural layout of this area. It also related to campus size and the distances between different parts of the campus. These are related to the ease of pedestrian movement and the pattern of vehicle circulation. Permeability and the ease of finding the way for pedestrian that are provided by the layout configuration are also key factors in this issue. Accordingly, Dempsey *et al.* (2010) and Cowan (1997) asserted that the extent to which routs connect spaces has a great influence on how lively a place is. In fact, this can act as a sustainable factor because it affects aspects such as social interaction and the usage of open space affecting the walkability of the campus environment. It can be argued that when a campus layout encourages walking, it would decrease car reliance and, as a result, diminish air pollution and support social equity.

Methods

For this study, the main campus of Baghdad University in Baghdad city in Iraq was chosen as a case study. This campus was selected to conduct this research because it is deemed the oldest designed campus in the country representing the mother campus of the all other campuses. The other reason to select this campus was being designed by an internationally known architect, enjoying a distinctive layout. His concept was to reflect the layouts of traditional cities in the country. A method of clustering and grouping buildings using intersections between two or three grids in different directions was employed (Figure 1). This way allowed creating courtyards and spaces among each group of buildings keeping linkages between the buildings in the first floor. This concept leads

somewhat to positive relationship between masses and voids, which is a major principle of urban fabric for traditional Islamic cities.

Figure 1: Arial Photo of the main campus of Baghdad University-Iraq

This research adopted both quantitative and qualitative methods to conduct the field study. While a questionnaire was employed as quantitative technique, the observation survey was used as a qualitative technique to gather the required data. The sample size of the questionnaire was 370 respondents including students, faculty members and staff. This size of the sample was based on previous studies (Saadatian *et al.*, 2013) and online tools. For data analysis, the study employed the SPSS software to conduct the statistical analysis using the logistic regression analysis, in addition to descriptive statistics including frequencies and percentages. Observation survey was done in a five-day visit to the case study campus. It included assessing different aspects of physical character of the campus such as streets layout, buildings and spaces configuration and public transport. In addition, users' behavior and activities in the outdoor environment were also observed. The observation employed two techniques: recording notes and taking photos.

Results and discussions

Two aspects of campus layout associated with sustainability, namely accessibility and usage of private car, were researched.

Accessibility

Accessibility is a layout design quality associate with social sustainability because it represents the ability to easily reach services, goods as well as doing activities (Abd-Razak *et al.*, 2012). The accessibility is deemed an essential sustainability factor for campuses because it leads to innovation and the concern about campus spaces used by pedestrian (Eckert, 2012). Accessibility in this understanding could contribute to support social equity, increase interaction between people as well as diminish air pollution and energy consumption through promoting campus walkability and pedestrian movement.
Accessibility on campus is defined as the ease to get to various destinations in the campus including facilities and services, academic, residential as well as recreational areas. It is directly affected by the structural layout of the campus. (Abd-Razak *et al.*, 2012).It is, therefore depends on to what extent the campus layout is compact and the way in which the important uses are located on the campus. This was argued by Burton (2000) who revealed that the good access to facilities and services is one of the advantages of compact layout. On the other side, in order to create accessible campus, a university should pay enough attention to the character of walkways, namely their quality, convenience, continuity, attractiveness, protection from weather and so forth. Hence, accessibility is deemed an important design quality because it directly influence the pattern of life on campus such as promoting walkability.

In this study, campus users were asked whether they could access into their important destinations easily on their campus. Figure (2) summarizes the responses where facilities core, nearest dining place and nearest shop recorded very high percentages of responses to have easy access.

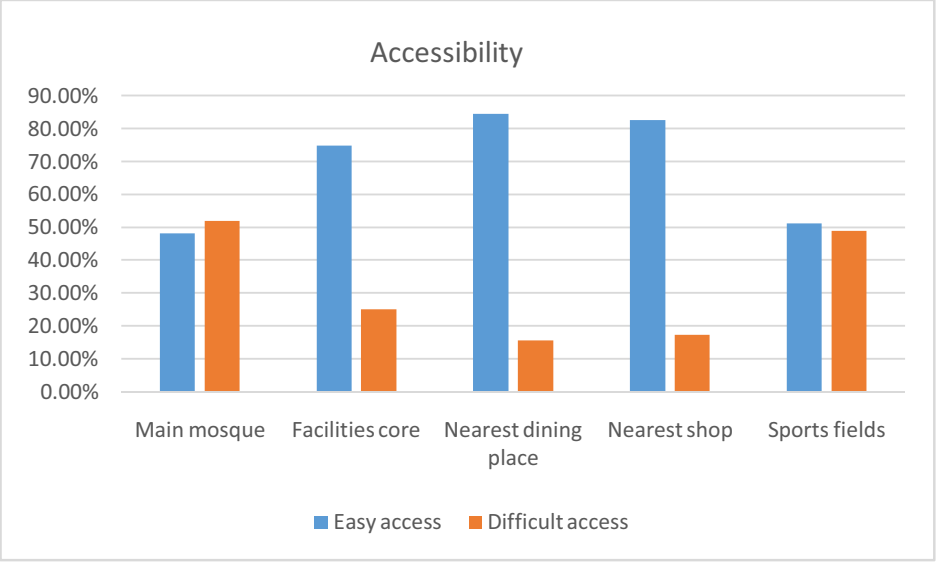

Figure 2: Perceived accessibility into the important destinations on the campus. Source: Authors

However, greater percentage of the respondents with about 52% indicated that their access into the main mosque is difficult. This could be attributed to the location of the mosque where a high-speed street separates the mosque from the majority of academic areas. Therefore, students need to across the street in order to reach the mosque.

To investigate how campus layout elements affects accessibility, a logistic regression analysis was conducted. Several variables related to campus layout entered into the regression model. Two destinations where chosen to be examined as the most important for campus users, namely the facilities core the main mosque (Table1). Results of the regression model showed that the existence of direct ways to the destinations (i.e. shortcuts) and the ease of crossing streets appeared to have significant impacts on the access into the two destinations at (99% and 95%) confidence level respectively. These results stressed the necessity to support the convenience for pedestrian movement by increasing the shortcuts through buildings or courtyards between them, in addition to provide safe street crossing by calming traffic speed on campus streets.

On top of that, clustering and grouping buildings emerged as significant factor for creating accessible facilities core at (95%) confidence level. It is true to say, this aspect could express compactness of campus layout, which was emphasized on by numerous studies as a substantial factor for urban sustainability, for examples (Jabareen, 2006a, Tsai, 2004, Bramley *et al.*, 2010). According to Burton (2000) the compact layout provides better access to facilities and services. Actually, this applies to the campuses too (Abd-Razak *et al.*, 2012, Hashimshony and Haina, 2006), particularly in hot-dry regions where Iraq and other middle east countries.

Table 1: The impact of campus layout variables on the accessibility into chosen destinations

Layout aspects	Access into facilities core		Access into main mosque	
	coefficient	Sig.	coefficient	Sig.
Distances between campus areas	.134	.509	-.102	.575
Campus size (Area)	.224	.326	-.847	.000***
Existence of direct ways to the different destinations (shortcuts)	.685	.001***	.599	.002**
Multiple choices to the destinations (permeability of streets)	-.278	.080*	-.168	.229
Connectivity of campus areas (How well campus areas are connected by walkways)	.180	.290	-.024	.872
Massing and grouping (Compactness)	-.338	.038**	-.118	.394
Ease of crossing streets (in terms of traffic speed)	-.412	.013**	-.311	.028**
Efficiency of public transport	.244	.123	-.205	.111

* Statistically significant at 10% level
** Statistically significant at 5% level
*** Statistically significant at 1% level
Source: Questionnaire survey- Author

It was observed through the observation survey that layout configuration of the case study campus depends on clustering the buildings into six or seven groups of buildings forming the facilities core and the academic areas. This configuration allowed buildings to be close together creating positive open spaces between them and to be linked at the first floors by connecting bridges and spaces (Figure 3). With this setting, shortcuts and direct ways emerge through the ground floor across buildings, courtyards. They sometimes appear as half-closed galleries forming very effective circulation spaces between buildings, which support pedestrian movement and accessibility. Thus, universities should encourage this way of configuration for their campuses in order to pursue sustainability.

Campus size also recorded significance for the access into the main mosque with confidence level of (99%). Campus size should be appropriate with campus population and the amount of building. Campus size could affect the distances between different areas, which in turn affect the accessibility to various destinations. As a result, student and other users could be encouraged to walk to their various destinations when distances are within easy access. In this regard, it is noticed by the observation survey that the main mosque is located far apart from the academic buildings making it difficult to access to it by users (Figure 4). In addition, this setting might affect negatively on safety issue as the long distance of empty area can encourage crimes exposing pedestrian to fear (Abd-Razak *et al.*, 2012). Given its importance for Muslim societies, the main mosque of the campus should be located within easy and safe distance for pedestrian from all academic and residential buildings. In short, it can be said that the key factor regarding these relationships is the ease of movement for pedestrian making the campus more walkable, which is, in turn, a principal factor for campus sustainability.

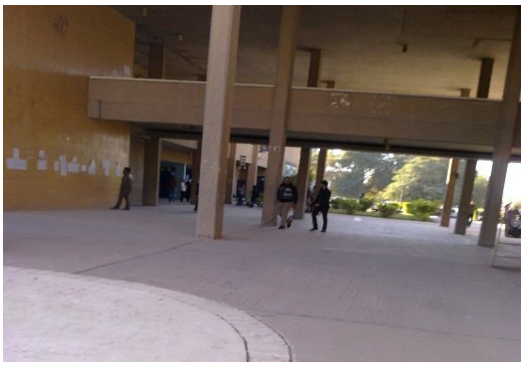

Figure 3: Directness: shortcuts through ground floor with keeping linkages on the first floor. Source: observation survey

Figure 4: Main mosque stands alone away. Source: observation survey

The use of private car

Diminishing the use of private car is strongly associated with creating sustainable environment for a campus. This aspect determines whether or not a campus environment

is healthy. This fact was mentioned by Masnavi (2007) where asserted that the harmful emissions released by private cars is a direct reason of air pollution and energy consumption. This affects negatively the human health in addition to its economic harm. The results of questionnaire survey showed that the majority of campus users never use their private cars to travel to their various destination in the campus, as shown in figure (5).

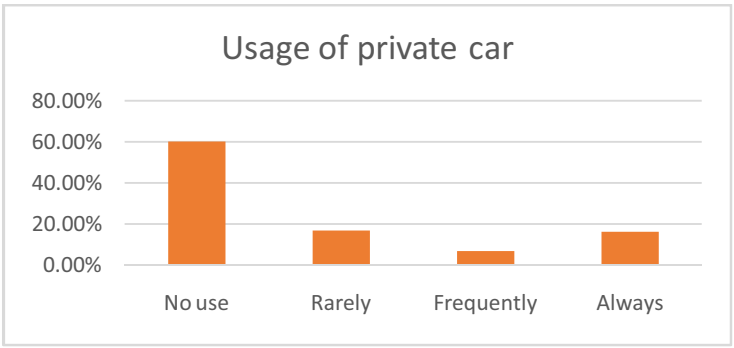

Figure 5: Use pattern of private car on campus. Source: Authors

Although the existence of landmarks is related to legibility and way finding, it appears here as a significant factor in the regression model of car usage on campus with confidence level of 99% (Table 2). It could be argued that the reason of this might refers to the role of landmarks in making the environment more legible and easy to understand, which could, in turn, encourage people, particularly new students or visitors, to walk to their destinations easily. The more the people who use walking, the less the use of private car. The observation survey recorded the importance of landmarks represented by the presidency tower for pedestrian on campus. Due its height and distinctive location, it appeared very effective in directing people in addition to its attractive appearance (Figure 6).

Two layout features, namely the grouping of buildings and the distances between uses aslo emerged as significant variables in the regression model. As mentioned above, these features are related to how the different uses or buildings were configured and located in the campus. Accordingly, they express the extent of compactness of campus layout. Masnavi (2007) revealed that the distribution of facilities and land use have an impact on the use of private car.

Table 2: The impact of campus layout variables on the usage of private car

Layout (Usage of private car)		
	coefficient	Sig.
Legibility (importance of high buildings)	-.842	.000***
Legibility (importance of art works and large trees)	.303	.145
Importance of distances between campus areas	-.691	.002***
Building density on campus	-.088	.729
Multiple choices to the destinations (permeability of streets)	-.165	.316
Connectivity of campus areas (How well campus areas are connected by walkways)	-.090	.633
Massing and grouping (Compactness)	-.486	.006***
Ease of crossing streets (in terms of traffic speed)	-.019	.918
Efficiency of public transportation	.269	.117
Quality of car parking	-.257	.116
Car Penetration of the campus core and academic areas	-.122	.416
Availability of parking for disabled	-.019	.929
Availability of parking	-.559	.012**
Availability of street trees	.271	.436
Access into main mosque	.005	.985
Access into facilities core	.110	.747
Quality of street paving	.058	.758
Quality of bus stop	-.003	.987
Accessibility of bus stop	.850	.012**

* Statistically significant at 10% level
** Statistically significant at 5% level
*** Statistically significant at 1% level
Source: Questionnaire survey- Author

Figure 6: Campus presidency tower acts an efficient landmark and focal point
Source: Observation survey

Furthermore, as shown in the regression table, the usage of private car in the studied campus is affected by the availability of car parking with confidence level of 95%. Actually, this aspect has sparked different opinions. While some argued that availability of car parking supports the convenience of car users, which is, in turn, one of sustainability objectives. Others, however, think the limited amount of car parking would decrease car reliance and, as a result, makes people walk towards their destinations. Dober (1992) considered parking spots on campus one of placemaking elements that configure the campus. Eckert (2012) revealed that campus users often prefer sufficient and convenient parking. However, it was advised by Dober (1992) that parking on campus should be pushed to campus edges. This method would make people cross the campus walking to their destinations. Thus, it is true to say, this remains appropriate as long as the traveled distance does not exceed 10 minutes walking. In contrast, According to Carmona (2003), car parking should be sufficient , convenient (located nearby), attractive and safe.

Through the observation survey, it was observed that small and medium car parking lots on the case study campus are distributed along the loop street that serve the majority of campus areas. This layout is efficient in preventing car penetration of the academic areas or facilities core. However, it was noticed the existence of a huge-size main parking located nearby the campus core, which is unsustainable quality in terms of the consumption of land and the undesirable views. It is argued, instead, to pursue sustainability that large surface parking lots should be replaced by structure-type parking, which referred by (Irvin, 2007).

The other factor, which rose as significant in the usage of private car regression model, was the accessibility of bus stop recordering a confidence level of 95%. This feature is related to the usage of public transport that represents a sustainable mode for people to move between campus areas. Carmona (2003) considered the local access to public transport as one of the sustainable design principles. The more efficient the public transport, the less reliance on private car on campus would be achieved. According to Davies (2007) the bus stop should be located within walking distance of 10 minutes or 800 meters. Therefore, the number and location of bus stop should be considered in a campus layout. Through the questionnaire, 70.5% of the respondents considered their access to nearest bus stop is easy. This directly affected the usage of the public buses by camps users where about 58% of the respondents used public buses much, as shown in figure (7). This means that this service is used by the greater percentage of campus users, which indicates a positive aspect of this service. However, the observation survey have recorded a frequent congestion of people who were trying to ascend into the public buses, particularly during the peak hours (Figure 8). The reason of this could be attributed to a lack in the service frequency represented by the number of working buses and managing the work schedule.

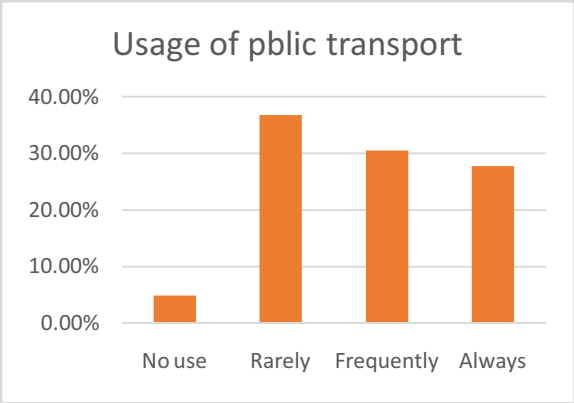

Figure 7: Use pattern of public transport on campus. Source: Authors

Figure 8: Heavy demand to the public buses on campus
Source: observation survey

This situation implies the importance of public transport for the community of this campus. Thus, Iraqi universities in order to diminish the use of private car, they should pay enough attention to bus stops in terms their locations and accessibility.

Conclusion

This study is to examine how the structural layout affect sustainability on Iraqi campus. It found that campus layout has a considerable contribution to make a campus more sustainable socially, environmentally and even economically. Using quantitative and qualitative methods, the study investigated the physical components of campus layout against two factors of campus sustainability. The first is related to social sustainability, namely the accessibility on campus, while the other is associated with environmental sustainability and indirectly the economic sustainability, namely the use of private car. Findings proved that layout features have the ability to support directly campus walkability and the ease of pedestrians' movement, which are very important components of campus sustainability.

The accessibility on campus encompasses several destinations such as facilities core, main mosque, the nearest sundry shop, the nearest dining place and sports fields. It was found by this study that higher percentages of campus users have easy access to the majority of these destinations, which indicates a successful layout (in terms of this aspect) in general. Through the logistic regression model, the access to facilities core and the grate mosque were examined against campus layout aspects. Five aspects of campus layout emerged as having the most impact on the access to those destinations. The existence of direct ways and the ease of crossing streets (in terms of traffic speed) recorded an impact on the both destinations. Direct ways could be represented by the shortcuts though buildings, which are very important in making the campus more accessible. In case of the conflict points between vehicles and pedestrian movement, then traffic speed would become a crucial factor to cross the street easily and safely towards a destination. This aspect was the second significant factor for accessibility that should take

enough care by Iraqi universities towards sustainability. Campus size and building grouping also appeared as significant variables for the access into facilities core. While the former should be compatible with campus population and building density, the latter is related to the configuration of campus buildings and the way they are related to each other. In fact, those two aspects could determine whether or not the campus layout is compact, which in turn, important factor of campus sustainability. Moreover, the permeability of street layout also emerged as significant variable for the access to facilities core, which is related to whether the street layout provide multiple choice for pedestrian and vehicles. Therefore, Iraqi campuses should take into consideration that the more the choices for pedestrian and vehicles, the more the accessible destinations on campus.

As for the usage of private car on the campus, the study found that campus layout has impact on car usage. Landmarks represented by high buildings appeared as influential on the usage of private car, in terms of it can encourage pedestrian to walk by making the environment more legible and understood. In addition, distances between campus areas and the grouping and clustering of the buildings should be paid a great attention because they can lead to a compact layout, which is, in turn, a substantial factor for campus sustainability. Other layout aspect, namely the accessibility to bus stop rose as a significant variable on the use of private car in the campus. Iraqi universities should locate bus stops in appropriate points due to their direct impact on the efficiency of public transport of the campus. In fact, this aspect has two directions of campus sustainability. The first is the environmental direction, where it encourages people to use public buses instead of private cars. This would diminish the harmful emissions from private vehicles. The second direction is the economic one, where the more the use of public buses, the less the energy consumption and cost paid for travel. To conclude, this study found that creating a walkable campus and providing good conditions for pedestrian people are the key issues for Iraqi universities to create sustainable campuses. Furthermore, Iraqi campuses in their pursuit towards sustainability have to be designed or modified according to their own circumstances. Hence, the variables that emerged by this study represents the own sustainable character of the layout of Iraqi campuses.

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DEVELOPING SUSTAINABILITY VALUE-DRIVEN IDENTITY

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In the past few years, the State of Qatar witnessed major economic transformations, specifically in the oil, gas and petrochemicals industry. It has also successfully started to transform its former rent-based economy into a knowledge-based and service-oriented society. Buildings were solicited the use modern technologies to evoke the nation's past. This is highly evocative the Qatar commitment to the lifestyles of the past, while encouraging economic and technological development. This paper focuses on understanding the relationship between culture and identity in Qatar to qulaify sustainability. It suggests integrating traditional elements within the social and urban fabric of culturally diverse cities. The paper investigates this idea as an approach of maintaining the principles of traditional architecture of Islamic cities while taking advantage of the introduced modern technology. The paper calls for integrating the identity of the place within the contemporary urban environment of old cities.

Keywords: Cultural Identity; Contemporary Urbanism, Architecture Elements; Traditional Indicators; Qatari Architecture.

Introduction

Amidst the majority of non-Qataris, the small Qatari population appears to be rather homogeneous. Expatriates comprise approximately two thirds of the population (Nagy, 2006). As a result, the demographics of the society have become more global and contemporary attached with international values in addition to the attitudes that have impacted the existing cultural and architectural patterns. Qatari architectural trends have become increasingly contemporary and completely detached from the traditional ones that reflect the country's identity. Doha, the capital, has recently witnessed the resurgence of the discourse on Islam as a cultural identity. Sincerely at times, but opportunistically at others, many architects got engaged in the design of various historicist styles to satisfy the growing demand for a contemporary Islamic architecture. The modern and post modern Qatari architecture have gone their way disregarding tradition and accordingly, the Qatari Architectural identity has been erased.

Qatar's attractiveness today is generated from its modernized architectural patterns and styles that balance tradition-ism and modernism. Many of the newly designed buildings are strictly reproducing the Qatari traditional elements and styles as shown in Figure 1.

Figure 1: Examples of Modern Buildings Designed on Traditional Architectural Patterns

A Discussion on the Contemporary Urbanism of Qatar

In this modern world, certain architectural features have become fixed and eternal as they help in finding the lost architectural roots and they remain true to the region's identity. Almost every architectural structure addresses, in a direct sense,

cultural identity and philosophy within a physical context (Chinchilla, 2007). Qatar is found to be unique when it comes to the contemporary and special urban space, identity, and city image when compared to other regions in the Gulf. The geographical context and history, resistance to colonialism and unprecedented impact of the oil and gas industry in Qatar, accumulatively show the distinct history, culture, economy and the profound traces of change.

Gary Martin noted that "Oil wealth, along with social and political change, have threatened Islamic culture and traditions. This identity crisis is readily apparent in architectural design" (Martin, 2008). A desire for rapid development, Martin noted, brought to the Middle East the massive importation of Western technology, planning, design and constructional expertise. The Islamic concepts of unity, harmony and continuity were often forgotten in the rush for industrial development. Many of the new buildings in the Middle East are direct imitations of Western models that were designed for another culture and they are creating an alien environment in Islamic communities. Martin listed three directions of contemporary Islamic architecture as follows:

1. It completely ignored the past and produced western-oriented architecture that ignored the Islamic spirit and undermined traditional culture.
2. It retreated the Islamic architectural past in a way that integrated the traditional architectural elements, such as façade of arches and domes, onto the modern built environment.
3. It understood the essence of Islamic architecture and allowed for the modern building technology to be used as a tool in the expression of this essence.

Qatar's modern architecture, as mentioned by (Jaidah, 2009), integrated its traditional Islamic elements onto its modern built environment. The examples range from the often arbitrary usage of forms detached from their historical and geographic contexts, to the rational, abstracted and at times minimalist projects of architects trained in the modern tradition. Qatar has come to encompass a greater variety of contemporary architectural styles in recent years, where some buildings found to be entirely distinctive and local in their character and many others are seen to be products of direct foreign architectural influences. Now that Qatar has state-f-the-art technology, Doha city has become home to innumerable modern structures that have striking architectural designs, Figure 2.

Figure 2: West Bay–Al-Dafna Area Skyline (Doha Skyline, 2011)

Cultural Identity of Qatar

Culture is widely known as an integrated pattern of human knowledge, belief and behavior that depends upon the capacity for symbolic thought and social learning. It is also known as the set of shared attitudes, values, goals and practices that characterizes an institution, organization or group. According to the American Heritage Dictionary III, the definition of culture reflects the totality of socially transmitted behavior, patterns, arts, beliefs, institutions and all other products of human work and thoughts. It consists of; language, ideas, beliefs, customs, codes, institutions, tools, techniques, works of art, rituals, and ceremonies. "It is an important

factor in shaping identity" (Pratt, 2005). Identity, on the other hand, has been always related to physical space; it has always been believed that cultural or collective memory is produced through and reflected in objects, images and representations. It is perceived to be located in specific places or objects and is therefore of major significance in urban planning. Yet, this process of cultural or collective memory is bound in complex political stakes and meanings.

Before taking any consideration on cultural identity, as argued by (Mateus, 2006), one has to keep in mind that the concept of culture is in constant mutation, just like the concept of other very familiar terms like; integrated economy, globalization, social integration and multicultural society. These are used in so many different contexts and are suffering from saturation of meaning. According to (Landry, 2000), cultural identity represents the sum of our past creativity and the results of creativity are what keep society going and moving forward. It is the result of centuries of community living and interacting in its own geographical surroundings, which means, it was formed from its natural continuity with its past, a natural result of an undisturbed existential possession that people simply "had" (Tomlinson, 1999). (Castells, 1997) has devoted an entire volume of his celebrated analysis of 'the Information Age' to the proposition that: 'Our world and our lives are being shaped by the conflicting trends of globalization and identity.' For Castells, the primary opposition to the power of globalization lies in 'the widespread surge of powerful expressions of collective identity that challenge globalization-on behalf of cultural singularity and people's control over their lives and environment'. In conclusion, culture as a "historical reservoir", has been always seen as "an important factor in shaping identity" (Pratt, 2005). Critics of cultural identity dispute that the preservation of cultural identity, being based upon difference, is a divisive force in society and that cosmopolitanism gives individuals a greater sense of shared citizenship (Gans, 2003). Identity is seen here as the up-surging power of local culture that offers *resistance* to the centrifugal force of capitalist globalization.

In accelerated growth cities like Doha, the concept of identity and its implications are increasingly complex and multi-dimensional; it encompasses culture, urban quality, and lifestyles, use of space, technical procedures and building construction techniques. Built environments like Souq Waqif play major roles in stabilizing group identities, thus, creating a sense of place and offering citizens a sense of historical understanding and belonging. It can be argued that the development of Souq Waqif acts as an important mechanism in the maintenance of Doha's cultural identity and influences the globalization movement of Qatari culture, seen through the mushrooming of imported structures and the imposition of national historical identities on unique localities (Hubbard, 1993).

Elements Affecting the Reproduction of Urban Identity in Qatar

Traditional City Marks

City marks are concluded in ancient local market in Doha that reflects the identity of the country. In Doha, Souq Waqif "Standing Market" is derived from the fact that merchants sold their goods whilst standing when it banks were often wet during wintertime. The souq was mentioned first in historic documents around 1766 A. D. With the gradual development of the little town of Doha, most merchants transformed their plots and houses in the souq to shops and formed an attractive and dynamic permanent market for all sorts of goods. Goods sold in the market were imported from; the Arabian Peninsula, East Africa, India and Persia. Among these goods, an essential construction material called "dangeel" that was used for roofing

and changed dramatically the building typology of this Gulf region. The souq attracted traders from all different aforementioned places, over time some permanently settled in Doha, which explains the very diverse ethnic background of the shops' owners. Figure 3 shows the souq before and after restoration.

Souk Waqif in the late 50's and early 60's. Old Photographs of Qatar. (n.d.)

Souk Waqif today. Qatar embassy (2004).

Figure 3: Souq Waqif before and after Restoration

The souq has been constructed using traditional materials and elements of architecture reflecting its almost a hundred year old history. The building system of Souq Waqif consists of walls formed with a series of bearing incorporated columns-with a span of 90 cm. The gaps between the pillars are filled with seashore stone, an alternative technique for creating windows, with blind arched plastered latticed panels-for decorative purposes. The main bonding material used in these structures is mortar, obtained from mixing mud and gypsum. The roofs are often flat, composed of mangrove poles and are covered with woven bamboo fixed with ropes.

The apparent structural skeleton with a rough coating is a key feature of all façades around the souq, maintaining richness though architectural simplicity. The scarcity of wooden 'dangeels' offers flexibility and durability in hanging loads with different sizes. This is proof of the importance of wood and demonstrates its rarity as a material in the local environment.

The simplicity of the urban context in the Muslim world, as shown in Figure 4, resulted in most buildings not exceeding two or three floors, reflecting both the nature and history of the traditional Muslim souq. The urban pattern is more spontaneous as the souq was established following a distribution of shops that were gradually erected.

Figure 4: Souq Waqif: Façades Traditional Materials and Elements of Architecture

Pathways and Street Enclosure

Streets and pathways have a big effect on increasing the sense of place in the city. As shown in Figure 5.

Figure 5: Souq Waqif: External and Internal Alleys and Pathways

Waqif's narrow streets and alleys reflect a successful example of breathing the culture. A stunning renovation has thankfully returned it to a typical 19th century

souq, complete with attractive shops. An intricate labyrinth of streets offers a natural shelter from the country's sweltering sun. Unlike impersonal air conditioned malls where shoppers are entirely shielded from the environment, Souq Waqif, offers passers-by refreshing shaded pathways and street enclosure.

Streetscape

The livability and the beauty of this souq is greatly determined by its streetscape, that successfully ties the fabric and the common landscape of the place. The term "streetscape" herein defines the space between the building facade (frontage) and the curb and all other souq public spaces and furniture including; lighting, signage, benches, and other amenities. Waqif's streetscape is designed to emphasis the traditional elements of architecturecreating an essence of the old Qatari era; new features and sophisticated lighting systems are also developed to provide illumination, Figure 6.

Figure 6: Souq Waqif: Lighting System

Amongst the significant design opportunities created in Souq Waqif is the inadequate signage system leading in and out of the Souq and linking various facilities to each other. As a result, a modernized character has been locally generated. Arabic/English branding logos have been developed, Figure 7.

Figure 7: Signage and Stores' Branding Logos Written in both Arabic and English

Most, if not all, of the restaurants and stores in Souq Waqif are extend their activities to the outdoor space displaying products, serving pedestrians and interacting with the public, Figure 8.

Figure 8: Souq Waqif: Street Furniture and Accessories

Activities and Trade

As shown in Figure 9, Souq Waqif houses several art galleries with regular workshops, art events and concerts, forming a part of its holiday seasonal calendar. The "Souq Waqif Art Center" lies at the centre of these activities. Several art shops and exhibition rooms are located along its lengthy courtyards like "The Art Source Painting Shop", "Soora Photography Studio", "Heraf Arts and Crafts", "Afkar Books" and "The Art Shop" which stocks all types of art supplies. Other activities in the souq include, but are not limited to, spice traders who display aromatic ground spices in

boxes, sacks and huge tubs; stores that display antique furniture and silver souvenirs and dozens of restaurants serving cuisine from all over the world. It could be noted that the ways goods are displayed on both sides of the souq's narrow alleys imitate the traditional Qatari market display. A glimpse of a typical Qatari's life could also be extracted from those merchants selling their goods at the Souq.

a. Food Market and entrance to the Cloth Market

b. Pet Market in the North internal space

c. Heraf Arts and Crafts

d. Spices and herbs

Figure 9: Souq Waqif: Daily Activities: Shopping and Trade

A Case Study of Contemporary Architecture in Qatar

The purpose of this part is to evaluate indicators based on traditional architecture for integrating the Qatari architecture language in the urban contemporary environment with the support of city image and urban identity. Based on the previous study (Ibrahim 2013), establishing the traditional architecture variables in Qatar, which are: Building elements, landscape components and function/ activities- had been evaluated.

A questionnaire is developed, taking into account the concluded elements/parameters that affect the traditional value. The traditional values are classified into three main parts: the building components, landscape components and the function/ activities. The questions are to examine the stakeholders' opinion for Souq Waqif and how they think of its architecture. The Souq has been investigated according to the developed questionnaire parameters. This phase is carried out based on site visit and observation techniques. The result of the questionnaire had been analyzed as an approach for implementing the framework for defining the significance of the architecture elements in emphasizing the identity in the contemporary architecture. The questions were designed to be close-ended questions, which are simple that individuals can answer. It consists of twenty questions that are covered the different three considered traditional variables as shown in Figure 10.

Building components: *Evaluate the following building components in terms of Qatari traditional trend.* ** Rate using the following scale: Traditional 1 2 3 Not traditional* *1. The Wall* *2. The Roof.* *3. The Openings.* *4.* The *Structure.* *5.* The *Building Materials.* 6. The Ornamentation of Buildings. *7. The* Form.	**Landscape Components:** *Evaluate the following landscape components in terms of Qatari traditional trend.* ** Rate using the following scale: Traditional 1 2 3 Not traditional* 9. Landscape Structure: Landscape composition and configuration in overall. 10. Traffic road Materials. 11. Lighting. 12. Signage.	**Function/ Activities:** *Evaluate the following function/activities in terms of Qatari traditional trend.* ** Rate using the following scale: Traditional, medium and not traditional* 15. Festivals events. 16. Crafts and souvenirs. 17. Food and drinks. 18. Manufacturing/ industry/workshops. 19. Tours/ transportation/ trips 20. Others please state.

Figure 10. The questionnaire that been used for the three cases study in Souq Waqif

Ranking the Traditional Indicators in the Contemporary Architecture

A comprehensive analysis for the three variables has been carried out to establish the required indicators include: Identifying the historical background, function, physical elements, building materials, and physical surroundings. These indicators are implemented along a framework to enable local authorities, and building industry decision makers to understand the degree of integrating Qatari architecture language into any proposed contemporary urban. The established assessment criteria will be used by governor and private sectors as a purpose of making urban spaces more responded to the tradition and to embrace modern buildings in many forms including new construction, renovations, site planning and more. The implemented framework is to be validated and certified in the next stage. This is been done according to the responses of the questions and the rank of each indicator in terms of satisfying the traditional architecture.

Building Elements

According to the responses to the questionnaire, there are significant building elements in Souq Waqif area that reflect the traditional. A big percentage of the answers reflect that the wall, roof, opening, structure, form and building colour are reflecting the Qatari architecture. The variables of building components were given by the highest responses a high score in terms of being traditional.

Figure 11 shows the building components rank based on the responses to the questionnaire questions. It is clear that Souq Waqif has a significant traditional building component that reflects the Qatari architecture.

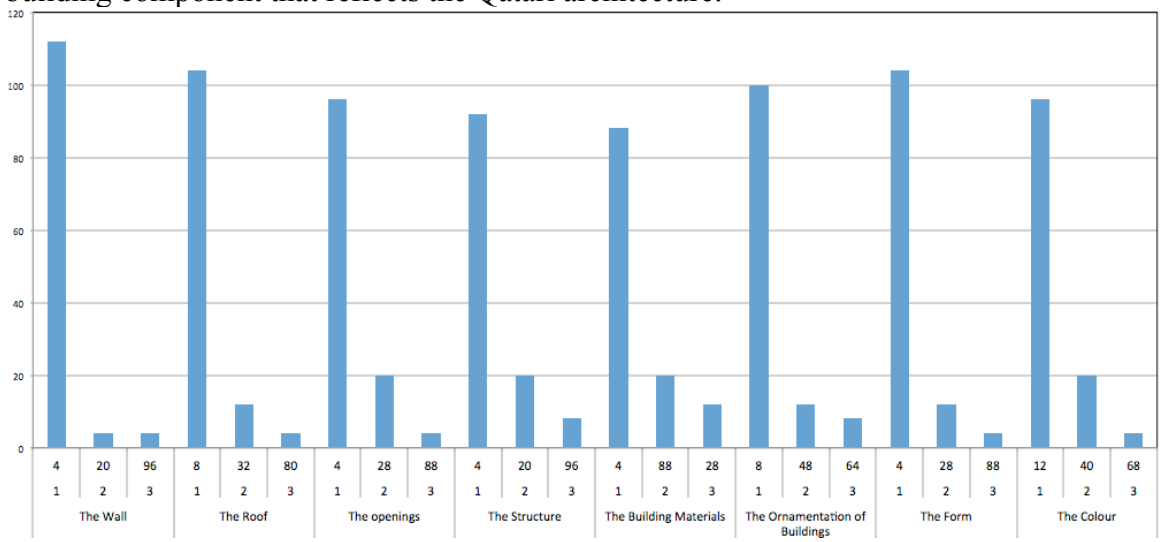

Figure 11. The response for building components in Souq Waqif

Landscape components

The pedestrians and pathway, signage and furnishings are the only landscape components that are completely reflecting the Qatari traditional architecture in Souq Waqif. However, the landscape structure, traffic road materials and lighting are reflecting the Qatari architecture in a medium scale, Figure 12.

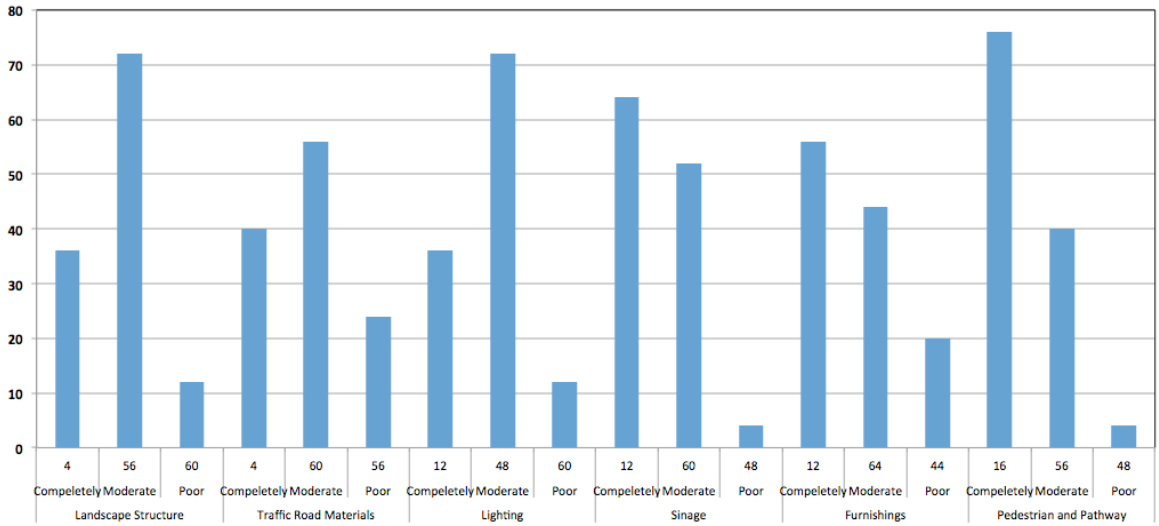

Figure 12. The response for Landscape components in Souq Waqif

Function/ Activities

The function/ activities in Al- Dafna area are having not traditional value according to the most of the responses. However, there are some activities that are giving some traditional dimension such as: Festival events and tours/ transportation trips.

In Souq Waqif, there are many function/ activities that are reflecting the traditional; however, the tours/ transportation trips has more responses consider it as a medium rank, Figure 13.

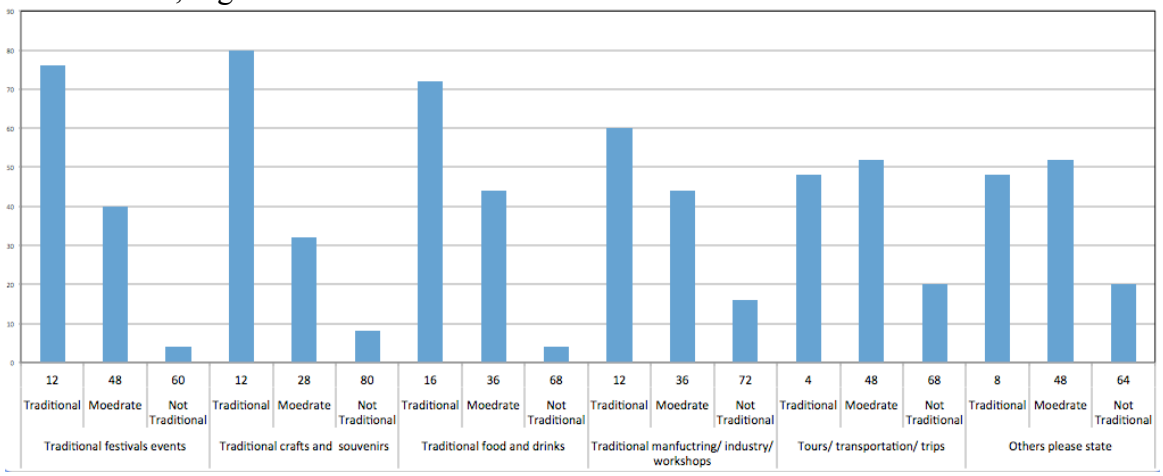

Figure 13. The response for Function / Activities in Souq Waqif

Conclusion

As a means of reproducing the identity of the place and to confirm the necessity of rooting traditional values to the contemporary environment, a framework/tool that identifies key variables and considerations has been generated by the author. The tool calls for gathering and analyzing all necessary information about the environment being investigated in relationship to the surrounding context and the built environment. Souq Waqif has been chosen as a study model to examine the developed tool. The methodology followed by the researchers to generate this tool included: Conducting several site visits to Souq Waqif, observing the interaction between end-users and the built environment, interviewing merchants and end users,

recording the significant architectural details of the place and analyzing the behavior of both visitors and merchants.

This paper introduces the case of Qatar and the urgent need of sensitivity in dealing with the global and traditional urbanism in contemporary architecture. In line with this, this paper aims to establish ranked traditional indicators in contemporary architecture. The considered indicators of Qatari traditional architecture include: building components, landscape components and function/ activities. A questionnaire that covers the variables under each indicator is distributed to samples of different background people: Qataris, expatriates in addition to the expert in the field. An analytical study based on the responses of the selected samples has been conducted for Souq Waqif.

The building components consist of all exterior components of a building – roof, walls, windows, skylights, and so on. According to the survey response, the building components are the strongest elements that reflect the traditional in the contemporary architecture. Accordingly, the building envelope must be properly designed using the traditional elements and to be integrated into contemporary architecture in Qatar.

We shall also argue that the traditional landscape components that reflect the culture of the country offer several advantages when applied in the contemporary architecture. Traditional landscape components such as: structure, road materials, signage, furniture and so on plays a role in reflecting the traditional in the contemporary urbanism in Qatar.

The traditional function and activities are emphasizing the urban space and has a positive role in drawing the image of traditional in the contemporary urbanism indirectly.

The data collected on the above listed issues were related to the findings from verbal interviews, questionnaire and observation.

Acknowledgement

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SUSTAINABILITY OF PERSIAN ARCHITECTURE: A BRIEF INTRODUCTION

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Persian architecture has a very long and complex history, and it is often regarded as the field in which Persia made its greatest contribution to the world's culture. The present study indicates a focus upon sustainable architectural philosophies and principles that have been taken as best criteria from ancient Persian which could still use in contemporary architecture applying new technologies. In fact, these patterns were presented based on consideration of particular elements such as nature, cosmic symbolism, geometry, structural and aesthetic variety in designing. As well, the framework of Iranian art was linked to durability, reliability, renewable energy, and eco-efficiency. To this end, the present study directs its attention to specifications of Persian sound architecture to synthesize their past with present technology.

Key words: sustainable architecture; Iranian art; durability

Introduction

Sustainable architecture tries to decrease the side effects and the negative environmental influence of buildings by efficiency and moderation in the use of energy, materials, and development space. It is also the philosophy of designing physical objects, the built environment, and services to comply with the principles of social, economic, and ecological sustainability. The traceable concepts of durable designs began in Ancient Persian around 550 BCE. At the time, most of Persians led architects to design buildings that would present particular elements such as nature, cosmic symbolism, geometry, structural and aesthetic variety in designing. The Persians understood the facts about the unique merits of sustainable architecture and the impact of it on society. Traditional Iranian architecture has maintained continuity and in this architecture, there are no trivial buildings; even garden pavilions have nobility and dignity, and the humblest caravanserais generally have charm. In expressiveness, most Persian buildings are lucid-even eloquent. The combination of intensity and simplicity of form provides immediacy, while ornament and, often, subtle proportions reward sustained observation (Firouzeh Mirrazavi, 2009).

Concept of Sustainability

Sustainability does not have a rigid definition, but few major aspects of sustainability are given here (Sirija & Arch, 2013):

- Sustainability means living a life of dignity in harmony with nature.
- Sustainability is an attempt to merge ecology and economy into one system.
- Sustainability means renewing resources at a rate equal to or greater than the rate at which they are consumed.
- Sustainability means living within the resources of the planet without damaging the environment now or in the future.
- Sustainability means creating an economic system that provides for quality of life while renewing the environment and its resources.
- A sustainable community is one that resembles a living system where all of the resources (human, natural and economic) are renewed and in balance for perpetuity.
- Sustainability means taking the long-term view of how our actions affect future generations and making sure we don't deplete resources or cause pollution at rates faster than the earth is able to renew them.
- Sustainability is creating a world where everyone can have fulfilling lives and enjoy a rich level of well-being within the limits of what nature can provide.

Concept of Sustainable Architecture

Sustainable architecture is a term that describes environmentally conscious design techniques in the field of architecture (Sirija & Arch, 2013). In the broader context, sustainable architecture seeks to decrease the negative environmental impact of buildings by enhancing efficiency and moderation in the use of materials, energy, and development space. The idea of sustainability, or ecological design, is to ensure that our actions and decisions today do not inhibit the opportunities of future generations. The term can be used to describe an energy and ecologically conscious approach to the design of the built environment.

Architecture and Sustainability Factors

Construction projects typically consume large amounts of materials, produce tons of waste, and often involve weighing the preservation of buildings that have historical significance against the desire for the development of newer, more modern designs. Sustainable construction is defined as “the creation and responsible management of a healthy built environment based on resource efficient and ecological principles”. Sustainably designed buildings aim to lessen their impact on our environment through energy and resource efficiency (ASC, 2010).

It includes the following principles:

- Minimizing non-renewable resource consumption
- Enhancing the natural environment
- Eliminating or minimizing the use of toxic materials

Sustainable building can be defined as those buildings that have minimum adverse impacts on the built and natural environment, in terms of the building themselves, their immediate surroundings and the broader regional and global setting. Thus, the rational use of natural resources and appropriate management of the building stock will contribute to saving scarce resources reducing energy consumption and improving environmental quality.

Sustainable Architectural Principles of Ancient Persians

Persian architecture principles are presented based on consideration of different stages and levels in design and construction management. Persian traditional architecture mainly focuses on the following cases.

The Design Stage Procedure

In Persian architecture design stage consists of many steps. There are five stages in traditional design as follows (Pirnia & Sabk Shenacy, 1971):

- Gaz-Kardan (To Measure): to find out site physical dimensions and possible capacities
- Goft-o-goo (Dialogue): To contact the client and have a mutual negotiation with them in order to realize what their required needs are and how they should be fulfilled regarding building asset whole life cycle (WLC)
- Barzeh (Sketching): To draw a rough sketch to determine the concept of design in order to negotiate with the client
- Arayesh (Approved Plan): To complete the drawings based on accepted sketches and approved ideas and concepts by client
- Kast- Afzood (Finalizing the drawings based on probable changes approval): to draw the final documents in a way that the building can be constructed due to drawings (As-built drawings).

Structural and Aesthetic Architecture

Iranian architecture displays great variety, both structural and aesthetic, developing gradually and coherently out of prior traditions and experience. Its paramount virtues are several: a marked feeling for form and scale; structural inventiveness; a genius for decoration with a freedom and success not rivaled in any other architecture. Decorations are also geometric, floral or calligraphic and often they are so closely molded into the design that they appear to be an intrinsic part of the structure. The colors need to be bright and bold because the sunlight is often extremely harsh. Blank surfaces and recesses were filled with increasingly complex

stalactites, mosaics and frescoes, and decorated with arabesques, geometric patterns and calligraphy. Mosaics forming the single word 'Allah', repeated hundreds of times in a highly stylized script, may alone make up the decoration of a wall.

Nature, Cosmic Symbolism

There is a respect for all elements of nature in Persian culture and community. In mysticism, it is believed that water, wind, soil and fire are the basic elements forming our surroundings. Hence, the presence of these elements is always apparent in Persian architecture. Benefiting natural vegetation, natural lighting, natural ventilation, earth geo-thermal and other potencies of nature are all included in this architecture (Vakili-Ardebili & Boussabaine, 2006). Traditionally, the guiding, formative, motif of Iranian architecture has been its cosmic symbolism by which man is brought into communication and participation with the powers of heaven. This theme, shared by virtually all Asia and persisting even into modern times, not only has given unity and continuity to the architecture of Persia, but has been a primary source of its emotional characters as well (Firouzeh Mirrazavi, 2009).

Geometry

One of the Persian architecture specifications is use of geometry in their designs. Geometrical rules in design advocates stakeholders to have better perception of measures, proportions and aesthetics. Also it supports them in structure regarding forces dealt in a building construction. The precise understanding of geometry and its relevant terms enabled Persian architecture to present more durable stable forms. The forms created in this architecture are based on circle, square or rectangular geometrical characteristics which are confirmed as the resistant forms regarding forces behaviors (Vakili-Ardebili & Boussabaine, 2006).

Renewable energy and eco-efficiency

Renewable resources are those that can be grown or harvested at a rate that exceeds the rate of human consumption. Using these materials is, by definition, sustainable (Jong-Jin Kim, 1998). Sustainability not only aimed at physical Sustainability, but also sustaining and protection of earth and its energy resources. For example, the runoff and sewer network of Persepolis are among the most complex in the ancient world. Persepolis is constructed on the foot of a mountain (Rahmat Mountain), with an elevated terrace that is partially man made and partially part of the mountain complex. As Persepolis was in essence an important cultural center often used by the beginning of the spring during the festival of Nowruz it enjoyed great precipitation and water runoffs from the molten ice and snow. The sewer network assumed great importance at this critical time as it was meant to both handle the water flow downward from higher areas as well as manage the inhabitant's sewage runoffs, and their water needs. In order to prevent flooding, the Achaemenids used two

engineering techniques to divert molten snow and mountain runoff: The first strategy was to collect the runoff in a reservoir that was a well with a square opening with dimensions of 4.2 m for the square opening, and a depth of 60 m, allowing a volume of 554 cubic meters, or 554,000 liters, (60 x 4.2 x 4.2) of runoff to be collected. The second strategy was to divert water away from the structure, should the reservoirs be filled to capacity (Wikipedia, 2014).

Sustainable Architectural Education

In Iran in all majors especially architecture the educational aspect of teaching is more than its research aspect, thus understanding and perceiving the functional concepts and developing the methods that are compatible with the environment and climate and cultural values do not have proper place in teaching. Although in recent years many efforts were conducted to investigate and apply traditional knowledge and create sustainable architecture but these tendencies were often personal stylish, relied on Western models and had lack of social support. Also, environmental courses which in recent years were added to the curriculum of students, have lack of the executive areas and adequate social needs at the community –level and are not effective like many other theoretical courses (Torabi, 2013). In fact, Issues related to educational planning for sustainable architecture, including the use of natural resources, construction materials, collection and integration of building systems and multipurpose utilization and consistent with humanistic values, which these trainings in Iran are in contrast with the societal habits and are in need of coordination in management structure.

Synthesizing the Past with Present Technology

From the late 19th century, as Persia opened up to the outside world, the importation of European building techniques hastened the decline of traditional styles. It begins with the advent of the first Pahlavi period in the early 1920s. Some designers, such as Andre Godard, created works such as the National Museum of Iran that were reminiscent of Iran's historical architectural heritage. Others made an effort to merge the traditional elements with modern designs in their works. The Tehran University main campus is one such example. Others, such as Heydar Ghiai and Houshang Seyhoun, have tried to create completely original works, independent of prior influences (Diba & Dehbashi, 2011).

Contemporary architecture in Iran follows some of the techniques of European modern and their traditional architecture. On the on hand, major constructions projects are implemented by the government and are a showpiece of modern architecture in Iran. For example, Borj-e Milad (or Milad Tower), the tallest tower in Iran is the fourth tallest tower in the world and also the Flower of the East Development Project is the biggest project on Kish Island in the Persian Gulf. On the other hand, minor

projects such as construction buildings that are built by contractors do not follow sustainable architecture and constructions are not under scrutiny.

In fact, there is a difference between academic fields and professional practices in architecture and the academics also recommend traditional architecture in traditional way in Iran. Besides, our architects could use durable traditional elements from our past buildings and modern technology. As well, natural resources, reducing energy consumption and providing comfortable, healthier and sustainable living spaces should be the aims of a climatically responsive sustainable building design. More importantly, taking advantage of the ancient people's experiences to improve the quality of architecture would pave the way to achieve a stably permanent design (Shojaei & khodayari, 2011).

Results and Discussion

According to Persian historian and archaeologist Arthur Pope, the supreme Iranian art, in the proper meaning of the word, has always been its sustainable architecture. The ancient Persian culture also awarded a preponderant importance to the decorative aspect in their sound architecture which used as resource and vehicle of expression with a deep philosophical meaning about life. So, Iranian policy makers can refer to their precedents to plan, design, and create sustainable constructions. Besides, Iranian architectural professionals have to accept the fact that as a society’s status improves its demand for architectural resources such as land, buildings or building products, energy and other resources will increase. To this end, sustainable architecture education is urgent and the goal of sustainable architecture education should be to access scientific knowledge about environmental resources, ethics, values and skills in line with the objectives of sustainable development and public participation in the decision making thus in moving from the conventional architecture to sustainable one. Architectural education requires fundamental changes which are faced with numerous obstacles. Issues related to educational planning for sustainable architecture, including the use of natural resources, construction materials, collection and integration of building systems and multipurpose utilization should consistent with humanistic values, which these trainings in Iran are in contrast with the societal habits and are in need of coordination in management structure (Torabi, 2013).

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SAFETY OF LIGHT RAIL TRANSIT SETTING FROM WOMEN'S PERCEPTION

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Light rail transit is one of the modes that been introduced to reduce dependence on private car and to reduce traffic congestion. This study is focusing on women's perception of safety at light rail transit setting. Safety in this context should consider gender base as different gender perceived their environment differently. Environment or setting affects people's perception and effect from outside stimulus, past experience or from other sources affect the way women perceive the environment. It is important to study their perception as it will lead or determine the usage of public places and public transport. In order to understand this issue, the study was conducted through mixed methodology with single case study approach at Masjid Jamek Light Rail Transit setting. 120 respondents were asked about their perception of the physical environment that affect safety and structured observation were conducted to study both physical and social aspect. Findings show that physical elements do affect women's perception of safety and social elements such as incivilities derive from the environment itself. Design intervention could increase or decrease the potential of crime and more importantly the feeling of being safe in transit area. Therefore, transit setting need to be design towards safety aspect.

Keyword: safety, setting, perception, women

Introduction

According to United Nations Report on Enhancing Urban Safety and Security (2007), crime rates has increased and from the year 1980-2000, there was an increase of 30% crime rates recorded in the world. There is also an increased fear among urban

residents where according to UN survey, the fear of crime is pervasive in both developed and developing countries.

Safety of women's rider is essential as they are the most user of public transport and vulnerable to risk of being victimized. Safety is a basic and essential need for human being and we always have to maintain our own safety and people around us. The UN Habitat (2011) highlighted that women should be given equality to 'access' and 'use' the city. Transit setting needs to be accessible and safe not just for women but also for the general population to foster a liveable community. Safe public transit designed from a gender perspective is an essential component of safe cities for women (UN, 2012). There are global concerns and effort at international level pertaining to public safety and at local context, concern over safety is increasing with the rising of crime rate statistic. According to the Malaysian Quality of Life Index (MQLI 2000), which is based on eleven areas, it was found that all areas have recorded a significant improvement except for public safety. Public Safety Index fell by 16.021 points during the ten year span (Malaysian Quality of Life 2002 Report issued by the Economic Planning Unit of the Prime Minister's Department). It was found that fear of crime increased where people had lost their most basic human rights to security and to live without fear about their safety.

Literature Review

Safety can be divided into two categories that is actual safety and perceived safety. Actual safety is regarding the way people move in their environment while perceived safety is concerning their feeling of being safe or unsafe. Perceived safety is not necessarily linked to actual safety; safety or a sense of safety, freedom from doubt or uncertainty; and something that gives or assures safety, protection, safeguards (Webster's 1966). One of the key attribute to successful place is comfort and image, where feeling safe is the intangible character that contributes to this key attribute.

Gender-based violence and women's safety is increasingly recognized as a key health, development and human rights issue. Many different approaches and strategies

are used with different degrees of success. In order to make meaningful progress in efforts to promote women's safety, effective and successful programmatic and policy approaches must be identified and shared widely. According to Sideris (2009) gender has been identified as the most significant factor related to anxiety and fear about victimization in a transit setting. UN Habitat (2011) highlighted that the increasing population, diversity of people, inequalities and urban crime is rising including crime against women. These crimes occurred in public places where they are not reported and under-reported. Women are affected by urban design choices, the organization of public services and the mix of urban function. Women feel insecure, which affect their 'access' and 'use' of the city. This fear should be regard as important and violence towards women's "right to the city" must be tackled (UN Habitat, 2011). According to the Government Transformation Plan (GTP.02), there is a reduction of crime rate in Malaysia however; public perception of safety is still a challenge, as 52.8% of the citizens still do not feel safe. Sideris et al (2009) studies have shown that whether the fear is real or only perceived, it gives an impact for women and leads them to utilised precautionary measures and strategies that affect their travel pattern, including modifying their behaviour.

Methodology

The methodology for this research is a case study using mixed method approach. The combination of both methods will provide a better understanding of the research problems than either research alone (Creswell, 2006). A descriptive case study strategy has been selected where theories have been collected to guide the collection of data (Yin, 1993). A single case study was conducted due to the time constraint. The literature reviews were conducted to provide a baseline of what safety and built environment relationship has been established nationally and internationally. The literature review specifically looked at women's fear in transit setting and strategies that have been proposed and implemented.

Masjid Jamek light rail transit and its surrounding area have been chosen as the case study due to its role as transportation node and interchange station to other rail line, located in the heart of Kuala Lumpur and a historical setting and urban spaces. Population size at Masjid Jamek light rail transit is 160,000 (Syarikat Prasarana, 2012) however due to limited time and resources De Vous (1991) table is used as a justification to determine the sample size for this study. The questionnaire survey was conducted at the light rail transit setting in Masjid Jamek using 120 female users as respondents. The questionnaire was developed based on the literature findings and theoretical framework. A pilot study was done using 12 respondents on site to minimize the ambiguity of the questions and questionnaire has then been revised after the pilot study to further clarify the questions.

For the qualitative method, structured observation has been conducted due to the time constraint. It will provide a rich data and during the observation the data has been recorded as much as possible about the activities that occur within the observed settings. The environmental data such as physical conditions of the observed setting were then mapped and recorded. Observation was done at interval time from morning until night time for four days.

Table 1.1 Demographic of respondent (source: fieldwork, 2014)

Respondent (N=120)		
Demographic profile	**Category**	**Percentage (%)**
Age	a) 18-25 years b) 26-34 years c) 35-42 years d) 43-50 years	34 32 25 9
Total		**100**
Home	a) Kuala Lumpur b) Outside Kuala Lumpur	58 42

Total		**100**
Occupation	a) Professional	32
	b) Supporting staff	44
	c) Self employed	5
	d) Student	19
Total		**100**
Duration using LRT services	a) Less than a year	27
	b) 2-4 years	41
	c) More than 5 years	33
Total		**100**
Frequency of using LRT	a) Everyday	55
	b) Once a week	10
	c) Occasionally	35
Total		**100**

The Case Study Area

Masjid Jamek LRT Station and its surrounding are located in the heart of Kuala Lumpur city. It is an important place in the history of Kuala Lumpur where Kuala Lumpur was born and developed into a tin mining city. The location is strategic for businesses, cultural and historical significance. It is an important social space for Kuala Lumpur dwellers since pre-war period and when the LRT station was not built yet, the street and squares are important urban spaces in the city. There are four significant streets leading to the Masjid Jamek Light Rail Transit station, which are Jalan Tun Perak, Jalan Melayu, Jalan Melaka and Jalan Benteng. Jalan Tun Perak, which, was formerly known as Mountbatten Road in the 1960's, and later as Java Street. There is one square, known as Medan Pasar located nearby the LRT Station

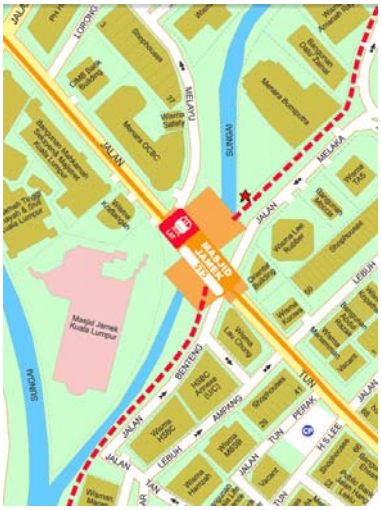

Figure 1.1 Case study surrounding Masjid Jamek LRT setting (source: google.com)

In terms of activities, this area is not only serve as an interchange node for user but for LRT user as well as for various types of activities like shopping, Friday prayer at Masjid Jamek, private colleges around Medan Pasar and tourist attraction at Masjid Jamek, Central Market, Kraftangan and other nearby buildings. Masjid Jamek LRT station and its setting are a transition point for locals and tourist where most landmarks are just at walkable distance. Due to these factors, LRT Masjid Jamek setting was selected as a case study to assess women's perception of safety.

Findings and Discussion

Why do women feel unsafe at light rail transit setting?

The findings of this study clearly show that there are many physical and social elements that affect women's perception in light rail transit setting. Women feel unsafe when the physical environment indicates the elements of negativity for example hidden walkway and underground passageway. The orientation of the building is affecting visibility and accessibility where, Jalan Benteng and Jalan Melayu is the less visible area

from certain angles and it does affect the user's perception. When the area is less visible, it attracts unwanted acts and incivilities. Accessibility should be continuous towards the transit station where women are exposing themselves to any negative elements in the city.

Maintenance of the area makes women feel unsafe with unkempt landscape, litter and dirty wall. Maintenance should be continuous and comprehensive in order to avoid further negative act, which will affect perception. However, there is an ambiguity in this aspect where the findings of this study are not consistent. It might be due to the social norm that society has adapted so well. Lighting has been found as another element that is important where it enhance visibility and when the area is visible, it is perceived to be safe.

Social elements are important criteria for example the presence of homeless people and street beggars in the area. Their presence indicates that the area is unsafe, especially at night. The travel pattern among women are not only restricted during day time as most of them, especially the middle income group are working until night time at the bazaar and Central Market. The presence of other user is important as most of the respondents indicated the reason why they choose an LRT station as the safest place. However, the overcrowding does makes the women feel unsafe due to the hearsay about the pick-pocket phenomenon in crowded places and due to the perception that the offenders could simply hide among the crowd.

How does the light rail transit setting affect women's perception of safety?

The light rail transit setting affects women's perception from both physical and social aspects. The design of light rail transit setting and the streets leading to the station affect the way women perceived their safety. Women tend to be more alert of their environment where they notice any negative cue for example, poor visibility, lack of maintenance, incivilities and orientation. The lack of surveillance due to the design of the setting is also affecting their perception. Even during daytime and in an open area like Medan Pasar, crime still occurs unexpectedly. Negative wall creates a negative

perception where there is lack of surveillance. The vibrancy of the setting affects the perception of safety where areas with more activities at all time can attract more people. The presence of people and activities increase the sense of place and surveillance quality.

Women feel unsafe in their setting and tend to modify their behavior by changing or avoiding certain setting for example at Medan Pasar, where women avoid using the five-foot walkway due to the presence of the male users (foreigners). Environmental setting is affecting women's psychology through their perception. When there are many negative elements in their surroundings, their perception will change.

The finding shows a strong relationship between physical environment and women's perception of their safety. Physical elements are tangible and are meant to be used, therefore it needs to be addressed in order to enhance safety. Urban spaces should be accessible by all and therefore, the safety of its physical design needs to be considered.

Table 1.2 Places that woman feel safe in this area

Respondents were asked to indicate the area, which they feel safe in the survey. Finding shows that 51 percent feel safe at the light rail transit station itself followed by 6 percent for both Jalan Melayu and Medan Bandar and 5 percent for Masjid Jamek.

4 percent respondents perceive Jalan Tun Perak and Bazaar as safe while 5 percent stated that they feel safe at in their workplace around the station as safe. From this table, it shows that women feel safer in the transit building itself rather than the outside setting where most crime occurred.

Table 1.3 Reasons why people feel safe in certain area

No.	Reason	Percentage
1.	Provision of CCTV	5.0
2.	Many shops around the area	6.8
3.	Familiar with the area	10.1
4.	Religious building (Masjid Jamek)	1.7
5.	Many people around the area	35.6
6.	Presence of police or safety personnel	11.6
7.	Did not mentioned any place because they feel unsafe	4.7
8.	Missing data	25.0
	Response rate	**75%**

From the survey, it shows that the physical presence of other people around the area makes them feel safe in which 35.6 percent respondents have mentioned it. This is consistent with Boyle et al (2002) findings that the presence of people is a factor that makes people feel more secure. The presence of police or safety personnel does make women feel safe where 11.6 percent indicates that as a reason. The other 10.1 percent says that they feel safe because they are familiar with the area. This is related to the theory of Familiar Stranger (Milgram, 1977) and 4.7 percent did not state any place because they do not find any place in this area as a safe place. Masjid Jamek as an important religious building has been indicated by only 1.7 percent and it shows that the role of religious building is changing where people do not relate to it in their everyday life anymore.

Table 1.4 Correlation table between hidden walkway, poor lighting, hearsay and changes of route

		hidden walkway	poor lighting	hearsay	changed route
hidden walkway	Pearson Correlation	1	.436**	.162	.410**
	Sig. (2-tailed)		.000	.078	.000
	N	120	120	120	120
poor lighting	Pearson Correlation	.436**	1	.137	.304**
	Sig. (2-tailed)	.000		.137	.001
	N	120	120	120	120
hearsay	Pearson Correlation	.162	.137	1	.272**
	Sig. (2-tailed)	.078	.137		.003
	N	120	120	120	120
changed route	Pearson Correlation	.410**	.304**	.272**	1
	Sig. (2-tailed)	.000	.001	.003	
	N	120	120	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

A walkway which is hidden from public view and modification of the route is related where the p-value is lower than .001, there is also a correlation between poor lighting and change of route (p-value .001) while there is no correlation between hearsay story with the change of routes where the p-value is .003. The correlation shows that the environment or physical element does affect women's perception and hence answering the research question in this research.

Conclusion

It should be noted that this study addressed the perception of safety rather than the actual incidence of crime in the study area. From the findings, it shows that there is a strong relationship between physical environment and women's perception in transit settings. Many physical elements in this area are not fully addressed to overcome the issue of safety even though women who work all around the area dominate the population of light rail transit user. With the increase of population in Kuala Lumpur and the

increase of crime, women's perceived safety should be given priority by relevant authorities. Design intervention is important compared to installation of technological devices like CCTV. Public places need to be well maintained to enhance perceived safety. The presence of police can enhance the perceived safety, but their presence is not helping much as the urban spaces are static and women are using it at all time. A good urban design strategies will enhance the sense of place and developed pride to the people. When the good stimulation is given, people will perceive the area differently and would not have a feeling of fear of the public places.

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AN EXPLORATORY REVIEW OF THE RELATIONSHIP BETWEEN PLACE CHARACTERISTICS AND CUSTOMER'S EXPERIENCE IN URBAN MARKETPLACE

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Urban marketplace is a place where the trading activities take over the role in the community. Over the urban development, the marketplace changes through times and it eventually become important as it is where the community grow socially, culturally and economically. Consequently, a number of urban marketplaces become iconic because of their unique products and setting, making them a tourist attraction. However, redevelopment projects at times transform the characteristics of the marketplace that eventually affect people's experience. There is a significant need to closely examine the characteristics of the marketplace to understand how they appeal to people and affect people's experience. This is important to ensure that the development of sustainable urban marketplace can continue to flourish in the future, alongside their rich heritage values. This paper aims to give an overview of existing studies that have been done on understanding place and place characteristics, the urban marketplace and the dimensions of customers' experience. An in-depth literature review was the main method of research focusing on the attributes of place characteristics, aspects of the customer's experience of place and qualities of urban marketplace. The focus of this paper is to discuss the concept of place and the factors that influence people's experience in the market. Secondly, this paper discusses the factors that enable the marketplace to sustain the culture and business for the market vendors. The findings from this exploratory review reveal the interconnectedness between the attributes of place characteristics and customers' experiences that are useful in examining the urban marketplace, which is vital for the local community and visitors.

Keywords: place characteristics, people's experience, urban, marketplace

Introduction

Urban marketplace is an important place in a developing country as it becomes the place where transaction take the role and thus contributing to the informal

economy grow. Instead being as a local market, these marketplaces become one of the most visited place in a tourism activity as the market is where the heart of the city lies. The tourists desire to search for local food, crafts and experience the local lifestyle made them attracted to visit the local marketplace where the community have daily routine there. In addition, the marketplace plays an essential part where people gather and socialize with one another. Suziyana (2010) explains that marketplace becomes a place to interact, exchange news with each other and create a close relationship among themselves. The traditional marketplace has become an important place where people catching up with others while doing the trading. Ahood Al-Maimani (2014) supports with his views that marketplace becomes an important place for trade, commerce, exchange, entertainment and social interaction. The marketplace is a focal center for the community. It becomes one of the aspects in the human settlements and community through time. The richness of the traditional marketplace to the community and how it is crucial to the identity of the city is important. Gaye Birol(2004) state that the local identity and local culture created by the local market are influenced by its marketing and architecture.

The purpose of this paper is to analyze the relationship between place characteristics and customer's experience in the context of the urban market, as a means of seeing how they can be held as part of the urban's development and growth. The methodology involves an in-depth literature review on the essence of place characteristics and aspects of people's experience as a customer. There are several reference books, reports, journals, articles and web sites that relate to this study have been referred. The findings from the literature review are then reflected on how they relate to each other, in order to identify factors of place that affect the customer's experience at the marketplace.

Results and Discussion

Place Characteristics

Previous studies on place characteristics have looked into several aspects like the origin of the place (Donat, 1967, p. 9; Groat, 1995a), location (Relph, 1976), time (Relph, 1976), and community (Minar and Greer, 1969).

Place characteristics refers to the attributes of a particular place. As explained by Donat (1967, p. 9), places starts from all sorts of identity which may include places, street, community, town, country, region, but they never conform to the tidy hierarchy of classification.They overlap and interpenetrate one another and are wide open to a diversity of interpretation. Furthermore, Groat (1995a) writes that the meaning of places as theories of place, prototypically and expert judgments in aesthetic

evaluations, and meaning of home. Place characteristics can be based on people of how the people value the place and how they signifies the place as an important place in their lives. The attributes of place can draw out of three main aspects which are the link between place and location, place and time, and place and community.

Table 1: Place characteristics

Years	Attributes	Authors	Research Concern
1967 - 1995	Origin of the place	Donat (1967, p. 9) Groat (1995a)	• Writes that "places occur at all levels of identity, my place, your place, street, community, town, country, region, country and continent, but places never conform to tidy hierarchies of classification. • Categorizes research on the meaning of places as theories of place, prototypically and expert judgments in aesthetic evaluations, and meaning of home.
1976	Location	Relph (1976)	• Studies focused on the place characteristics. The place is indeed located. Location or position is neither necessary nor sufficient condition of the place.
	Time		• Studies the characteristics and qualities of place influence the sense of attachment and experiences that a person or a community associate with that space.
1969	Community	Minar and Greer (1969)	• Study that the human contacts on which notions of commitment and identity are built are most potential to happen among people sharing the same piece of land.

Place and location

Relph (1976) explains that most of the place is indeed located. Location or position is neither necessary nor sufficient condition of the place. It is important to show that mobility and nomads do not influence the attachment to place and people. The location is crucial as people would stay and thus built experiences and this createa sense of place to the people. This proves that the location and place that people usually visit such s marketplace will slowly become a part of place identity as well as contributing to the visitor experience.

Place and time

The development character of places through times is connected to the redevelopment buildings and landscapes. Relph (1976) writes that the characteristics and place influence the sense of attachment and experiences that a person or a community associate with that space. This shows that as a place change over time, the level of attachment and experience may also be changed accordingly. The places identified with any individual or culture expand, flourish, a decline as the site, activity, or buildings take on and lose its significance. The place has become more functional to

the community through the time evolved. It's become a part of experiences in place.

Place and community

The community is a dominant user that shape the physical setting in place experience. Minar and Greer (1969) explain that the human contacts on which notions of commitment and identity are built are most potential to happen among people sharing the same piece of land. The link between the community and the place is essential as they support the identity of each other as the landscape is an expression of communally, which involve feelings and values and in addition include interpersonal involvement. It can be said as people are their place and a place is its multitude.

Furthermore, public places with high imageability then to persist and to create an ongoing target for the same experience. The community becomes part of the aspect of a place that continually shape and reshape each other.

Customers' Experiences

Table 2: Customers' experiences

Years	Attributes	Authors	Research Concern
1994-2009	Factors	Verhoef et al. (2009, p. 3)	• Explain that customer experience comprises of "cognitive, affective, emotional, social and physical responses to the retailer."
		Puccinelli et al. (2009) and Verhoef et al. (2009)	• Study that the customer side of the retail shopping at a commercial place is an important part of the equation.
		(Ailawadi, 2009; Kopalle et al., 2009; Mantrala, 2009; Ganesan et al., 2009).	• Prove that Some aspects of the customer experience are shaped by promotion of the products, price and competitive effect, merchandise management and supply chains
		Bitner and Hubert (1994)	• The customer satisfaction results from individual and global transactions, considering the service quality engage a general impression of the superiority or inferiority of the service provider and the services.
		Parasuraman, Zeithaml, and Berry 1988; Verhoef, Langerak, and Donkers 2007)	• Other researchers had focused on suggesting the customer satisfaction and service quality
		Frow and Payne (2007)	• Studies the important to manage the customer 'touch point' as a way of enhancing their experience.

Customers' experience is considered to be one of the factors that influence the place to sustain over time, as people are the primary users and visitors of a place. The categories of experience can be divided into people's characteristics, direct interaction with others, and the societal surroundings. In the context of the marketplace, visitors may stay as visitors where they not eventually take any kind of consumption, however, they may also change into customers where they get involved in buying activities. Verhoef et al. (2009, p. 3) explains that a customer experiences comprises of several aspects which are cognitive, affective, emotional, social and physical responses to the retailer. The visitor's experience is shaped by these aspects of experience, which is different from other types of visitors in public places.

Furthermore, Puccinelli et al. (2009) and Verhoef et al. (2009) stated that the customer side of the retail shopping at a commercial place is an important part of the equation. This is relatively related to the marketplace as it is commercial place and also a community place. The vendors in the marketplace sell a wide range of products and they have to be competitive in attracting the buyers. Moreover, customer experiences also being shaped by the promotion of the products, price and competitive effect, merchandise management and supply chains (Ailawadi, 2009; Kopalle et al., 2009; Mantrala, 2009; Ganesan et al., 2009).

In addition, Bitner and Hubert (1994) agreed that the customer satisfaction results from individual and global transactions, considering the service quality engage a general impression of the superiority or inferiority of the service provider and the services. Other researchers had focused on suggesting the customer satisfaction and service quality (Parasuraman, Zeithaml, and Berry 1988; Verhoef, Langerak, and Donkers 2007). The service quality play important roles as it bears upon the satisfaction of the people while doing the trading. Frow and Payne (2007) writes that it is important to manage the customer 'touch point' as a way of enhancing their experience.

Urban Marketplace

Previous studies on the urban marketplace were taken on several aspects like the function (Al-Maimani, 2014;Tangires ,2008) , vendors (Plattner, 1978, cited in Sommer, 1989), specialty (Lee and Said, 2012; Mitchell, 2010; Weiss, 1998) and difference (TRAX and Stead, 2010; Weiss, 1998).

Marketplace are important centers f trade, commerce, exchange, entertainment and social interaction that have survived through times. Al-Maimani (2014) writes that they are the focal points for the community and helped enhance the communication and socialization. The marketplace is the place where the communities meet, sells local products and gain a source of income. Tangires (2008) stated that the

marketplace commonly serves as a place where at the same time acting as a public or communal space. The public market is a place where a variety of goods are sold regularly by many small, private vendors (Plattner, 1978, cited in Sommer, 1989). Furthermore, the market becomes the 'heart' of the city and act as an important public space (Lee and Said, 2012; Mitchell, 2010; Weiss, 1998).

Weiss (1998) describes that the marketplace is 'a city within a city, with its own economy and a way of life'. It is not only a place where trading activities occur, but where a sense of community is built between the marketing community and with customers. Markets have unique characteristics that positions them differently from supermarkets and shopping malls because of the 'sensory experience' they offer through the physical characteristics, products and services, which reflect the local community's way of life (TRAX and Stead, 2010; Weiss, 1998).

Table 3: Urban marketplace

Years	Attributes	Authors	Research Concern
2008-2014	Function	(Al-Maimani, 2014) Tangires (2008)	• They were the focal points for the community and helped enhance civic communication and socialization • The marketplace commonly serves as a place where at the same time acting as a public or communal space
1978	Vendors	(Plattner, 1978, cited in Sommer, 1989).	• The public market is a place where a variety of goods are sold regularly by many small, private vendors
1998-2012	Specialty	(Lee and Said, 2012; Mitchell, 2010; Weiss, 1998). Weiss (1998)	• The market becomes the 'heart' of the city and act as an important public space • The marketplace is 'a city within a city, with its own economy and a way of life'
1998-2010	Difference	(TRAX and Stead, 2010; Weiss, 1998).	• Markets have unique characteristics that positions them differently from supermarkets and shopping malls because of the 'sensory experience' they offer through the physical characteristics, products and services, which reflect the local community's way of life

Qualities of the Marketplace and the Influence of Customer's Experience

Since the marketplace is a place where people shop and socialize, it contributes to enhance the interactions among the community. It is a significant aspect of a city as they create experiences throughout the activities happens in the marketplace. Other than as a trading place, the marketplace also functions as a space for people to meet, to mingle and catch up with each other. It is where the interactions occur among the

traders and the buyer who consists of the local people and also tourists.

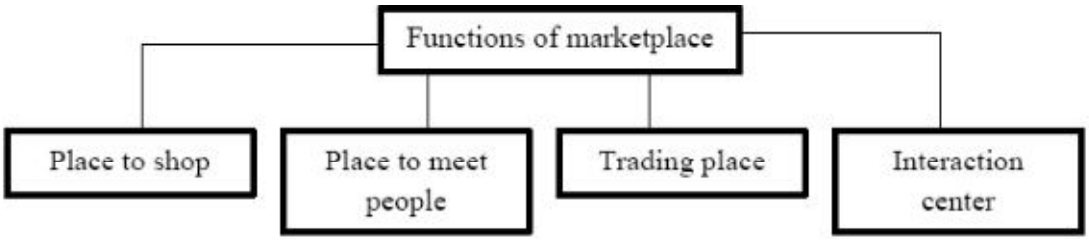

Figure 1: Function of marketplace

The modes of interactions influence the people who visit the market, thus creating some sort of experience with them and later influencing whether they will come again to the market or not. The emotional feelings also play important role in making the marketplace as a good place to visit. The way the buyers are treated and how the buyers treat them, make them feel comfortable and at ease in buying what they need. As described by Bitner and Hubert (1994), the satisfaction comes from the transactions taking account the service quality given which give the general impression of the superiority or inferiority of the service provider and the services The manner the service given influence the people, experience and it influences the tone of the market.

The urban marketplace plays a bigger part in supporting the culture and prolonged the trading activities among the market community. According to Janssens and Sezer (2014), the marketplace is not just a place for the commercial gathering place, but it also provides fresh and affordable food for the community, economic chances for those who love to grab the opportunity and space to mingle and hang around with the people.

Furthermore, another factor that influences the marketplace to sustain the business for the community is the customer satisfaction and service quality. The service quality play important roles as it bears upon the satisfaction of the people while serving the trading (Parasuraman, Zeithaml, and Berry 1988; Verhoef, Langerak, and Donkers 2007). In the marketplace, the customers have chances to interact more with the seller as they can inquire in more detail about their shopping needs. Some even ask for the tips regarding the products they want to buy. The service quality play a role as it determines the success of the trading. The seller often comes from the local people where they are more likely to live near to the marketplace.

The satisfaction of the customer becomes the main consideration for the traders as they are likely to have the transactions done. The traders set up their stalls and it gives an opportunity to the buyers to have a look at the goods displayed. Since the market consists of small and private vendors, it is where the sense of belonging built up among the market vendors and the local community and is inherited from one

generation to another generation.

Figure 2: Factors of satisfaction of customer

Conclusion

The market is a place where a sense of community is built and strengthens among the local community and also the market community. The people's experience in the urban marketplace influences the quality of the marketplace, thus contributing to the sustainability of the informal economy. The emotional feeling involve between the seller and the buyer determine whether the customers will come back for the second time or not. The way how they had been addressed somehow make them feel closer to the seller. The satisfaction becomes one of the components leading to the experience created in the market. It leaves an impression to the customers and visitors based on the way the sellers interact with them.

The marketplace serves a role in sustaining the local culture of the city. It is not just a place for meeting people, but also a place where people get to see and purchase local products that may not be found in other markets or cities. The need to get fresh products like the vegetables, meats, fruits and daily products can be fulfilled in the market. In addition, the price is affordable and helps the community to save more. The predictive factors, noting as influencing people experience included location, time and community. The findings of this research are useful for further research by doing the comparative and detail studies on what makes a market a good quality space.

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BUILDING FORM AND SHAPE OPTIMIZATION TOWARDS ENERGY EFFICIENCY: A REVIEW

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Building form is considered as one of the parameters in improving energy conservation and performance. Looking at the building form history, various building forms differ according to climates, places and cultures. This paper aims to present a synthesis of recent researches related to building form and energy impact. The aspects taken into consideration include methodological issues in identifying building form in relation to energy efficiency. By overviewing methodologies in measuring energy efficient building form, this will highlight the manipulation of form, shape and design over building energy. In summary, building form does play a role in affecting building energy and how the form being manipulated according to climate and places.

Keywords: building form, energy efficient, energy performance, shape, geometry

Introduction

There has been a vast research on form, geometry and shape of a building. A lot of research on building has been explored in ensuring the reliability and sustainability of the building elements. These developments of the building environment studies can be traced back to Victor Olgyay in 1963. He proposed a systematic approach in adapting the design of a building with environment. This is later expanded with same scope by Baruch Givoni in 1969. As a result of these studies, a lot of improvement has been made to the building design from vernacular to contemporary architectures. It is important to study the relationship between the building, the environment and human

in improving the building design in the future. If the building achieves a good balance it will reflect back to the environment and human. Winston S. Churchill stated in late 1943*, "we shape our building and later the buildings shape us"* shows the interrelation between buildings in human's life and environment

Energy efficient building has always been associated with better insulation, window, sunscreen, and ventilation designs. Most of the research shows that 40-50% of building energy consumption is affected by building design. Architects and designers usually have full control over spatial arrangements of form and fabrics of the building. This shows that the designers have a major influence in designing, building of complex form and shape. Designers are the ones who control the building orientation, compactness of the building form and selection of material and insulation. The external shape of a building can change its energy consumption regardless of the materials and its usage in terms of schedule. These overviews of researches identify how studies on form can help designers designing better building forms in the future. Optimization of building forms should be a practice by designers at an early stage of the architectural project (Adamski, 2007). An energy efficient building design reduces building costs through the life cycle of a building. As these buildings have lower energy consumption, it will provide better future investment.

Methodology

This research was based on the reviews of several articles. The articles were selected based on different disciplines, including energy, building, environment, passive and active systems, mechanical and architecture. Various studies from different disciplines were guided towards building form manipulation. Computerized searches were conducted using online databases such as Science Direct, Taylors & Francis, Sage and Scopus. Keywords combinations were used to guide the search: form, shape, geometry, building, energy, sustainable, heat gain, solar gain, and climate.

Papers were chosen mainly from those published between 2000 and 2014 which included theoretical and empirical articles both quantitative and qualitative. Literature was chosen to demonstrate the knowledge available about the optimum building forms from the studies conducted. To understand the different forms of the building and its energy consumption, greater literature was placed on a study that addressed the relationship between optimum building form and shape and energy efficiency. There

are numerous studies related to building, energy and its research methodologies. Furthermore, the aspects taken into consideration also include methodological issues and research findings on building form and shape.

Focus of the Reviews

Previous studies on identifying building form and its research methodology were studied. Looking at the methodologies, researches were focused on optimum building shape in relation to energy efficiency. Form in architecture is being understood as an external appearance that can be identified, an act of manifestation or the manner of arranging and coordinating the elements to create an image (Ching, 2007). Building form acts as a significant determinant of total heat loss in cold climate (Oral & Yilmaz, 2003). There is a significant impact of building shape, form or geometry on the energy consumption (Jedrzejuk & Marks, 2002).

Form, shape and energy

Building form is an external appearance of a structure or the given shape to the structure. Form derives from a combination of geometries which generally generate a volume of space. Geometrical factors do affect energy consumption as there is an evidence of energy saving about 3 to 14 % based on different climate conditions (Susorova *et al.,* 2013). There is a strong connection between shape and energy consumption, including cooling energy requirement (Depecker et al., 2001; Hachem *et.al.,* 2011; Ourghi *et al.,* 2007; Zerefos *et al.,* 2012). Due to the significant impact on energy and construction cost, shape is considered an important aspect in green building design (Wang *et al.,* 2006).

There are few parameters need to be considered when identifying the relation between building and energy such as shape, building materials and window areas. Designers have high influence on these elements in early stages of design (Granadeiro *et al.*, 2013).

1. Existing building as a case study.

Exploration of how energy and building function can be studied successfully through a case model or on an existing model. The existing model can be analysed base on its energy usage. Tzempelikos *et al.* (2007) established a case study in Turkey to identify how buildings behave in different energy settings. Creation of optimal form is important to ensure the functionality of a building, as different geometric

shapes will have different capacities in receiving solar energy due to its geometric properties (Marcijus *et al.,* 2012). The shape of a building does influence solar energy received by the building and its energy consumption (Caruso, Fantozzi, & Leccese, 2013; Mingfang, 2002; Zerefos *et al*., 2012). Case study by Zerefos *et al.* (2012) has discussed about building form and its environmental performance using surface to volume ratio, shadow and daylight distribution and sky view factor. Based on the case study model it reveals that prismatic shape has lower solar gain and consumes less energy compared to orthogonal shape. Then, case study by Ling *et al*. (2007) demonstrated the most desired shape of high rise buildings are square shapes with W/L ratio of 1:1 and rectangular shape with W/L ratio of 1:2.

2. Shape & form

Rectangular shape of east west axis showed better thermal performance than square shape of the same volume and area (Behsh, 2002). This may be true for thermal performance, but could differ for cooling load or heat gain. Rectangular form showed better thermal performance than square shape and roof should be highlighted as a major heat source.

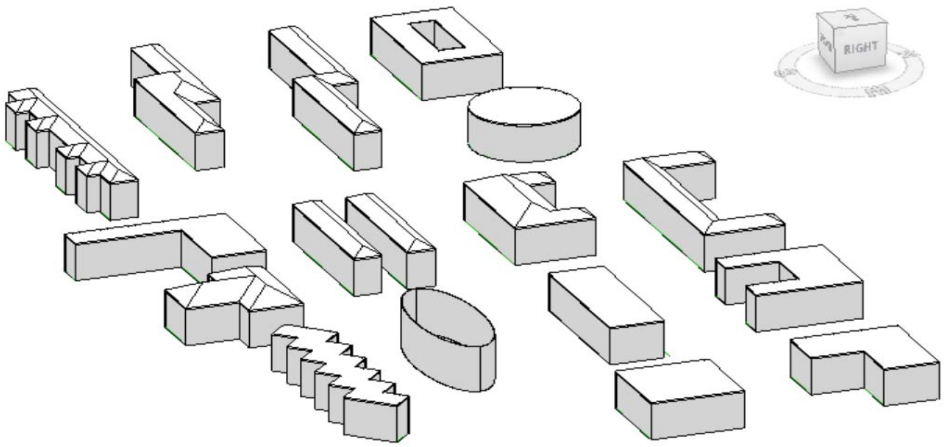

Figure 1.1 : 3D views of basic and extended building form based on the reviews.

Many types of building forms have been studied as shown in Figure 1.1. Indeed, courtyard form is one of the popular forms that are commonly researched since 2000. There is a study on courtyard building shape based on solar heat gains (Yaşa & Ok, 2014) and search on the optimal courtyard building shape based on solar radiation and thermal performance (Aldawoud & Clark, 2008; Aldawoud, 2008; Ahmad S. Muhaisen & Gadi, 2006; Ahmed S. Muhaisen & Gadi, 2005; Ahmed S. Muhaisen,

2006). Courtyard is the best optimum form in hot arid climates stated by Ratti *et al.* (2003) as it provides larger surface and high thermal mass, provides daylight and shallow plan form, has narrow space for shade and improved thermal comfort. In this example, courtyard would be the best form that makes the best use of land, especially in an urban context.

Another example of high rise building form, investigations of the solar radiation impact revealed that the orientation and envelope of south orientation in the high rise form are the crucial parts to be protected and solar radiation intensity can be reduced up to 40% by utilizing passive solar design strategies such as core positioning, recessing space, and self-shading envelope (Ahmad *et al.,* 2004).

Building compactness and energy

The study of building compactness index identifies specific forms that can minimize heat gain. The importance of compactness index in the estimation of building energy consumption is described where a larger building has a lower compactness index compared to smaller buildings and surface to volume ratio should be as low as possible to minimize heat gain (Bekkouche *et al.*, 2013). There is a direct correlation established between relative compactness and building energy consumption (Ourghi *et al.,* 2007). Indeed, relative compactness, window to wall ratio and glazing defined by solar heat gain coefficient are the three major factors influencing building shape and energy use (AlAnzi *et al*., 2009).

Most studies agree that the compactness of a building could ensure better energy consumption. However, Granit & Möller (2008) stated that compactness may reduce energy, but other elements could act differently due to the compactness of form. The analysis would be more reliable if other variables are being analysed. Other variables could be volume, proportion, lighting or other qualities.

Methodologies: optimization, mathematical and shape grammar

1. **Investigating complex form and generating variations of form.**

Attempts of finding optimized building form using algorithm has been widely explored. The algorithm will generate alternatives to optimize form with better energy optimization. Nearly 300 researches under algorithm optimization methodology could

be found. Algorithm is applied as a decision aid in building design that involves lots of parameters or variables (Machairas *et al.,* 2014). Numerous studies in numerical approach such as optimization algorithm (Lee *et al.,* 2013; Yi & Malkawi, 2009) multicriteria optimization (Gerber *et al.,* 2011; Jedrzejuk & Marks, 2002; Kataras, 2010; Marks, 1997), genetic algorithm (Kämpf & Robinson, 2010; Lin, Yu, Li, & Zhou, 2013; Wang *et al.,* 2006), floor shape optimization (Wang *et al.,* 2006) has been broadly researched. Kämpf & Robinson, (2010) conducted a research on constrained evolutionary algorithm combined with Radiance energy analysis. The research has illustrated an interesting architecture form but non intuitive. The computational tools can help to provide stimulation for designers to derive a solution to design problem. The form optimization is more reliable when the algorithm is combined with energy analysis.

There is also a study on analytical approach using mathematical equations of Calculus of Variation in getting the optimal form (Caruso *et al.,* 2013). Exploration using mathematical transformation is a data analysis method analyzing frequency domain, known as Fourier transform method (Ai, Cheng, Liu, & Yang, 2013) and finite difference approach (Aksoy & Inalli, 2006).

Other than that, Granadeiro *et al*., (2013) generate alternative shape design with integrated energy simulation using shape grammar to encode the architectural design system. A shape grammar is a production system that generates geometric shapes. The downside is that the system is quite complex. Granadeiro *et al.*, (2013) believe that geometry and energy do shape design choices.

In search of performance based architecture, a parametric approach combining energy efficient designs can suggest energy consumption driven forms while designing to improve building performance (Lin *et al*., 2013). Parametric design method can create various forms namely energy efficient, also known as generative designs. Certain generative designs were created in search of better building forms with better energy consumption (Lin & Li, 2012). Most of these methodologies investigate complex form and shape of optimized energy efficient form, and how the result and the findings could help the future designers for better buildings with low energy consumption.

2. Form prediction performance

Genetic algorithm has also been used to predict form performance and analytical

geometry in generating complex optimized form. Here, the methodologies used to identify the optimal configuration of the building envelope in relation to the solar radiation incident (Kataras, 2010 ; Yi & Malkawi, 2009). Kataras, (2010) through the optimization studies has shown that inverse pyramid shape rotated slightly off north south axis is the most optimal in achieving maximum solar gain during winter and minimal solar exposure during summer. While, Yi & Malkawi (2009) identify that in summer, while south, east and west are concaved, the optimized form has more shaded surface areas but not too shaded for winter season .

The calculation of the optimized form shows that energy consumption is less 8.42% than initial building. Form optimization involving improved techniques in hybrid evolutionary algorithm combined with ray tracing program to predict and maximize solar irradiation on the optimal form and urban geometric form in cold climate suggests that the buildings should be arranged progressively up towards the north of the site contradict to the site planning guidance (Kämpf & Robinson, 2010).

Building form ratios and energy

Building form is defined as a base to shape factor which refers to the ratio of building length to building depth. The ratio of total façade area (surface area) to building volume best described as building form (Oral & Yilmaz, 2003) but, may not be precise enough for complex form (Behsh, 2002). Study of building form has been majorly related to surface to volume ratio.

Lower surface to volume ratio takes longer time to be affected by outdoor temperature. Form with low surface to volume ratio is an optimal form for the hot and dry region. However, the use of surface to volume ratio indicator alone is not enough in getting the relation between building form and the energy behaviour (Behsh, 2002). He explores the relation between roof area to wall area ratio and south oriented surface to west oriented surface ratio and identifies that low roof to wall ratio and high south to west wall ratio is the most optimum.

Building form in urban form setting and energy

There are also studies of building form in an urban context, how form can help in ensuring a better urban setting and minimizing heat gain in an urban context. It starts with one simple building form; as the form evolves and multiplies, it creates a

complex urban form. The studies merely focused on building form and energy performance (Ratti *et al.*, 2003), exploring the efficient form in holistic approach (Okeil, 2010),and then identifying courtyard as the best form in urban setting of hot arid climate as courtyard has daylight penetration through the court and a shallow plan form (Ratti *et al.*, 2003).

High rise building is one major building form that attracts heat as it is high-rised, hence making it closer to the heat sources. Most studies explore the high rise form in getting the optimum shape that can reduce heat penetration and save energy. There is a difference in plate type and tower type buildings where plate type shows less consumed energy, circular shape of certain width to length ratio shows low amounts in solar insolation, and certain high rise wall do received less solar insolation if placed accordingly (Choi *et al.,* 2012). The study shows that the energy consumption for high rise buildings can be minimized through manipulation of building shape (Ahmad *et al.,* 2004; Al-Tamimi, 2010; Bojic, Yik, Wan, & Burnett, 2002; Cheung et al., 2005; Ling *et al.*, 2007).

Factors influencing energy efficient building forms.

Most of the study has been characterized into certain criteria stated, however, in order to highlight the finding of previous research, more focus has been put on climate, relation between shape and energy, material and its parameters (Figure 1.2).

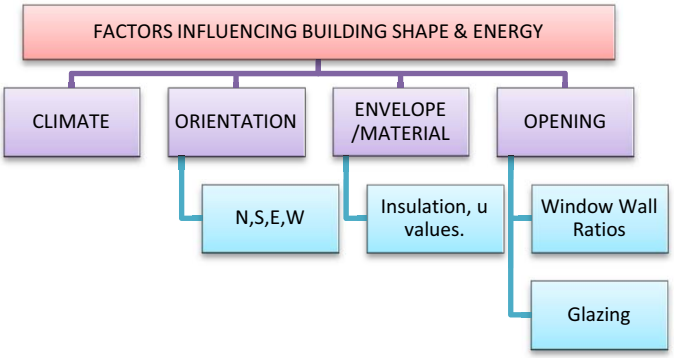

Figure 1.2 : Factors influencing building shape and energy.

1. **Climate**

The effectiveness of building form in terms of energy efficient does depend on how the climate has shaped the building form. In the case of prismatic and polygonal form, in the context of Mediterranean climate, the case study reveals prismatic form has lower solar gain and consumes less energy compared to orthogonal form. It shows

inclined roofs and walls decreases the solar radiation incident (Zerefos *et al.*, 2012). There is an average of 7.88% reduction of energy when using prismatic form. While the study on high rise building shows different geometric shapes have been identified as having different capacities in receiving solar energy. This is due to geometric properties and cylindrical shape are identified as the optimum shapes based on total solar insolation in high rise form (Marcijus *et al.*, 2012). The study on L and U shaped houses shows the wings are mostly associated with shading, where the research shows the numbers of shading facades, its geometries and relative dimensions are major variables affecting solar incidents and transmitted radiation (Hachem *et al*., 2011).

In both climates either warm or cold there is a significant reduction in energy consumption based on reduction in solar gains on building envelope due to direct solar irradiation. Optimum form can be obtained using a mathematical approach depending on latitudes. Direct solar gains can be reduced up to 20% by compacting a particular section of the building that is parallel to average ecliptic (Caruso *et al*., 2013). In severe cold climate and less sunny winter focusing on heating load, energy consumption is inversely proportionate to building compactness (Depecker *et al*., 2001). The study displays different results based on different climate as it is the result of the heating load study over building shape. Thus, this study does show that building form and energy are affected by various climate conditions.

2. Orientation

Orientation of building form on a particular site in a specific climate is significant as different climates with altered orientation would result in different energy consumption. Indeed, climatic conditions have a dominant effect on building shapes, same goes for courtyard performance specifically to its thermal performance. Orienting the long axis of the courtyard along northeast and southwest, which has three storeys is one desirable step of improving energy performance of courtyard in a hot humid (Muhaisen, 2006). However, Straube, (2012) argues that form and orientation do not have a large impact on energy consumption, and believes that size of the building floor is a better indicator of energy consumption through enclosure than building shape or form.

3. Material

Building material and building elements are set up parts of the building shape and form. Looking at materials that cover the building form, U-value shows an important factor influencing heat loss in building in cold climates. U-value is the

measure of heat loss in a building element such as a wall, floor or roof. Low U-value means a high level of insulation applied in specific material. U-values of opaque component with the reference of area to volume ratio have been used to determine the optimum form that minimizes heat energy consumption. Example, reference data that has the optimal U-values and the area to volume ratio would provide guideline for identifying optimum building form (Oral & Yilmaz, 2003).

4. Opening

Other building elements that constitute building form and shape is window. The window to wall ratio and room depth have the highest effect on total energy consumption (Steadman, Hamilton, & Evans, 2014; Susorova *et al.,* 2013). While window orientation may have a marginal effect on energy consumption, the south façade orientation is established as the best window placement. Indeed, better energy performance can be gained by using south orientation as it is less exposed to direct heat gain (Behsh, 2002; Susorova *et al.*, 2013).

Optimizing building and fenestration geometry parameters such as window to wall ratio, window orientation and width to depth ratio can decrease energy consumptions (Susorova *et al*., 2013). All the parameters combined are inclusive of building shape and form. As building façade and envelope are part of building form that generate most heat loss by having windows, so building form is considered important in preventing heat loss in cold climate (Oral & Yilmaz, 2003).

Conclusion

The building elements and material do constitute the portion of optimize form, so better understanding on how these elements react towards certain climate and orientation can be explored. Various studies has been done related to each building elements such as, shading devices, windows, wall, roof and structure. Undeniably, there is a strong relation between form, shape and its energy consumption. In order to design and produce energy efficient building form or an optimal form, the research study needs to be executed in order to justify the design guidelines based on different areas, site and climate. When the designers face various site constraints, these research outcomes would give alternative ways to overcome their problems. Better ways that produce better energy efficient building design. Most studies on building form and shape are geared to search for improved energy consumption. Energy

consumption is the most important factor during designing, constructing and throughout the building cycle. Therefore, it is a major need in identifying techniques to cut off energy used in buildings.

The importance of energy consumption in a building makes it important to carry basic research that would yield interesting results. Indeed, the review shows building design measures can reduce the energy demands of buildings.

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URBAN DEVELOPMENT AND SUSTAINABILITY: THE DILEMMA OF CO-EXISTENCE

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Sustainability is an equation of nature and human existence in a productive harmonious balanced environment that fulfil the socio-economic requirements of the present generation and secure the rights of the future generations to meet their needs. Sustainable urban development is a hard planning task that never ensures such a co-existence of physical growth and/or development provision on a site and conservation of its nearby environmental capitals. This study aims to explore requirements and attributes of sustainable urban development, and highlights the consequences of decision-making process and current practices of planning and development authorities in the kingdom of Saudi Arabia. Investigation of the topic relied, on one hand, on theoretical method of reviewing relevant literature to clarify the concept and attributes of sustainable development and its key requirements and indicators. On the other hand, case study method used to deduce the failure of one of the major urban development project in the Dammam Metropolitan Area (King Abdullah Seafront Park) to meet the requirements of sustainable development. This relied on direct observation during several visits made to the site and analytical study of the projects' master plan. Analysis of the project's m aster plan and direct personal observations conducted during several site visits on different circumstances indicated that planning authorities - with the help of decision-making process - failed to create a balanced co-existence of nature and provision of communities' needs. In fulfilling their responsibilities for providing services and welfare to the communities, planning authorities have created severe immediate permanent damage to the ecosystems within the context of the project, as well as unending environmental degradation consequences that affect and contradict all issues of the project sustainability. Planning a large development project to meet sustainability measures is not an easy process. An interdisciplinary task requires involvement of different disciplines and backgrounds participants at the earlier stages of the project. In addition, improvement of decision-making process is necessary to accommodate and deal with the outcomes of impact assessments related to environmental, socio-economic, and others.

Keywords: *Sustainability, urban development, environmental capital, Dammam Metropolitan Area, King Abdullah Seafront Park, Environmental Degradation, Impact assessments.*

Introduction

Sustainability and sustainable development (SD) have been recognized as a roadmap to the satisfaction of contemporary societies. Sustainability has become long-term mission and primary goals for future urban development. SD is different from development in being more complex and interfered with the economic, social and environmental issues, which constitutes the pillars of sustainability.

SD aims toward the achievement of economic and social development that ensures higher standards of living for existing and future generations, and at the same time, protects, and enhances the physical environment (Selman, 1996). In this case, SD can maintain a delicate balance between the needs of human to improve their lifestyles and feeling of well-being on one hand, and preserve natural resources and ecosystems functionalities, on which present and future generations depend, on the other hand (Al-Sulbi, 2011).

Urban ecosystems have been facing environmental and socio-economic driving forces, in association with the steady growth of urban population and their increasing demands for facilities and services. Under such circumstances, municipal authorities face the challenge of considering sustainability as a main objective for future development and seeking implementation of its concepts as part of the decision making process. As stated by Asprone et al, (2014) the concept of sustainability is very complex; and implementation of its process can be extremely difficult, as its objective is to govern a complex system of actors and entities. Man and society on one side and environment and natural resources on the other side, where complex relationships and conflicting dynamics relate and link these two parts to each other.

Cities and urban centres are clearly expressing the conflict between conservation and development. During the recent decades, cities have experienced rapid development and fast growing (in terms of both physical growth and increased number of population), and have become more crucial nodes of the contemporary society's networks. Most of the world population who is now exceeding seven billion inhabitants are concentrated in the cities where major transformation and human processes take place. According to the 2010 United Nations (UN) key findings' report, the number of urban population in 2009 exceeded 3.42 billion, which expected to reach 6.3 billion in 2050 (United Nations, 2010). The report indicated that the Kingdom of Saudi Arabia (KSA) has more than 21 million inhabitants of its total population (nearly 82%) live in cities, which expected to reach 90% in 2050.

Since the last decades of the 20th century, the KSA has witnessed huge investments and extensive urban development especially in the main cities and urban centres. And because of its economic importance and strategic location, as the eastern gateway to the KSA, the Dammam Metropolitan Area (DMA) has dramatically grown from few scattered small fishermen villages to a modern metropolitan centre consists of three administrative, commercial and industrial cities (Dammam, Khubar and Dhahran). One of the major seafront development project is the King Abdullah Seafront Park (KASP), which constructed on an area of more than 500,000 m^2 along the coastline of the Dammam city.

This project was used as a case study to analyse and investigate the relationship of planning, design and implementation processes with the environmental issues that may affect or have intrinsic contribution to the sustainability. Data collection for this task relayed on the frequent site visits and direct observation and judgement of the author, based on his experience as a landscape architect and environmental resources planner and manger. Moreover, the reviewed literature on the issues related to environmental sustainability, socio- economic development and decision-making process on urban development and environmental conservation in the KSA formed the base of this study research. In addition, due to limits of time and resources, this research study aimed to limit debate on the environmental issues that are strongly connected to sustainability and urban development.

Methodology

This research was developed based on theoretical methodology applying case study and analysis of the reviewed literature. Selected literature has been reviewed with respect to environmental sustainability in case of huge development involving massive changes of the site characteristics and disturbance of the stability of ecosystem's natural physical processes.

The KASP was used as case study, to define elements of the site's environmental sustainability and their involvement in design and construction. Site and design was

analysed based on available documents, personal experiences, direct observation and discussion with specific user groups including operation and maintenance groups of the project. It relied on wind and current effects, coastal processes and the influences of coastline modification (as criteria for assessment of the case study). In relation to that, the system of the decision making process in the KSA in both fields of urban development and environmental conservation was reviewed and assessed to define its weakness in assisting and encouraging sustainability.

Furthermore, SD principles and requirements were reviewed in order to assess up to what extent they were considered in the different phases of the project life cycle.

Root of Sustainability and SD Terms

Since the middle of the 20th century, considerable realization of environmental issues has started to attract attention of the governments and lead the debates of decision makers, who concluded that socio-economic development has intrinsic impacts on the environmental non-renewable resources and ecosystems stability with effects on economic activities and liveability and existence of humans on the earth. Accordingly, a growing recognition of the interdependence of ecosystem health and human well-being leading to the call for SD.

SD and sustainability has practiced throughout the human history but not circulated as expressions until the beginning of the 18th century when the first use of the term "sustainability" occurred by the German forestry scientist Hans Carl von Carlowitz in 1713. He was the first who called for the sustaining use of the wood resource in the service of the entire community and that of the dear posterity (Grober, no date). Later, French and English foresters adopted the practice of planting trees as a path to "sustained-yield forestry" (Heinberg, 2010).

Nevertheless, its ambiguity and confusion, sustainability and its synonyms terms become common and frequently used in all sectors and aspects of development. Meadows et al (1972) used the term ‘sustainable’ in reference to human development patterns. They explored the decline of global systems through the 21st century under the current population and trends of resources use. Accordingly, they concluded, "there is a possibility to alter these growth trends and establish a way to ecological and economic stability that can help achieving future sustainability" (Warster, 1993, p. 144). The origin of the term *"Sustainable Development"* is the report of the International Union of conserving Nature (IUCN) presented in 1980 as a respond to the Limits of Growth Study (Atkinson, 2007). Later, the term has gained great deal of attention and usage after the United Nations' World Commission on Environment and Development (WCED) released its Brundtland Report "Our Common Future" in 1987. The WCED defined SD as *"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"* (United Nations, 1987, p. 37). In 1989, the Swedish oncologist Dr. Karl-Henrik Robert together with other leading scientists formulated their consensus on the four system conditions for sustainability in the *"ecosphere/society"* system, in what they called it *"The Natural Step"* (TNS) (Robert, 2000). TNS aims for ultimate maintenance of ecosystems to support human needs at local and global levels; and elimination of the dependence on non-renewable resources, concentration of non-naturally degradable substances, and minimization of resources consumption that contribute to physical degradation of nature (Environmental Mainstreaming, 2014).

The United Nations Conference on Environment and Development (UNCED) and Rio Declaration Agenda 21, emerged from Earth Summit 1992 followed these initiatives, and declared social, economic and ecological dimensions of SD (Holden et

al, 2008). Four years later, the UN Habitat II Summit took place in Istanbul and brought the cities' living environment into the core of environmental agenda. It called for adequate sustainable human settlements at national levels with a designated role for cities and local authorities (United Nations, 1996). In 2002, the Johannesburg World Summit on SD focused on addressing local and urban environments in global sustainability (United Nations, 2002). In the same year, the UN Habitat was initiated the World Urban Forum as a biannual forum (the last was in April 2014) to promote open dialogue on rapid urbanization and its impacts on communities, economics and environment. The UN Habitat has initiated a series of programs aiming to improve health and environmental quality in cities, include Sustainable Cities, Safer Cities, Rapid Urban Sector Profiling for Sustainability, the Global Urban Observatory and other programs (UN Habitat, 2008). The following figure 1 lists the key events in the development of the concept of sustainability and SD.

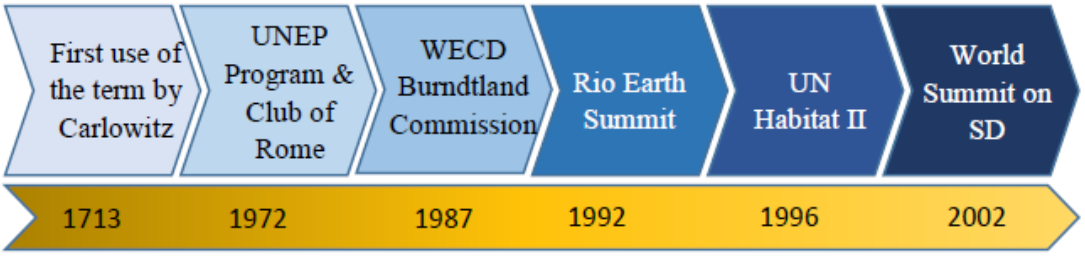

Figure 1: Key events in the development of the concept of sustainable development (compiled by Author)

Approaches to Apply Sustainability in Urban Context

The concepts of urban sustainability and sustainable urban development are emerged from the needs to reduce environmental pressures of human activities within urban context. A global growing concern about environmental deterioration as reactions of urban growth and associated physical development, several approaches have emerged to control such growth and ensure its environmental compatibility. The growth of cities beyond the specific regional productivity, resources and environmental potentials is linked to the causes of natural ecosystems deterioration. Thus, it is necessary to take the ecological scarcity and ecosystem stability as a basis to promote sustainable urban growth (Ekhart, 2002).

The eco-city approach is one of the initiatives arisen from the need to achieve SD in urban context. Its core is to maintain the organic balance and sustainability of interactions and processes between socio-economic and ecological dimensions (Dou, et al, 2013). A similar approach is ecoregional or ecology-based design, which deals with larger context up to 100,000 km^2. The concept of ecoregional approach divides the ecoregion into "*sites*" or local ecosystems (micro-ecosystems) - the smallest units. A "*landscape mosaic*" (Meso-ecosystems) which made up of spatially contiguous sites distinguished by material and energy exchange. The ecoregion - the largest unit - is made up of several meso-ecosystems (Bailey, 2002). Both and other similar approaches (such as design with nature) link land use planning and site design to the potentials and constraints of the site; and apply great concern to the physical limitations, environmental processes and the carrying capacity of the ecosystems.

Supporters of these approaches believe that understanding of the natural processes that occur in different regions and the consequences of disturbance and natural climax is the key to successful land use planning and site design, as well (McHarg, 1971; Kunstler, 1993 and Bailey, 2002).

One of the promising approaches is the "*City as Sustainable Ecosystem*" (CASE). This approach looking at the patterns and processes of sustainable ecosystems as the basis for bridging the gap between human design and the ecologically sustainable systems of Nature (Capra, 2002). Newman and Jennings (2008) argue examining the city as an ecosystem facilitate flows of energy, materials and information to study the dynamics and drivers of change in the system along with the interactions between human and nonhuman parts.

The CASE approach puts humans firmly within the ecosystem, not apart from it. They influenced by the ecosystems within which they function and they can use ecosystems as their guidance model to modify urban form, transform human processes in the cities and restore the capacity of urban bioregion to function in perfect sustainable manner.

The Kingdom of Saudi Arabia: Geophysical and administrative Settings

The KSA locates at the south-western corner of Asia where the Red Sea separates it from Africa. It occupies 80% of the Arabian Peninsula's mainland, which is approximately 2.24 million km^2 (MOCI, 2003; Child and Grainger, 1990). It overlooks the Red Sea in the west for approximately 1,850 km and the Arabian Gulf for more than 700 km (Figure 2). The KSA inhabits by more than 27 million, most of them are concentrated in the main cities (MOEP, 2014).

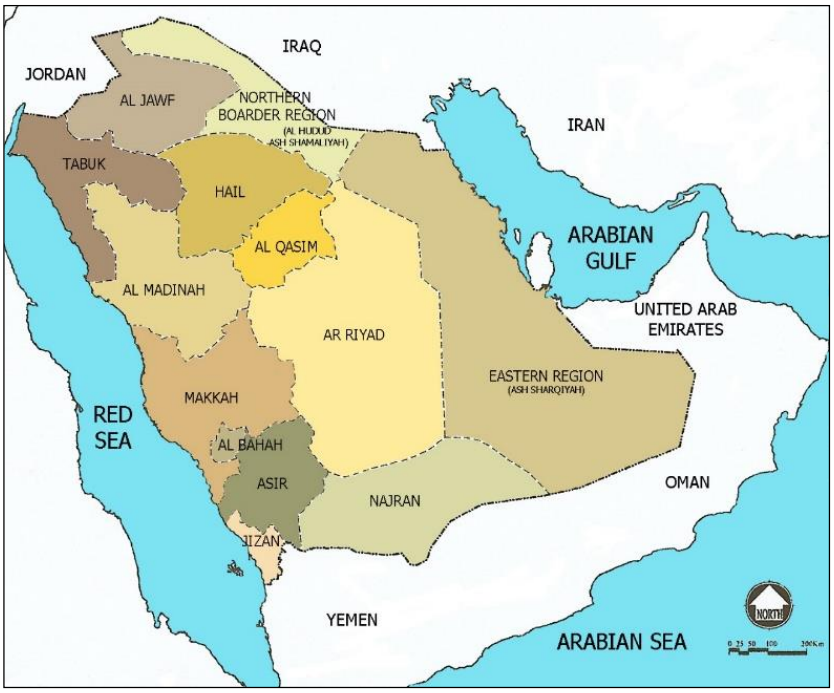

Figure 2: Administrative Regions of the KSA, location and the area in relation to its neighbours within the Arabian Peninsula (Source: based on GCS, 2014).

Based on the Provinces System (*Nidham Al-Manatiq*) approved by the Council of Ministers on February 29th 1992, the KSA is divided into thirteen regions (Figure 2 and table 1) each headed by a governor (*Emir*). Each region is divided into numbers of governorates followed by number of administrative centres controlling the local affairs of surrounding towns and villages. since regionalism is part and parcel of a deliberate approach to decentralisation (Lloyd and Peel, 2006), the Provinces System is considered as an introduction to decentralisation of decision-making for the

purposes of achieving SD at the regional and local levels (Al-Sultan, 2007).

Table 1: Administrative regions of the KSA, their capital (administrative centre)

no	Region	Capital	no	Region	Capital
1	Al-Baha	Al-Baha	8	Ha'il	Ha'il
2	Al-Jawf	Skaka	9	Jizan	Jizan
3	Al-Madinah Al-Munawarah	Al-Madinah	10	Makkah	Makkah
4	Al-Qassim	Buraidah	11	Najran	Najran
5	Ar-Riyadh	Riyadh	12	Northern Boarder	Ara'ar
6	Asir	Abha	13	Tabouk	Tabouk

The *Emir* (Regional Governor) lives in the capital of the region, and acts as chief administrator of the whole region, oversees all its affairs and controls all governmental departments and public organisations. Through his wide powers, the Emir is responsible for the overall development of the region as he chairs the Provincial Council (PC), which consists of representatives of ministries in the region, and includes at least ten citizens.

The supreme goal of the Provinces System is to maintain public participation in the provinces' affairs. The council members deliberate on the needs of the province where different committees work on future development plans, monitoring ongoing projects and other related issues.

Decision Making Process

The KSA follows a monarchy system where the King sets on the top of the decision-making pyramid. The decision-making process follows bottom-up approach for approval and top-down approach for implementation, where the King who issues the royal decree for implementation must approve every major decision. The following figure 3 summarises the decision-making process of issues related to urban development. At the bottom level (policy-making), proposals of projects, programs and/or policies are initiated and discussed by Municipal Council (MC) and, if approved, forwarded to the PC for further discussion and prioritization together with all issues related to the development of the region. Based on the Decision of the PC, the governor forwarded the region’s issues either to the Ministry of Economy and Planning (MOEP) or to the concerned ministry for further processing. The MOEP is responsible for the preparation of National Five-Year Development Plans (FYDPs) based on what it receives from PCs of all regions and other governmental institutions.

The planning system, as many other systems, in the KSA, is a centralised system where all plans suggested by governmental bodies (including ministries, higher committees and commissions) to be implemented at national level are discussed in the Council of Ministers (CM), Chaired by the King. Usually the CM refers to the King for approval or submits the plans to the Consultative Council (CC) for study and final check before approval (Al-Buthie and Eben Saleh, 2002). Approved issues return to the concerned municipalities through the Ministry of Municipal and Rural Affairs (MOMRA) which coordinate Ministry of Interior (MOI) and its regional and local branches if enforcement is required to implement the approved proposals.

It can be noticed that environmental issues are not part of this process. Three other bodies (Ministry of agriculture (MOA), Presidency of Metrology and Environment (PME) and Saudi Wildlife Commission (SWC)) are responsible for all environmental issues and treat them individually and in divert conversion with urban issues. Therfore, urban development processes are practiced apart from environmental issues

and resulted in severe environmental impacts.

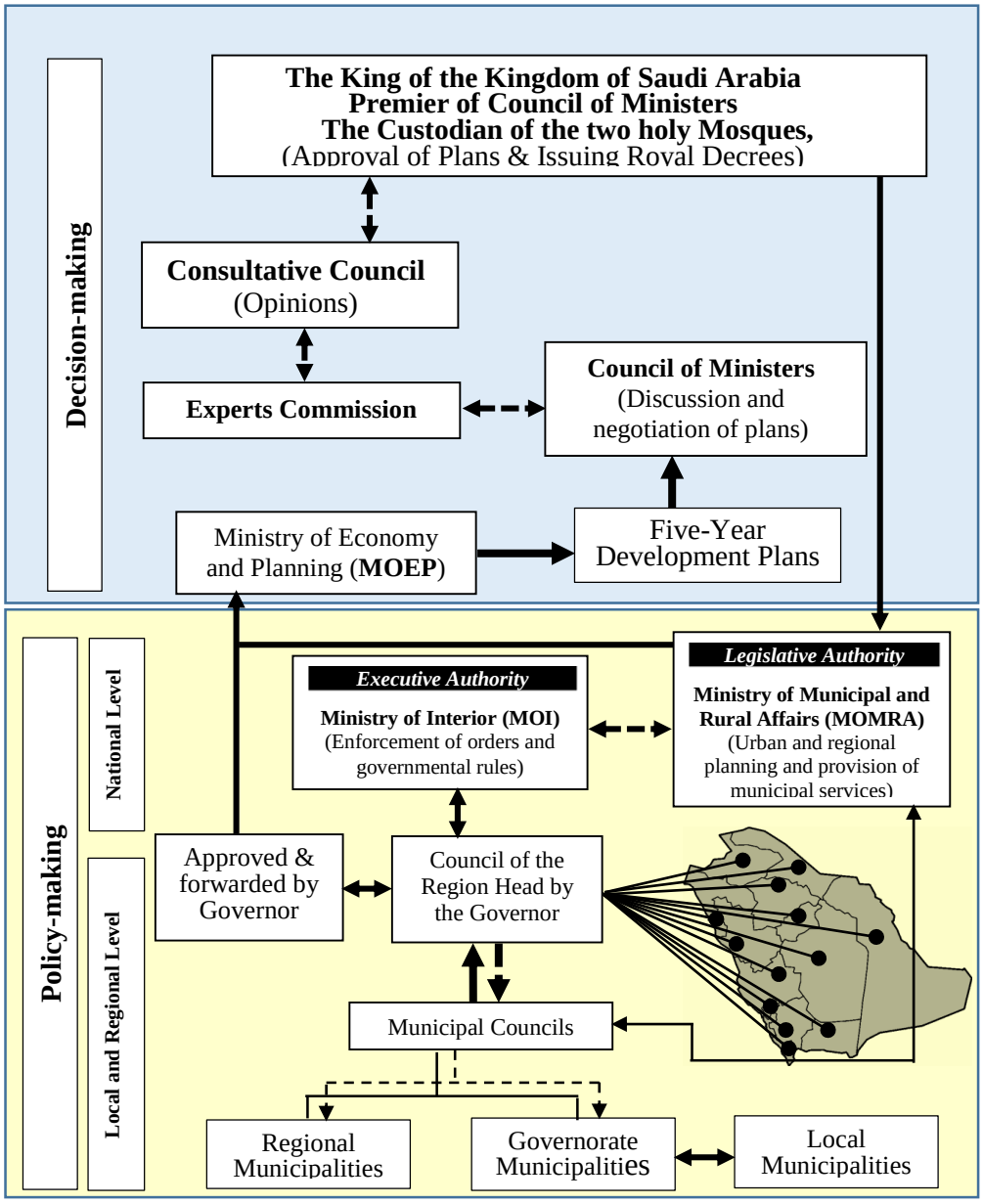

Figure 3: Decision-making process in urban context *(compiled by author based on Al-Buthie and Eben Saleh, 2002; and Al-Gilani and Filor, 1997 and recent amendment of the structure)* (→ forwarded for Approval/implantation, ⇢ for Coordination)

The Case Study: King Abdullah Seafront Park (KASP)

Worldwide, modification of coastal areas to accommodate urban land uses, recreational and tourism facilities requires huge reclamation of intertidal habitats. The DMA is not exceptional from that. It has experienced extensive coastal development resulting in land filling and dredging of more than 4,100 hectares of intertidal and shallow water habitats during the 1980s and 1990s (Kubarrah & Al-Wakeel, 2003). Moreover, the trend has continued since the beginning of the 21st century. Such coastal reclamation process have significantly contributed to coastal environmental degradation (Haslett, 2000).

The Dammam waterfront occupies the southern part of the Tarut Bay (figure 4) between Seahat City and the King Abdulaziz Seaport. The KASP has extended on

about 3.5 km at the middle of the Dammam waterfront; west oriented facing the artificial Al-Murjan Island. This area suffered a great deal of reclamation operations resulting in the continuous shift of coastline westward during 1994 – 2004 (Al-Sulbi, 2008). The huge amount of land filling that took place during the construction of the KASP in order to create series of platforms up to six metres high, and push the coastline westward to water depth of more than two meters with absence of intertidal zone.

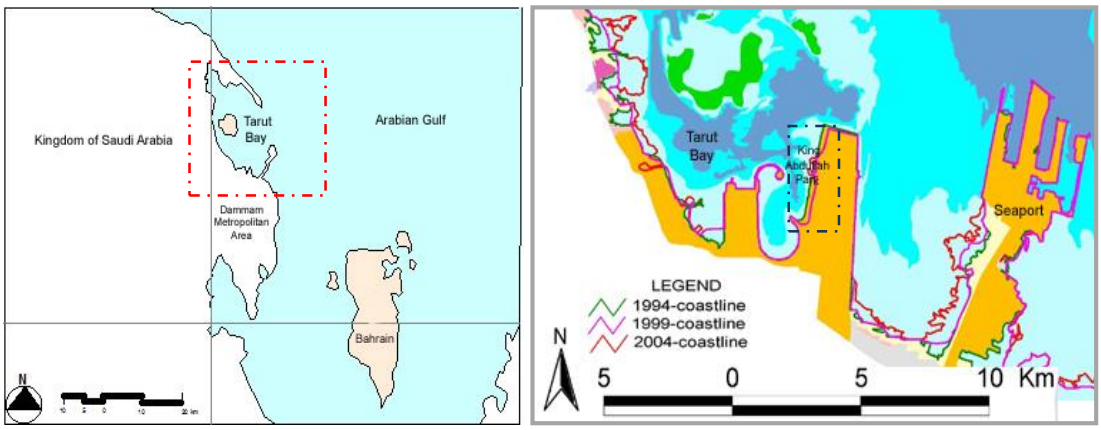

Figure 4: Location of the KASP on the Tarut Bay and

Sustainability Analysis of the KASP Site

Site analysis of the KASP has concerned with four elements contributing to environmental sustainability. The elements has been identified based on the researcher's personal observations are: (1) Maintenance and enhancement of natural processes, (2) Enhancement of biodiversity, (3) Continuity of site productivity and uses, and (4) Environment and physical quality. The criteria of wind and current effects; coastal characteristics and influences of coastline modification were used to assess different segment of the KASP. With absence of the intertidal zone, and application of the criteria, the area can be divided into three segments (figure 5):

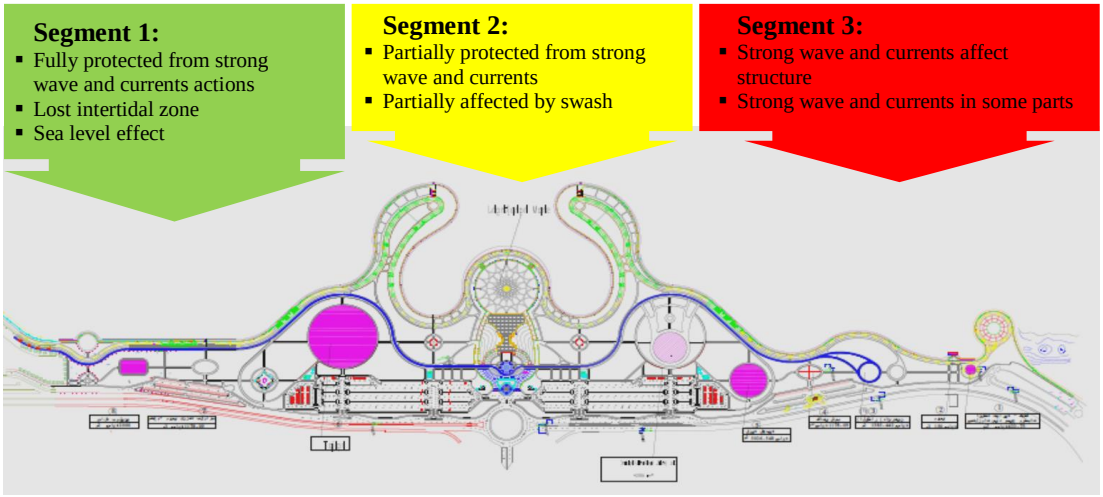

Figure 5: sustainability analysis of the KASP site.

- Segment 1 is located at the south end of the KASP, which is partially protected from strong wave, and tidal currents by the artificial Al-Murjan Island (figure 6). Water may become stagnant for long time especially during low tide, and

unpleasant odours might result from litter decay and the acceleration of algae growth and death in summer seasons. During the hot months of summer, the area experiences clear sky and high temperatures that, with other factors, stimulate algal growth.

Figure 6: accumulation of the litters in the segment 1 due to low currents and slow water exchange

- Segment 2: the platforms zone consists of two peninsulas embraced two bays in semi-circular forms as whole. The two bays surrounding the main festival plaza of more than 5m high above the sea level. This segment is partially protected from the effects of strong waves by the created northern peninsula. But, with the help of the north-western prevailing wind, litters and rubbish are easily driven to the far end of, and accumulated in the two created bays. As a result, bad odours might be emitted and affect the surrounding areas of this segment (figure 7).

Figure 7: segment 2 characterises by the effects of coastline modification and tidal currents tending to naturally reconstruct intertidal zone.

- Segment 3 is the northern part of the KASP. It subjects to strong and heavy wave actions due to its being part of the open sea with no intertidal zone on which waves can break. Moreover, the wind direction (north-west) helps the acceleration of wave actions and tidal currents; and in this case, waves' energy hits the constructed wave barrier resulting in eroding its materials underneath and causing collapse of the constructed barrier (figure 8). In addition, sequential waves can easily hit each other and the coastline barrier, with huge amount of uprooted sea grass, causing huge swash washing as far as 10m ahead. This action has number of impacts on both hard and soft landscape materials.

Figure 8: segment 3 affects by strong waves and tidal actions with severe disturbance of its elements and structures

In normal cases, coastal waves and currents, in the presence of intertidal zone, can reshape coastal zone, which is essential for biodiversity enhancement and environmental health. By losing such areas, coastal processes are impeded and numbers of flora and fauna sharply decline. In a similar way, the productivity of the area is affected by the destruction of intertidal habitat and deterioration of the near shore ones. In addition, environmental processes, qualities and coastal protection will be affected, even with the constructed walls or coastal defences.

SD of such coastal sites requires protection and restoration of intertidal zone, which represent terrestrial-marine meeting zone. Preservation and maintenance of its integrity with the expected outcomes of the project contributes in coastal equilibrium, enrichment of coastal habitats; and enhancement of biodiversity and coastal resources. However, extensive coastal reclamation for the KASP and other land uses diminish the chances of environmentally SD of the DMA coastal zone.

Results and Discussion

Several approaches for environmental sustainability in urban areas are emerged from the need to mitigate pressures of land uses and human activities. But in reality these approaches have failed to incorporate conservation of urban ecosystem into decision making process. In the case of the KSA, the dual-way of decision making process and its failure to support environmental sustainability might be strongly attributed to the clear separation between conservation and development practices. Furthermore, elimination of public participation due to conflict of interests among stake holders widen the gap between planning and decision making authorities on one side, and citizens on the other side.

Extensive urban development of the Dammam waterfront has revealed great deal of environmental impacts. The reclamation of intertidal flats has placed the coastline at a level of more than two meters deep with no intertidal zone. This in turn, diminish all coastal processes - which are necessary for coastal environmental sustainability – and accelerate strong wave actions and long-way splash with severe impacts on the structures for coastal defence as well as landscape elements and site furniture.

Sectorial-oriented practices in decision making and implementation have promoted individuality which against environmental sustainability and directly affected urban ecosystems integrity.

Conclusion: the Dilemma of Development and Conservation

Sustainability is hardly achievable task unless environmental issues are strongly integrated into urban development decision-making process. Current practices in this regard show complete alienation of environmental conservation and urban socio-economic development. In the KSA, even the concerned institutions of both are processing related issues independently. The failure of decision-making system for urban socio-economic development to accommodate environmental conservation and other related issues in the process is the weakest link to address the principles of SD.

Planning and policy-making process is not a one-man show; it is a multidisciplinary task in which all-environmental, socio-economic and urban development authorities must cooperate to sustain the integrity of combined natural and human systems as they interact and condition one another over time. Urban environment is a socio-ecological complex system in a dynamic process of development. It is flexible to changing circumstances and resilient to disturbance (Raskin et at, 1996). Therefore, conservation and development should be dealt with as inter-related process along the way of processing legislative action. The gap of

legislative system (Policy and Decision) to consolidate environmental conservation and socio-economic development as inter-related issues is the main obstacle to SD. Thus, principles of sustainability and SD need to be introduced into the legislative system. This might be done by the embodiment of environmental assessment (both strategic (SEA) and Project (EIA) levels) into the process of policy-making and decision-making at all stages of the actions (policy, plan, program and/or project) life cycle (figure 9 below).

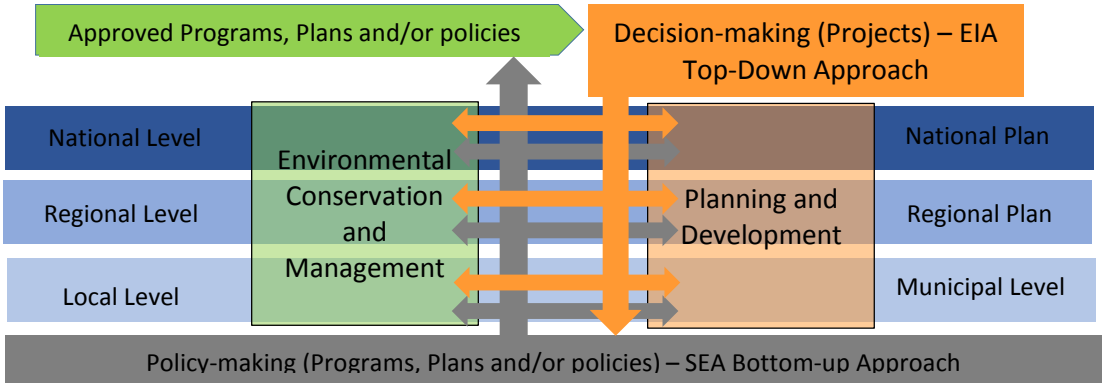

Figure 9: Proposed framework to embody SEA and EIA into legislative system

In addition, actions need to be environmentally assessed and approved at both horizontal and vertical levels in their way (bottom-up or top-down) during the processing for approval and implementation. This will strengthen the level of coordination and involvement of experts from different related disciplines, as well as engagement of citizens to participate in decision making process which may facilitate implementation of sustainability and SD principles.

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DESIGN STRATEGIES TO ENHANCE NATURAL VENTILATION OF AFFORDABLE MULTI-STOREY HOUSING FOR SUSTAINABLE DEVELOPMENT.

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This paper aims to review the affordable multi-storey housing in Malaysia with respect to the sustainable development in the country. There are intensive researches of housing being conducted to sustain the environment. Besides, several design strategies being suggested to enhance the concept of sustainable development. One of the important design strategies being focused is optimizing the potential usage of natural ventilation. This study focuses on Malaysian multi-storey housing in urban area because according to review, this type has become the most prevalent and affordable housing type to meet the demands for housing with rapid urbanization and high population density. However, the drastic development of this housing type does not give an adequate concern to the environmental aspect, especially natural ventilation. Therefore, regarding to the review of previous studies, this paper suggests that natural ventilation has a potential to improve living environment for Malaysian multi-storey housing.

Keywords: Affordable, Multi-Storey Housing, Sustainable Development, Natural Ventilation, Design Strategies

Introduction

Housing industry serves the social agenda of the government and also regarded as important engine of growth for most country (A. R. Musa, 2011). House is a basic need of humanity, thus to achieve house ownership, it must be affordable (Mun, 2012). The Australian National Affordable Housing Summit Group defined affordable housing as reasonably adequate standard and location for lower or middle income households and does not cost so much that a household is unlikely to be able to meet other basic needs on a sustainable basis (Dola, 2012). In China, affordable house is

not only a feature of house but a house service in relation to consumer capacity and desire to own or buy the house (M. S. Suhaida, 2011).

In United States and Canada, affordable house is a house that cost does not exceed 30% of a household's gross income (Dola, 2012). Thus, by consuming less than 30% of a household's budget, the other 70% can be allocated for other living needs (B. Bakhtyar, 2013; Dola, 2012). United States practised one of the most common housing affordability calculations, which is using the National Association Realtors (NAR) (as stated in Table 1).

Table 1: The formula to show the ability of medium-income earners for the monthly payment of a house (B. Bakhtyar, 2013).

Monthly Payment = Median House Price x 0.8 x (R/12) / [1/ (1/R/12) 360)]
Where,
R = the interest rate on loan.
0.8 = the conversion factor; assumption is the income, % down payment and other constant factors.

In Malaysia, affordable house is defined as buying and owning a house of one own choice at an reasonable price that will not burden on other living expenses such as foods, household needs, transportations and children educations (Dola, 2012). Effort to provide affordable house is increasing recently as the needs arise especially in urban areas. According to the Ministry of Housing and Local Government (MHLG) (*National Housing Policy*, 2011), based on the current situation, housing development is concentrated in the urban and suburban areas because the purchasing power is higher and the market is extensive. Thus, in the recent 10th Malaysian Plan, the government is emphasizing on the development of 78,000 affordable houses and RM500 million funds to recover housing projects, which mostly focus on urban area development (A. R. Musa, 2011; M. S. Suhaida, 2011).

According to Peter Moonen et. al. (Peter Moonen, 2012), by 2045, every two out of three persons are expected to live in urbanized areas, corresponding to 5.9 billion people. Over the past decades, urbanisation had took place in Europe and the US, while nowadays, the centre of urbanisation moved to Asia as consequence of the rapid economic growth (as stated in Figure 1) (Peter Moonen, 2012).

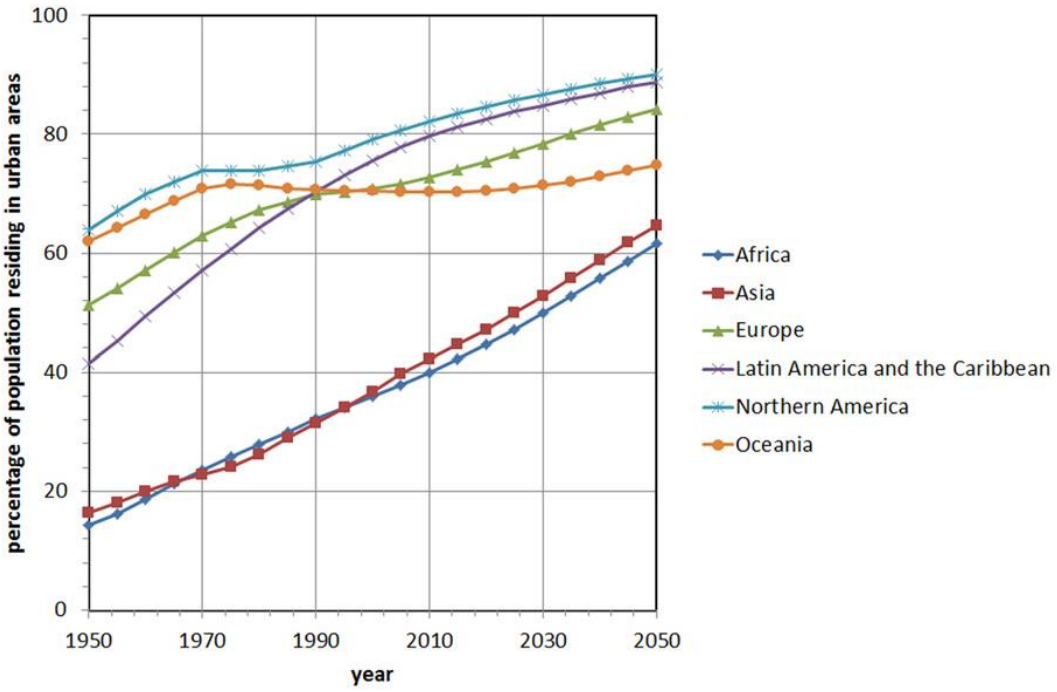

Figure 1: Percentage of population residing in urban areas by continent from year 1950 to 2050 (Peter Moonen, 2012).

Malaysia is one of the Asian countries that also influenced by this growth. Due to this growth, Malaysian government has outlined a housing budget to upgrade living standard for Malaysians especially for those who are living in urban areas. Also, the budget is outlined to ensure the Malaysians afford to own the houses. For the average Malaysians, particularly those living in or around urban centres, the price of landed residential properties have risen too high that they can no longer afford to buy, therefore they downgrade from a landed property to a multi-storey residential type (Dola, 2012). In addition, according to Suheir et. al. (Suheir M. S. Ammar, 2012), as a result of increasing land prices particularly in urban areas, the multi-storey housing become a more economically practical solution. Thus, this study mainly focuses on multi-storey housing in order to investigate the efficiency of the natural ventilation of this housing type.

Multi-Storey Housing

'Multi-storey housing' can be defined as a house building with several levels or floors (Michael Rundell, 2002) and it generally referred to as an 'apartment building' (Sun-Sook Kim, 2008). According to Jan Krebs (Krebs, 2007), 'multi-storey housing' combines several residential units in a complex building, arranged adjacent to or above each other on several floors. This develops multiple levels on a relatively small amount of land increases urban density (Krebs, 2007). The appearance of this housing

type with multi-owners decreases the ability and the right of every owner to have their own control over their dwelling compare to single owned detached house. Consequently, this multi-ownership housing is exposed to heavy usage, natural wear and tear, and it needs maintenance (Suheir M. S. Ammar, 2012).

Malaysian housing can be categorized into three types, which are low cost, medium cost and high cost. Table 2 indicates the projected new housing needs from 1996 to 2020 (Zaky, 2013). As stated in Table 2, the medium cost house is the highest percentage demanded by Malaysians. Thus, this study is focusing on medium cost house type, in which the affordable multi-storey housing is included in this category.

Table 2: Projected New Housing Needs By Category of Houses (1996 - 2020).

	Low Cost	Medium Cost	High Cost	Total
1996-2000	22, 817	47, 208	85, 548	786, 800
7th Malaysia Plan	29%	60%	11%	100%
2001-2005	101, 533	590, 628	84, 839	777, 000
8th Malaysia Plan	13.1%	76%	10.9%	100%
2006-2010	36, 607	598, 712	67, 382	702, 700
9th Malaysia Plan	5.2%	85.2%	9.6%	100%
2011-2015	16, 942	779, 061	68, 697	864, 700
10th Malaysia Plan	2%	90.1%	7.9%	100%
2016-2020	6, 528	844, 057	58, 315	908, 900
11th Malaysia Plan	0.7%	92.9%	6.4%	100%

Source: Institute of Strategic and International Studies (ISIS) Malaysia – Housing the Nation: A Definitive Study, 2013.

According to Haidaliza and Fakri Zaky (Zaky, 2013), a gap in the provision of medium-cost house is within the price range of RM150 000 to RM300 000 especially in main centre like Kuala Lumpur. There exists affordability among those who live in urban area to purchase a medium-cost house for multi-storey type. Therefore, to provide affordable multi-storey housing that serve better environmental aspect, the national housing policy of Malaysian government is outlined in the Malaysian development plan and revised every five years (Maidin, 2012). PR1MA (Perumahan Rakyat 1 Malaysia) is one of housing programme subsidized by government to increase home ownership among Malaysian especially those who live in the urban area (Zaky, 2013). SPNB (Syarikat Perumahan Negara Berhad) stated that according to Budget 2013, there are 22,855 residential units including medium-cost multi-storey

housing will be built especially in Malaysian urban areas (Fared, 2012). This budget is under the Rumah Mesra Rakyat (RMR) and Rumah Mampu Milik (RMM) programme with an allocation of RM320 million (Fared, 2012). Under the RMM house scheme, 1,855 medium-cost multi-storey house units with built-up area of 850sq.ft. will be constructed in Shah Alam and Sungai Buluh, Selangor and will be sold at between RM120,000 and RM220,000. The focus is in Selangor because Selangor has the largest population in Malaysia at 5,411,324 (as stated by Malaysian Department of Statistic) (Ahmad Ezanee Hashim, 2012). Table 3 states the comparison between My First Home Scheme (SRP), PR1MA and Selangor Scheme for multi-storey house in Selangor and Klang Valley ("Comparison between My First Home Scheme (SRP), PR1MA and Selangor Scheme," 2011).

Table 3: Comparison between My First Home Scheme (SRP), PR1MA and Selangor Scheme [17]

	My First Home Scheme (SRP)	**PR1MA**	**Selangor Scheme**
Who qualifies	Individuals or families which combined income of less than RM3,000. Must be below 35	Income less than RM6,000 No age limit	Incomes between RM2,500 to RM,5000 No age limit
What it is	100 percent loan and no 10 percent down payment	Apartments priced between RM220,000 to RM300,000	Apartments priced below RM100,000
Specifications	Houses must be between RM100,000 and RM400,000	850 sq ft and 1,000 sq ft and with a minimum of three rooms	750 sq ft and 850 sq ft
Tenancy	Must occupy house	Must occupy house Can only be sold after 10 years	Can only be sold after 5 years
Locations	Apply at most major banks, CIMB, Maybank, Affin Bank & Bank Islam.	Latest scheme in Precint 11, Putrajaya (560 units). Future ones in Sungai Besi, Kuala Lumpur, Selangor, Johor Bahru and Penang.	Latest scheme in Bandar Baru Bangi (124 units). Future schemes include Kampung Seri Temenggong, Gombak (480 units), Kota Puteri (1,056 units), Shah

	Alam (1,846 units), Hulu Selangor (508 units), Bernam Jaya.

Source: The Star June 29, 2011.

Results and Discussion

Based on data (as stated in Table 3), the observation methods are required for inventory and identification of multi-storey housing that are located mainly in Selangor and Klang Valley (Sapian, 2004). The analysis on the observation exercise has led to a conclusion that there are various typologies of multi-storey housing located in those areas. Figures 2 to 4 illustrate some examples of the multi-storey housing typology in the selected area (Aziz, 2010; Mazlin Ghazali, 2013).

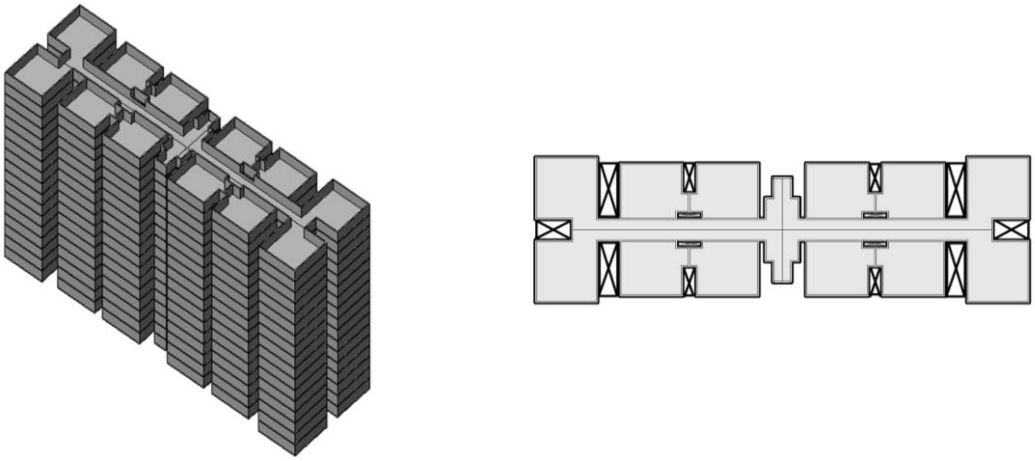

Figure 2:
Type A - Linear Organization in Rectangular Form.

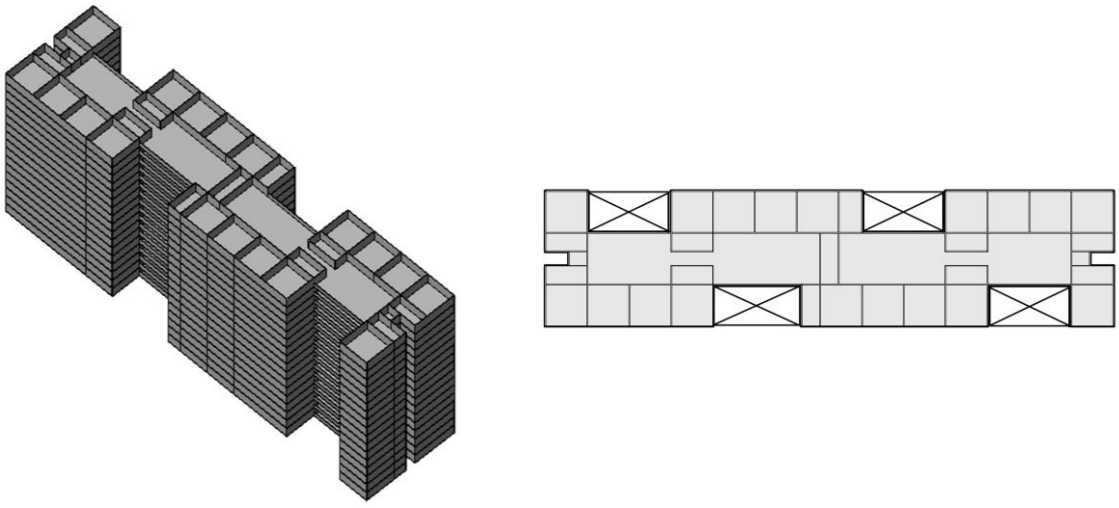

Figure 3:
Type B - Linear Organization in S-shape Form.

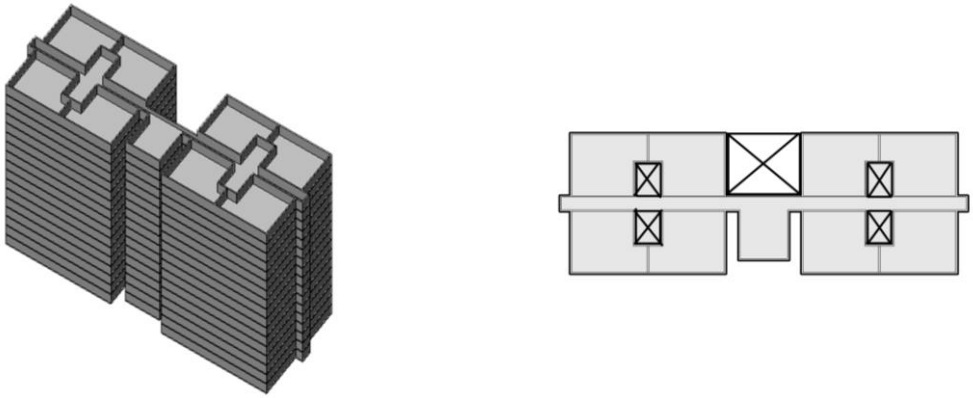

Figure 4:
Type C - Grid Organization in Symmetry Form.

The house typology (as illustrated in Figures 2 to 4) has a potential to be further discussed regarding the sustainability factor of the house. For example, the different typology of the multi-storey housing can be analysed and compared to propose better ventilation and day-lighting for the house (W. S. W. Mohamed, 2012). Furthermore, better design strategies might be suggested to enhance the quality of physical buildings and environment of the house for sustainable development (Mufti, 2012).

Sustainable Development in Multi-Storey Housing

The United Nations World Commission on Environment and Development defined 'sustainable development' as an approach to progress that meets the needs of present without compromising the ability of future generations to meet their needs (Friedman, 2007; Jones, 2008). This definition established a conceptual approach to housing development, whereby any action taken must be pursued with its future effects in mind (Friedman, 2007). World Summit on Sustainable Development (WSSD) 2002 stated that 'sustainable development' stands on three pillars, which are social, economic and environmental development (Oyedepo, 2012).

'Sustainability' is a concept with many definitions that vary across national borders and over time, but most agree that at its centre is the advancement of societies in a way that balances the social, economic, and environmental needs of current and future generations (Karl Foster, 2007). The concept of 'sustainability' is increasing recognition that environmentally responsible design (ERD), a combination of green and sustainable design, has a positive impact on the natural environment, the global economy, and the people who live, work, and play in the built environment (Jones, 2008). Table 4 states the six principles of sustainable design.

Table 4: Principles of Sustainable Design (Jones, 2008).

Principle	Criteria	Description
Principle 1	Respect for the Wisdom of Natural Systems	Sustainable design respects nature and natural systems; nature should be used as a mentor and model for design.
Principle 2	Respect for People	Sustainable design endeavours to create healthy habitats for all people without diminishing the ability of nature to provide nourishing place for all creation.
Principle 3	Respect for Place	Sustainable design honours the differences that exist between places, both on the macro level (e.g., with climate change) and on the micro level (e.g., with biological differences). Buildings should respond to place in fundamental ways.
Principle 4	Respect for the Cycle of Life	Sustainable design respects the natural cycle of life and centres on the concept that in nature all waste products are useful to other organisms. The goal is a safe environment. The choices made today will have consequences for all creatures yet to be born.
Principle 5	Respect for Energy and Natural Resources	Sustainable design recognizes that all natural resources have intrinsic value in their state. Conservation and renewable resources are the canon of a finite world.
Principle 6	Respect for Process	Sustainable design is more than the sum of the whole; to change the result, the process that leads to the result must change. Only through holistic thinking, collaboration, and interdisciplinary communication can a sustainable future be built.

In Malaysia, the government concentrates on the quality of life by focusing on improving the gross domestic product (GDP), such as housing sector, as well as appropriating strategies for sustainable development (B. Bakhtyar, 2013). According to Chua et. al. (Chua Fuh Yiing, 2013), sustainable development ensures the well-being of humans by integrating social equity, economic viability, and environmental conservation. Table 5 states the legal regulation that referred to sustainability development of housing in Malaysia especially for living environment.

Table 5: Legal Regulation that referred to Sustainable Development of Housing in Malaysia.

Legal Regulation	Remarks
Town and Country Planning Act 1976 (Act 172)	Section 2A (2) National Physical Planning Council. The functions are to promote the framework of the national policy, town and country planning as an effective and efficient instrument *for the improvement of the physical environment* and towards achieving the Sustainable Development. Section 8 (3) The statement is to formulate the policy and general proposals of the State Authority, respecting the development and use of land, including *improvement measures of the physical living environment*, communications, traffic management, socio-economic well-being and the promotion of economic growth, and for facilitating Sustainable Development. (4) In formulating the policy and general proposals under paragraph (3)(a), the State Director shall secure that the policy and proposals are justified by the results of his survey under section 7 and by any other information that he may obtain, and shall have regards to current policies respecting the social and economic planning and development and *the environmental protection* of the State and the nation.

Source: Town and Country Planning Act 1976 (Act 172)

As stated in Table 5, the improvement of living environment is one of the important aspects being emphasized by the local authority to achieve sustainable development. National policy on the environment and technology (as stated in Table 6) is also established to conserve the living environment through environmentally sustainable development (Chua Fuh Yiing, 2013).

Table 6: National Policy on the Environment and Technology of Housing in Malaysia.

National Policy	Key Emphasis
National Policy on the Environment	Economic, social and cultural progress through environmentally sustainable development.

National Green Technology	*Energy:* seek to attain energy independence and promote efficient utilization. *Environment:* conserve and minimize the impact on the environment. *Economy:* enhance the national economic development through the use of technology. *Social:* improve the quality of life for all.

Natural Ventilation for Sustainable Development

With the global energy and environment issues, natural ventilation in buildings has attracted great attention among most researchers as a part of sustainable development considerations (Yang Wang, 2014). Natural ventilation is the most effective instrument and parameter to improve Indoor Air Quality (IAQ) in urban areas, to protect health, to provide thermal comfort and to reduce unnecessary energy consumption (C. G. F. Allard, 2005; Mahmoud Bady, 2011). According to Adi Ainurzaman et. al. (Adi Ainurzaman Jamaluddin, 2014), inadequate ventilation in the house consequent indoor air pollution, which is one of the top four environmental risks to public health because majority of people spend approximately 90% of their life indoors. As living standards are improving, the issue of indoor comfort is being the leading concern of local inhabitants (Anh Tuan Nguyen, 2012). Natural ventilation should be better utilized due to indoor health and environmental concern (James O.P. Cheung, 2011).

Natural ventilation in buildings is caused by the pressure difference created between inlets and outlets of the building envelope, as a result of natural driving forces; (i) Wind induced ventilation (caused by the pressure distribution around buildings), and (ii) Buoyancy induced ventilation (created due to the thermal differences, hence density differences between the air inside and outside a building (Arvind Krishan, 2004; Awbi, 2008; C. C. Siew, 2011; Yusoff, 2012). According to James O.P. and Chun-Ho L. (James O.P. Cheung, 2011), prevailing winds in urban area are unavoidably modified by the increasing number of closely placed high-rise buildings that significantly modify the natural ventilation behaviour.

Natural ventilation is one of the important elements to maintain Indoor Air Quality (IAQ) in buildings. Natural ventilation as a strategy for achieving acceptable IAQ is essential based on the supply of fresh air to a space and the dilution of the

indoor pollution concentration (F. Allard, 2002). Previous research discovered that to maintain the IAQ of apartments, there is usually a dependence on natural ventilation (Hisashi Kotani, 2003). According to Mazran et. al. (A. M. A. R. Mazran Ismail, Ruhizal Roosli, Md Azree Othuman Mydin, 2011), in a very low outdoor-indoor temperature differential of hot-humid climate region, natural cross ventilation is much more effective ventilation strategy compared to stack ventilation in order to generate air movement ad passively cools the building.

Evans M. (Evans, 1980) stated that the effects of indoor wind speeds on human in domestic conditions can be summarized as: (1) at 1.0 m/s papers can be moved and it could be pleasant when warm, but is the maximum limit for night comfort, (2) air velocity of 1.5 m/s is too fast for desk work with papers and it is considered as the maximum limit for indoor activities, and (3) 2.0 m/s is acceptable only in hot and humid climate when no other relief is available. In addition, previous study revealed

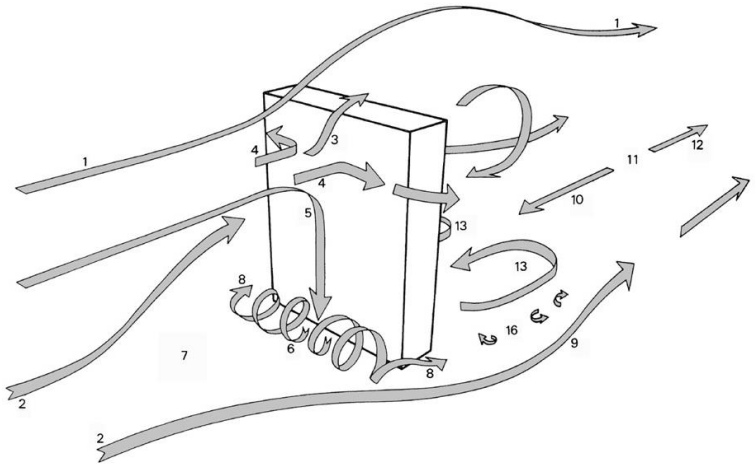

Figure 5: Wind flow pattern around a high-rise building (Peter Moonen, 2012).

Legend

No.	Wind Approach
1 & 3	Partly guided over the building.
2 & 4	Partly around the vertical edges.
5 & 6	Deviated to the ground level, where a standing vortex develops.
7	Further upstream, a stagnation region with low wind speed
8	Wraps around the corner
9	Joins the overall flow around the building at ground level
10 - 16	Downstream of the building, complex and strongly transient wind-velocity patterns develop, but these are generally associated with lower wind speed values and are less concern

that wind has significant effect on the air velocity induced by the appropriate ventilation strategy in buildings (Wardah Fatimah Mohammad Yusoff, 2010). For high-rise buildings, wind-flow pattern at perpendicular wind direction is as illustrated in Figure 5. In addition, the increased wind speed is caused by pressure short circuiting, for instance the connection between high pressure and low pressure areas (as illustrated in Figure 6) (Peter Moonen, 2012).

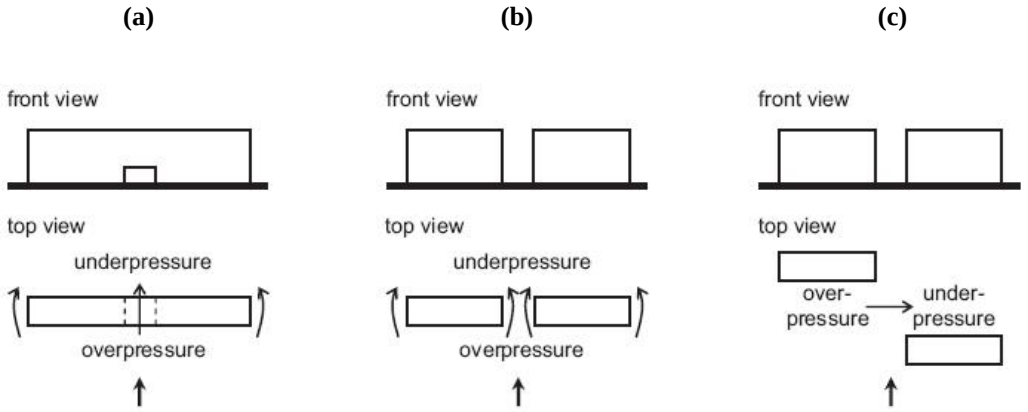

Figure 6:
Three situations in which increased wind speed can occur due to pressure short circuiting: (a) passage through a building, (b) passage between two parallel buildings, (c) passage between two parallel shifted building.

According to Awbi (Awbi, 2008), the natural ventilation principle used to exploit the natural driving forces can be divided into three types (as stated in Figure 7), (i) Single-sided ventilation, where ventilation opening(s) is only on one side of the room, (ii) Cross ventilation, where ventilation openings are on two or more sides of the room, and (iii) Stack ventilation, where ventilation openings are at both low and high levels and the main driving force is thermal buoyancy.

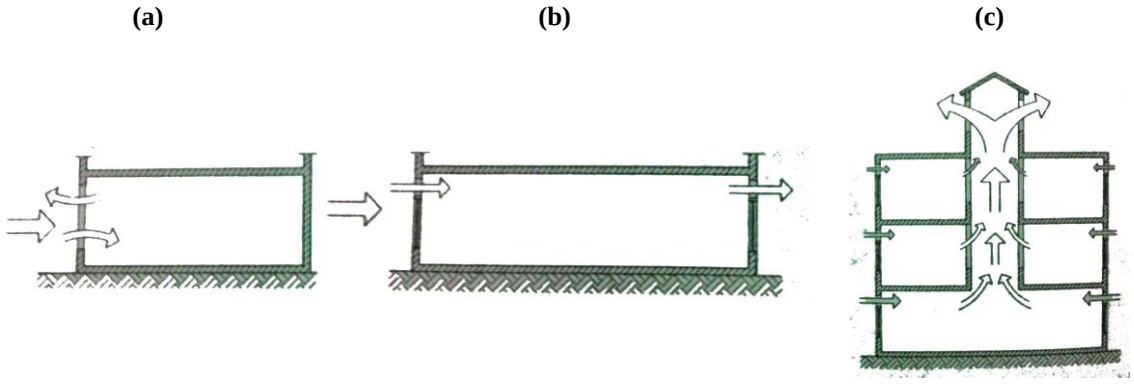

Figure 7: Natural Ventilation Principles.

Recently, there are various natural ventilation studies of multi-storey buildings in most countries over the world to achieve sustainable development. Table 7 indicates some natural ventilation studies in multi-storey housing. The studies being sorted according to the types of housing; low, medium and high cost apartments. Instead of apartment, other buildings are also included in this table to study on the research tools being used for natural ventilation studies. Thus, the most appropriate tool could be decided. Besides, this table is very helpful to find out the research gap in natural ventilation studies.

Table 7: Summary of Natural Ventilation Studies in Multi-Storey Housing.

Research	Year	Strategy @ Parameter						Research Tool						Types of Housing		
		Behavioural Adaptation	Natural Supply Inlet (Hybrid)	Voids @ Air Wells	Stack Ventilation	Balcony (Single-Sided) @ envelope	Volatile Organic Compound (VOC)	Calibrated Digital Instrument (CDI)	Multi Regression Analysis Model	Questionnaires	CFD Technique	Data Logger ONSET HOBO	IAQ Test	Low Cost Apartment	Medium Cost Apartment	High Cost Apartment
Indraganti, M. (Indraganti, 2010, 2011)	2011 2010	√						√		√					√	
Na Na Kang et. al. (Na Na Kang, 2012)	2012	√									√				√	
Moo-Hyun K., & Ji-Hyun H. (Moo-Hyun Kim, 2009)	2009		√								√				√	
Sapian A. R. (Sapian, 2004)	2004			√							√			√		
Mohamed M. F. (M. F. Mohamed, 2011)	2011					√					√					
Adi Ainurzaman	2014			√								√		√		

et. al. (Adi Ainurzaman Jamaluddin, 2014)															
Wan-Je J. & Jang-Yeul S. (Wan-Je Jo, 2009)	2009						√						√		√	
Siu-Kei W. et. al. (Siu-Kei Wong, 2009)	2009						√						√		√	
Sun-Sook K. et. al. (Sun-Sook Kim, 2008)	2008						√						√		√	
Seon-Yeong J. & Seong-Hwann Y. (Seon-Yeong Jeong, 2012)	2012					√					√				√	
Tomoko H. et. al. (Tomoko Hirano, 2006)	2006			√							√					
Siew C. C., et. al. (C. C. Siew, 2011)	2011			√					√							
Chris J. Koinakis (Kainakis, 2005)	2005								√						√	
James O.P. and Chun-Ho L. (James O.P. Cheung, 2011)	2011			√							√					
Peter Moonen et. al. (Peter Moonen, 2012)	2012										√					
Anh Tuan Nguyen & Sigrid Reiter (Anh Tuan Nguyen, 2012)	2012							√						√		
Yusoff, W. F. M. (Yusoff, 2012)	2012				√						√					

Mazran et. al. (M. A. O. M. Mazran Ismail, Ruhizal Roosli, 2011)	2011				√											
Ahmad Ibrahim et. al. (Ahmad Ibrahim, 2013)	2013				√							√				
Dania Gonzalez C. et. al. (Dania Gonzalez Couret, 2013)	2013											√			√	
Yang Wang et. al. (Yang Wang, 2014)	2014		√								√					

As stated in Table 7, medium-cost apartment is the most type being studied. Thus, this study suggests that this type is the most crucial type to be further study on its natural ventilation. However, there is no specifics study that suggests air wells or voids as design strategies for natural ventilation in affordable multi-storey housing to improve indoor thermal comfort ad air quality. Thus, this study intends to further investigate the practicality of air wells to enhance natural ventilation for medium-cost apartment, especially in hot and humid climate country like Malaysia.

Design Strategies to Enhance Natural Ventilation

Properly designed ventilation systems for buildings are essential for maintaining IAQ as well as for reducing a building's energy consumption (Awbi, 2008). Similarly, Blocken (B. Blocken, 2011) claimed that natural ventilation of buildings can be used to provide a comfortable and healthy indoor environment with reduced energy consumption. Deep plan buildings such as multi-storey housing are in principle unsuitable for natural ventilation, primarily because of the difficulty of providing fresh air to the innermost areas. However, the problem can be overcome by replacing the inner part with whether courtyard, atrium, or void (ventilated light-well) (Etheridge, 2012):

1. Courtyard

'Courtyard' is formed using the end of the house next door and these are largely protected from being overlooked (Krebs, 2007). Courtyard can be used as a source of ventilation air. According to Arvind Krishan et. al. (Arvind Krishan, 2004), air inside

courtyard may move very little, and when most needed be a poor source of breeze for single sided ventilation, but better source of breeze can be achieved for cross ventilation. Figure 8 illustrates the diagrams of wind flow in and around courtyard when corridors were built between courtyard spaces that enable cross ventilation through the corridor to draw air from the courtyard, through the adjacent rooms via a side door.

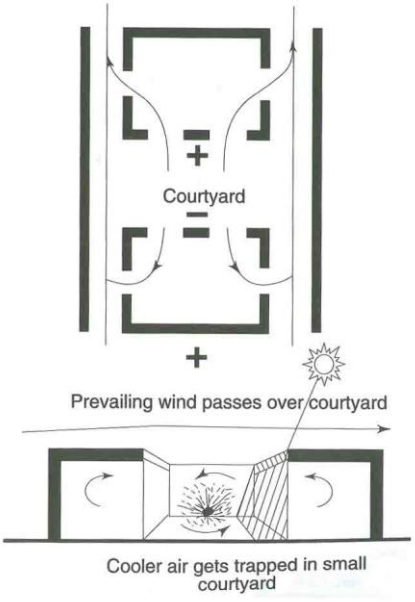

Figure 8: Diagram depicting some aspects of wind flow in and around courtyards.

2. Atrium

'Atrium' refers to a high sheltered interior space surrounded by several storeys or galleries (as illustrated in Figure 9) (Abd.Halid Abdullah, 2009). Atrium space is usually covered by a glass roof and walls. As illustrated in Figure 9, an atrium is functioned for stack ventilation, which is used to generate cross-flow ventilation through the occupied spaces.

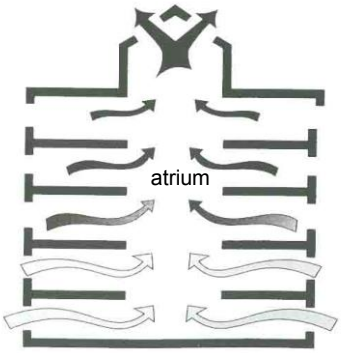

Figure 9:
Upward floor induced by an atrium to provide cross-flow ventilation, single-cell building.

Atrium applies buoyancy-driven natural system in which a vertical connection from each floor must be provided to an exhaust opening typically located on the roof (Stephen D. Ray, 2014)

3. Void

'Void' means light / air well, which is normally in the centres of a building (Hisashi Kotani, 2003). According to Shuzo Murakami et. al. (Shuzo Murakami, 2004), voids in the buildings bring advantages in the architectural, environmental, and structural aspects which can be summarized as follow: (1) indoor environmental control with a low environmental load using the potential of outdoor environment will be possible. The voids will facilitate natural ventilation and enable the IAQ to be controlled, (2) solar shading performance will be improved by introducing voids in the buildings. The voids will act as ventilation spaces and this enable passive maintenance of a good indoor comfort, (3) Proper isolation or connection for each room will be possible by the use of voids. The voids will become as adequate buffers (buffer spaces between private and public living spaces) into living spaces will make it possible to limit the invasion of private living and to achieve less stressful high-density neighbourhood units, and (4) Variegated living spaces can be created by combining rooms with voids.

Previous studies suggested that introducing voids in buildings can improve natural ventilation indoors. Tomoko Hirano et. al. (Tomoko Hirano, 2006) revealed that the building model with a void ratio of 50% is more effective than the building model with a void ratio of 0% in terms of air change rate (about four times larger) and average wind velocity at the openings (around 30% faster). Besides, Sapian A. R. (Sapian, 2004) suggested that the void allows the windward façade of the rear block to receive the wind that flow through the void. Hisashi Kotani et. al. (Hisashi Kotani, 2003) claimed that the ventilation rate in voids affected by both wind force and thermal buoyancy.

In hot and humid climate, voids do affect the indoor thermal performance of its adjacent areas (Nasibeh Sadafi, 2011). Thus, this study intends to investigate the efficiency of voids to channel the natural ventilation towards each house units in multi-storey housing.

Conclusion

As a conclusion, certain design parameters of multi-storey housing in urban area should be particularly concerned by all building designers (architects, engineers, contractors etc.) in order to provide a comfortable living environment. From the discussion, this study suggests that natural ventilation in buildings is one of the important elements to maintain certain comfort level within a particular building zone. Thus, the effectiveness and efficiency of design strategies in multi-storey housing shall be further studied to enhance natural ventilation and improve better living environment.

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A USER-FRIENDLY STREET IN THE CONTEXT OF MALAYSIA

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One of the issues concerning the liveability and prosperity of a city is that the street is not friendly to its users. In urban design, much has been discussed on the significance of the design criteria in creating a user-friendly street. Streets are the most public of all city spaces and are generally utilised by all users including women, children, elderly and families. The streets support public and private activities for different types of users at different times. Due to the current lack of urban social spaces in the urban areas, the user-friendliness of the street is an important factor to bring people on to the street. The street must be friendly to the users to cater for different functions. The focus of this paper is to identify the design criteria for a user-friendly street in the Malaysia context by examining one of the earliest high street in Kuala Lumpur, namely Jalan Tunku Abdul Rahman. The study focused on the physical environment in identifying the design criteria that are friendly to the users. The research adopted a case study method with a mixed method approach in data collection and analysis. The questionnaire survey and in depth interviews was conducted with the users of the streets. Systematic field observation was carried out to gather evidence of the actual scenes of the places. Multiple sources of evidence were gathered, analysed and triangulated and the findings of the study were derived from the convergence of the data. The study found that design criteria of the street have a significant relationship with the uses and activities of the street. The research has established that in creating a user-friendly street, easy access by foot, proximity, safe crossing devices and environmental condition (free of pollution, noise, smell and vibration; a lot of covered ways/shade and other protection from sun and rain; and breezy and suitable temperature) are the important criteria in creating a user-friendly street in Malaysia.

Keywords: User-friendly street, user needs, design criteria, uses and activities

Introduction

Streets are a vital component of the urban form and the play an important role in the city centres. However, in Malaysian cities, it is hard to find examples of street

environments that are friendly and accommodating to the users. The unfriendly street environment for pedestrian in urban spaces is also cited as among the most critical urban issues addressed in the Kuala Lumpur City plan 2020. Urbanisation has a tremendous influence on urban spaces, generally, and streets, specifically. One of the influences is the erosion of the street as a public space, which also has an effect on public life and urban users (Shamsuddin et al., 2010). The rapid growth in the cities has a tremendous influence on the relationship between the urban users and the social spaces, especially the streets (Shamsuddin et al., 2010). This issue constitutes one of the most important concerns of the Draft Kuala Lumpur City Plan 2020. The increase in population has contributed to the decrease in the quality of the urban environment and the quality of life of the inhabitants, particularly in major cities like Kuala Lumpur. This is more pertinent in view that it is envisioned that there will be a population increase from 1.6 million today to 2.2 million by 2020. Therefore, the streets will become a vital space for the public and need to be governed effectively and efficiently to promote an environment that is conducive, sustainable and friendly to all. The focus of this paper is to identify the design criteria for a user-friendly street.

Literature review

A user-friendly street is related with a street that is inclusive to all (Burton et al, 2006; Yaakub et al, 2009); a street that fulfils the needs of all users (Tibbalds (1992); a street that is usable, accessible and safe to all member of society; and one that is strongly shaped by functional, emotion, physical and socio-cultural attributes and climate (Burton et al, 2006; Yaakub et al, 2009; Shamsuddin et al., 2004). This concept is related to the broader concept of walkable environment as user friendly streets as one of the factors that can encourage people to walk in the city. Walkability at its most basic considers the safety, security, economy and convenience travelling by foot. A walkable community is also determined by factors such as residential density, mixed land use, street connectivity, aesthetics, accessible to get recreation facilities and safety (Borst H.C. et al., 2008).The actual needs and preferences of the urban users are the most important quality and should be given more attention in order to re-evaluate the quality and design of the space over time and to create a successful urban space (Jansson et al, 2010). However the needs of the users in the street depend on their activities in the street and the activities are influenced by the quality and the character of the outdoor space (Gehl, 1987).

The understanding of design criteria is essential to identify what is a user-friendly street to the users. Gehl (2004) added that, by creating good pedestrian environment, it will provide a well-functioning public domain; inviting more people

to walk, stay longer and offering a variety of attractive public activities. The physical design of a street is the actual structure of a place, which includes buildings, landscape, climate and aesthetic quality (Shamsuddin et al, 2004; Carmona, 2003), it is the objects in the setting; natural elements, manmade features and climate; relation between places created by walls, distance, windows, barriers; and qualities of setting (Rapoport, 1986).The most important design criteria for user-friendly street is comfort, which is one of the basic human needs in urban spaces (Carr et al, 1992:Jacobs.1996; Carmona et al, 2003). In order to create comfortable street/space, the design decisions play an important role in modifying the impact of micro climate (Carmona et al., 2003; Mofidi, 2009).

Environmental conditions have a very strong relationship with people's behaviour and the usage of outdoor spaces (Nikolopoulou, 2007). Many features of the physical structures of the city can affect the urban climate that gives a comfortable environment to the street (Mofidi, 2009). In a hot and humid country like Malaysia, environmental conditions in public spaces and around buildings, such as micro climate, sunlight, shelter, air movement related to buildings and lighting, play a vital role in creating a comfortable space. This research seeks to uncover the criteria that are important for a user-friendly street in the context of Malaysia.

Methodology

This study adopts a case study method that is approached in both qualitative and quantitative manner. The street environment is examined in respect of the physical qualities through the analysis of questionnaire surveys of 340 respondents selected using quota sampling. The respondents were broadly divided into daily users (those who are constantly engaged with the street) and occasional users (those who are not dependent on the study area). In this study, in-depth interviews were utilised to complement the quantitative data. The type of user, age, sex and ethnicity are important characteristics that considered in selecting respondents in the interview. A convenience random sampling of 20 street users was interviewed. The in-situ interviews will assure that the respondent's phenomenological observations are recorded and that the perceptions while moving could be considered in the final outcome. In this study, structured observations of the users' activities and physical environment of the street was conducted as part of the multi method approach to record the physical characteristics and the qualities in urban pedestrian environments and to study human activities on the streets. Field observations and documentation of the quality of the site in the form of maps and photographic records were conducted for each sub-area of the case study. Field notes and related photographs were taken to examine the users' interactions with the physical settings, features and others.

The data were processed using both qualitative and quantitative approaches and tabulated to find potential patterns and connections. The data collected (quantitative and qualitative) are independent of each other and were analysed concurrently to allow the general patterns and the causal factors to emerge.

Case study

The study area, Jalan Tunku Abdul Rahman, is located within the core of the Central Business District (CBD), of Kuala Lumpur. Jalan Tunku Abdul Rahman (JTAR) is identified as one of the main traditional streets in the city centre due to its inherent socio-cultural stronghold and historical significance as being among the earliest high-streets in the city centre of Kuala Lumpur (Shamsuddin et al., 2010).This street receives the highest concentration of shoppers, visitors and pedestrians (KLCH, 2003) and is located in the area which has been dedicated for urban revitalization initiative (Ujang, 2008).

Results and Analysis

There are four design criteria that are important in creating a user friendly street, namely; easy access by foot, proximity, safe crossing devices, environmental conditions and other supportive factors.

a) Easy access by foot

Ease of access by foot is related with a safe environment and is dependent on the conditions of the walkway, well connected to path, services and facilities, wide, flat footways and no clutter blocking pedestrian movement people (Carrs et al., 1992). The results from the survey under safety and security attributes indicated that a safe environment for the elderly, people with disability and children as being one of the main attributes that make people use the street. Although JTAR has good connections with other streets, the conditions of the pedestrian walkway in JTAR are still not very friendly to the pedestrians, especially people with disability. Feedbacks from the interviews indicated that the conditions of the pavements and materials used made it difficult to walk, especially for those with disability. The pavement is not well maintained and the surface of the materials used, which is slippery when it rains in some areas, is not suitable and dangerous especially for people with disabilities. It was also observed that the walkway is uneven and cluttered, thus causing obstruction to the pedestrian movement, especially for the elderly and people with disability.

It was also observed that the walkways lacked ramps at surface changes, and the absence of tactile blocks make it difficult for people with disabilities to use the street. The curb extension condition is also too steep and the inappropriate gratings used

along the walkways hinder the smooth movement of pedestrians, especially for people with disabilities. Most of the finishes used have not been carefully selected and arranged to ensure safety and unobstructed access for all. Furthermore, the locations of signages, dustbins, phone booths and other street furniture along the pedestrian walkways create obstruction for pedestrians to walk unimpeded. As argued by Tibbalds (1992), pedestrians are always being impeded by street furniture, such as lamp posts, dust bins, and advertisement boards while walking on the street, which makes the street inaccessible and unsafe for them to walk easily. This statement is supported by Carrs et al (1992) who stated that the presence of these elements sometimes distract and severe the connections for walking as well as blocking the views, where visibility is an important factor for safety on the street.

In JTAR, the obstruction is not only caused by the location of the street furniture along the street but also there are goods for sale and motorcycles that are parked illegally making it difficult to walk. There is also a conflict between pedestrians' access by foot with traders and stalls on the walkway and motorcycles that are illegally parked, blocking the way for pedestrians. This not only affects the pedestrian movement by foot but also poses danger to the pedestrians from the traffic on the road. The width of the pedestrian walkway also affects the feelings of comfort in using the street. This street has narrow sidewalks that may cause danger to the pedestrians, hence making it less accessible.

Easy access by foot is important to create a user-friendly street. Therefore, continuous pedestrian linkage, appropriate location of street furniture, the careful design of pedestrian walkway and regular maintenance must be considered. As suggested by the previous study on streets in Kuala Lumpur city centre by Shamsuddin et al. (2010), people tend to walk longer and visit more shops if the street condition is convenient for them to walk. Inaccessibility by foot also increases the number of cars on the street as suggested by Schmitz et al. (2006) where currently people prefer to drive than walk even for short distance trips. Therefore, in the case of Malaysia, in order for the street to be accessible for the entire pedestrian including the disabled people, the design has to conform to the approved Standard and Industrial Research Institute of Malaysia (SIRIM), as Malaysian standard MS 1331: 1993: Code of Practice for Disabled People Outside Building.

b) Proximity

The proximity or commute distance from the user's place of work and home is one of the most important factors influencing the use of the street. The survey results indicated that proximity was one the reasons mentioned in using the street where the respondents who stayed within a 10 km radius with JTAR were the group that most

frequently visit the street. The results show that 46.7 per cent of the respondents who stayed 1-5 kilometres away and 31.7 per cent of the respondents who stayed between 5-10 kilometres from JTAR used the street daily. People are much more likely to walk to a given destination if they perceive that the distance is not too far. The perceived distance can be influenced by the right type of land use and design characteristics. Design elements such as continuous walking systems that connect door fronts with transit stops or other destinations can create good connections. Most of the interviewed respondents mentioned that they manage to walk about 1.2 kilometres away, which supports the theory by many authors that people will choose to walk approximately 1 kilometre in distance. The proximity of public transportation nodes and shopping spots make this street highly accessible for pedestrians. The proximity of one spot to another is a positive response factor that encourages people to use the street as expressed by one of the respondents.

The proximity factor of JTAR contributes to an accessible street that gives pedestrians comfort of the street (Carney, 2000) where the street users are able to move between and within the zones (Anderson, 2006). Burton et al. (2006) noted that 10 minutes (about 800 metres) are a comfortable walking time for people to reach services and facilities. Therefore, the locations of the services and facilities, such as shops, public transport and other facilities should be located or situated within a 10-minute walking distance (Burton et al., 2006). However, in some situations even though pedestrians aim to use the shortest route, due to encounters with other pedestrians and obstacles on the street they might not be able to do so. Based on the interviews it was found that the appropriate surface sidewalks also affect the comfort of using the street. Proximity from the parking area to the users' destination is another key factor that contributes to the feeling of comfort to the street users.

c) Safe crossing devices

The survey indicates that safe crossing devices are one of the most important attributes that contribute to a friendly street. The presence of safe crossing devices is another key attribute in supporting the feeling of safety and security in using the street. As noted in the interview, pedestrian crossing is very important for pedestrian safety to cross the streets, especially in areas that are busy with traffic. In the survey, the occasional group and age group of users expressed the most concern in respect of the need for adequate and safe crossing devices. This is because most of them use the street for shopping purposes and bring many bags and sometimes come with their family. It was observed that there are some areas along the study street that do not provide pedestrian crossings such as in front of the Sogo shopping block. This is not in accordance to the Malaysian standard 1331 (2003) which requires pedestrian

crossing to be provided in busy shopping areas and in areas where the number of vehicles exceeds 300 per hour.

Most of the users tend to use the zebra crossing more compared to the overhead crossings. People tend to prefer to cross the road illegally rather than use the crossings provided. This is due to many factors, the first reason being the width of the street that is too wide making it difficult to cross safely. The wider the street, the longer it will take to cross, therefore, the longer pedestrians will be exposed to vehicular traffic. The ITE (2006) recommended the width of the street to be reduced by extending the curb. This has the effects of traffic calming and not only reduced the pedestrian crossing distance, but also gives exposure to traffic by improving the driver and pedestrian's sight distance and visibility (ITE, 2006).

Another reason is that the overhead crossing is not suitable for those with mobility issues, such as pregnant women, women with shopping bags or strollers, elderly people and children. The survey results discovered that the aged group of users perceived that safe crossing devices are one of the most important attributes that contribute to the use of the street. It is impossible for such group to climb up the stair case with no other supportive facilities provided such as a ramp or escalator. Due to its height, the overhead crossing is also located at a higher level than the street, therefore lacking pedestrian surveillance, which contributes to the feeling of insecurity to the pedestrians. Whyte (1980) argued that putting spaces away from the street level like sunken spaces or roof top urban spaces is not convincing in terms of safety. In addition, the crossings also do not consider the specific needs of people with disability such as safe crossings for blind pedestrians. Sometimes the stop signs for crossings are also not clear. The sounds for the stop signal that allow people to cross the road are also not loud enough, making it difficult for people to hear and impossible for people with hearing problems. It was also found that at the pedestrian crossing area, there is no proper refuge for pedestrians (waiting space), especially at the areas with narrow walkways, and that the traffic calming system is not effective to allow adequate time to cross the street; as also observed by Shamsuddin et al. (2010).

d) Environmental conditions

Comfort and convenience are the basic physiological needs of people. The results indicate similar patterns of importance in respect of the attributes of comfort and convenience that can attract more users to the street. Based on the users' perceptions concerning their level of comfort and convenience attributes, it shows that being free of pollution, noise, smell and vibration, lots of covered ways and shade that can protect them from the sun and rain, availability of dust bins, public telephones and others public facilities, breezy environment and a suitable temperature are the most

important criteria that make a street comfortable and convenient (Table 2).

The scale of the attributes shows the criteria of comfort and convenience that are important to the respondents. It was found that most of the attributes that were stated as most crucial according to users' perception are more related to the weather and climate of the street. Surprisingly, based on the mean value, seating placement, sufficient and comfortable seating are the least important criteria compared to the others. Comfortable streets are calm, welcoming and pedestrian friendly with the necessary facilities and services (Burton, 2006). The occasional group of users were more concerned with these attributes to make them use the street compared to other groups. However, based on the survey (table 2), it indicates that the attributes related to comfortable and sufficient seating and location of the seating are less important compared to other attributes according to the respondents' perceptions. These results give a different scenario compared to other studies in Western and European countries where seating in the street is an important attribute for their users (Whyte, 1980; Gehl, 1986; Carr et al, 1996 and Burton et al, 2006). The factors that relate to culture and climate may create different functions for the street and at the same time create different kinds of activities on the street, which contributes to different attributes of users' preferences and needs.

Between the four attributes that contribute to the feelings of comfort on the street, free of pollution from dust, sound and smell is the attribute that most of the users indicated as being strongly important in the survey. The results show that comfortable and sufficient seating and seating placed adjacent to the pedestrian flow were the least important based on users' perceptions of the attributes that contribute to the feeling of comfort and convenience in JTAR. The findings of the current study do not support the previous research. This may relate to the environmental conditions that are not convivial, not healthy in terms of pollution and the micro climate of the street that is too hot and humid, being not a pleasing environment to view and lacking of shaded areas.

The feeling of comfort and convenience affects the length of time people spend in a public space. This was supported by Carmona et al (2003) who stressed that comfort is a prerequisite of a successful public space and affect the length of time people stay in the space.

i) Free of pollution, noise, smell and vibration

In the case of this study an environment that is free of pollution, such as smell, noise and vibration is shown to be the most important attribute that makes people use the street. As mentioned by respondent no.8: *"I don't like to spend time in JTAR because the environment is not conducive. It is hot, dusty, too crowded and the sounds*

from vehicles are too loud. Normally when I go to JTAR I just get what I need to buy and move." (Male)

Based on the interview it was also found that due to the dusty environment, it might distract people from doing more activities outdoors as according to respondent no. 2: *"When I go to JTAR with friends, we always have lunch together, but we normally have lunch indoors (inside the building), because the outdoor environment is quite dusty and that makes us uncomfortable" (Female).*

According to Krupart (1985), this attribute relates to the stress and experience of the environment. On site observation revealed that such pollutions are mainly caused by the large number of cars using the street. This was supported by the findings in the Kuala Lumpur City Plan 2020 (2006) that stated between 2000 to 2003, 81 per cent of the pollution was due to the vehicles.

ii) Presence of covered ways/shade and other protection from sun and rain

In hot and humid countries, protection from the sun and rain are important to create a conducive outdoor environment. The presence of covered ways that provide shade and shelter from the sun and rain is important for people to use the street comfortably. The survey showed that most of the users use the street in the morning and late afternoon, spending up to 4 hours in JTAR. Most of the activities also occurred in the areas that have shade and protection from the sun. People use these areas to sit and do more static activities, as they feel comfortable compare to the unsheltered areas where only dynamic activities were witnessed. It is also observed that during hot sunny days in JTAR, people prefer to walk under covered walkways such as the corridors of the shophouses and under shade from buildings along the street and only seating in areas that have shade are being used. There are three main ways of protection from the hot sunlight and rain, namely; through the design, orientation and spacing of the buildings (Carmona et al, 2003), tree plantings and the spacing between tree and building, and the presence of covered walkways (Carmona et al, 2003). The orientation of the buildings also plays an important role on the street to minimise the sunlight on the street. The areas that are shaded by the buildings tend to attract people and activities, especially optional and social activities. However, some areas of JTAR have good shadow casting because of the tall buildings in the street. Besides covered arcades, building overhangs of shopping complexes also provide shade for pedestrians.

In the case of JTAR, the pedestrian walkways are divided into two groups, which are covered walkways or arcades in front of the shops and uncovered walkways along the street. The former type of walkway provides protection from the sun, rain and strong wind while the uncovered walkways offer more space to walk. However, the

research by Abdul Latip (2011) also found that people prefer trees to covered walkways due to the cooling effects they bring to the area. Trees and greenery along the street do affect the use of the street. In the case of JTAR, there is strong exposure to the sun every day, therefore tree planting is one of the provisions for providing shade, reducing glare and cooling the atmosphere. The presence of trees/ greenery is felt to have a positive effect on the environment, such as modifying the impact of the micro climate, providing shade from the sun and also acting as a divider between the pedestrian walkway and traffic flow. It was observed that in the areas that have shaded trees planted, more activities exist. The seating located under shady trees also shows more use by the street users compared to the seating located in the exposed area along the street.

Relief from the sun is also a main factor that needs to be considered, as it can affect the micro climate in urban spaces (Whyte, 1980; Carr et al, 1992). Unlike Western and European countries where the sunlight penetration into places helps make the area more pleasant for the users (Carmona et al., 2003), in the Malaysian context, the protection from sunlight is a crucial element that can make people feel comfortable and pleasant when using the street. The improvements needed in JTAR are covered walkway, trees and greenery which relate to protection from the sun and rain and also cooling effects are required. This is in line with the statement by Lynch (1984) that streets that are shady provide a setting for activities and can bring people together.

iii) Breezy and suitable temperature

The survey shows that breezy environment and suitable temperature of the space are among the most important attributes from the users' perceptions that make them use the street and at the same time will contribute to a user- friendly street. This is supported by Nikolopoulou et al. (2007) with their observation that there is a strong relationship between micro climate conditions and the use of space. The local climate of the site also relates to the existence of trees and greenery along the street. One of the elements that need to improve JTAR according to the respondents is to increase the greenery and tree planting along the street. The presence of greenery in the city not only provides shade, but also may contribute to the cooling temperature in a place (Abdul Rahman, 2013). Therefore, planting and increasing greenery along the street may help to reduce the local temperature and at the same time will create a comfortable environment for the users to use the street. It has also been proven by Gill et al. in Abdul Latip (2011) that the mature trees can provide a cooler surface by 15.6 Celsius. The finding was also supported by Simonds (1994) who stressed that instead of beautification purposes, the presence of trees, ground covers and open water into

the open space will reduce 30 degrees cooler to the surface temperature than that of the sun hot paving.

Another criterion that affects the temperature in the street is the physical structures which include the surface material. It was observed that some of the physical structures and surface material are not suitable for hot and humid country like Malaysia. This is supported by (Mofidi et al, 2009; Bourbia et al. 2009) who stressed that physical structures, including properties of surfaces can affect the urban climate that provides a comfortable environment to the street. According to Bourbia et al. (2009) in their study, they found that there are differences in temperature in the area that is fully covered by hard surfaces with the non-existence of vegetation with the area that is covered with hard surfaces and with the existence of vegetation.

Breezy or wind environment affects the comfort level of the street users. According to Carmona et al (2003), in a very humid climate like Malaysia, the outdoor spaces may need to be designed to encourage a greater thorough flow of cooling air. This can be achieved by modifying the design decisions like the pattern of physical layout either natural or artificial such as positioning access, trees planting, walls and other obstructions (Carmona et al., 2003). The importance of wind flow and air temperature in urban spaces to encourage people to use the space has also been stressed by other authors (Carmona et al., 2003; Jacobs, 1996 and Nikolopoulou et al., 2007). Based on the users' activities on the street, the way they use the street, duration of stay, time of usage and where they prefer to spend their time can help to identify how important these factors are for them. The majority of the respondents use this street in the morning and late afternoon. The reasons they use the street more during the morning and late afternoon is because the temperature is lower and there is less sunlight, which creates a comfortable environment for them to use and spend their time. The results also show that the morning and evening users comprise of the majority who spend time in that street.

Conclusion

The purpose of this paper is to determine the design criteria that are needed for a user-friendly street in Malaysia The importance of such findings is due to the need to create a more walkable environment in the city centre in order to reduce the heavy dependence on vehicles for movement within the city centre. A user-friendly street will facilitate the creation of a walkable environment that is seen as the more sustainable approach towards city planning and design in the future. In this research it was revealed that the design criteria that contributed to the user-friendly street in the Malaysian context is mainly similar to the previous theories developed by other countries, especially the developed ones. There is also not much difference between

the users' needs of a user-friendly street with the needs of users of other urban spaces based on previous theories developed elsewhere. However, the attributes that contribute to the factors vary for each context, especially between countries with a different climate and economic level (developing and developed countries). This may relate to the differences in environment, climate or culture of the urban places. This paper identifies the factors that need to be considered in the future guidelines and policies for planning and design of urban spaces especially streets in the city centres. It is hoped that these factors will be taken into consideration by those involved with decision- making in respect of planning and urban design, as a guide to create a friendly street environment for the users that is generally lacking in our urban streets at present.

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AN ISLAMIC PERSPECTIVES ON PUBLIC ART: A CASE STUDY OF LAMAN SENI 7, SHAH ALAM

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This paper aims to examine the elements of public art from the Islamic perspectives in the aspect of social values. The evolution of public art and its roles have been central in the discussion of arts in public spaces primarily from the Western perspectives. Numerous literatures and studies have acknowledged the values of public art from social and cultural aspects. However, studies on the meaning and values of public art from religious perspectives are scarce. Thus, this paper illustrates to impart a different view of existing public art in Malaysia, which came in a more contemporary form than the traditional Islamic art. As such, this paper explains the applications of art elements that has been portrayed along back alleys in Shah Alam. Seeing public art is the part of urban landscape elements, it has also potential to evoke spiritual values and remind people about the Creator and His creations, and act as an informal platform for good values and knowledge to be disseminated. The study is conducted through site observation method and assessment from site inventory using three main topics: Elements of public art , social values, and meaning from Islamic perspectives. The observations were supported by photos. From the assessment, contemporary representation of public art also able to offer diverse noble values in line with the values of Islam. Attributes that may be infused into the creation of public art are identified to further guide the possible directions of Islamic public art in the future.

Keywords: public art; social values, Islamic art; Islamic perspectives

Introduction

Public art has a broad definition and richness in art forms and approaches. It is not merely referred to the art placed outside. Occasionally, it promotes manifestation based on political and cultural aspirations that intersect with the city's beautification efforts. It has been representation of recent growth and interest in public art practices among urban dwellers. As a result, it helps to celebrate the unique ceremonial space and the symbolism of the architecture that have been drawn to re-establish the character and identity of the city (Muhizam Mustafa, 2009). On the other hand, (Goebbeis, 2006) draws the distinction between "public" and "art in public places" which may have public value that characterised primarily in virtue of its location and bureaucratic legitimizations. The realm of public sphere is not confined to either site or function. The apparent differences between art and public art that is publicly accessible is not rigid. In this case, a neighbourhood is also well served by the existing public art. For example, by art sited to screen the sights and sounds of highways or to relieve road-weary automobile passengers with pleasant diversions along the way. The art that decorates town plazas, shopping malls, and the lobbies of public buildings also provides physical comfort and gathering places for socializing elders and workers on lunch break. However, Goebbeis also highlighted that there is public art that acts as known "corporate baubles" which is contributing to the aesthetic value for office buildings and industrial parks. This art is characterised as public art in terms of linguistic courtesy, whereby it advocates some values in terms of serenity but not promoting the affinity among the patrons. Numerous studies has shown that most of the western scholars put much concern on the experienced value of the art rather in response to social values that are viewed from spiritual aspects. In fact, the growth of public art and its roles have been central in the studies of art in public spaces primarily from the Western perspectives. Tremendous literatures and studies have acknowledged the roles of public art from social, cultural and environmental aspects. However, there is a dearth of the studies of the roles of public art in enhancing social values from Islamic perspectives. Therefore, the focus of this paper is to view public art from Islamic worldview that could offer more than extrinsic values of the artworks.

Public Art in Public spaces

Art in Malaysia has grown into vibrant media and approaches. There is the art that serves the aesthetically pleasing, commonly known as Fine art and also applied art, that has meant to meet the functions. Traditionally, the arts are drawing, painting, sculpture, photography and printmaking. However, since the 1990's, artworks have trespassed into new dimensions. Most of the arts are exclusively locked in the museum with reasonable entry fee (Abdullah, 2011).

However, Goebbeis, (2006) claimed that if private a art suggests an intimate exchange, a public art gathers a congregation. Thus, when we are observing the arts from the degree of public, public art merits its name in virtue of the fact that the creation of public is its point of departure. It has been assumed as public realm and produces a public relation to that concept. According to him, the art- making is indirectly a social process,it can be a reminder, commemorative, triumphal and perhaps expressive of collective grief, anger, and celebration or sometimes aggressively provocative. Therefore, personal expression is not the central motivator of public art, and originality is less imperative for public than for private art, whereby the individual artist's soul initiates the work. In Malaysia, the existence of public art suggests to break the mundane environment and encourage social value towards public spaces. It also play a role to become a part of landscape components as a booster for a better quality environment. By observing the combination of site, people and art as one organization, it could offer more than aesthetic values to the public. And yet in Malaysia, they have functioned solely as disintegrated units (Mohd Fabian, Osman, & Mohd Nasir, 2012).

Despite to inspire the higher thought about community, public art also aims to enrich the community by evoking meaning and purpose in the public sphere as well as reminder and remembrance of the special events. There are five types of public art: integrated, semi-integrated, discrete, community art and ephemeral art. Integrated public art refers to the art that associates the location's history, culture and social circumstances that make the work of art distinctly a part of the community. Whilst, Semi-integrated public art gathers its inspiration to a certain degree based on the different location. It is not necessarily mutually exclusive to that area; the piece of art works in different locations, provided that the locations share the same conceptual and physical locations. On the other hand, Discrete works of public art are not integrated with a certain area, therefore having no conceptual or physical dependence on the location. Moreover, Community art focuses on the community's belief system; these works of public art often have a community-based design and allow people to express their goals or problems. Community public art helps bring people's experiences in the community into the work of art itself. And Ephemeral public art is temporary, is designed specifically for an occasion or event and is so called seasonal in nature. In fact, public art addresses no specific way to value public art. As long as the artworks possess impactful effect on the community, and how the community perceive them, that is the best way to find the value of public art (Irons, 2012).

Islam and Art

The desire for spiritual fulfilment through art is inherently human, as is the fuel to congregate and share experiences. History has been proven that, public space was

called upon be the scene of the meeting between art and human (Mitrache, 2012). Remarkably, spiritual has always been related to religious perspectives. By looking at this angle, this study attempts to reveal the value of Islamic thoughts that has been embedded in the existing contemporary public art. The physical appearance of artworks may not show the traditional elements of Islamic art such as calligraphy, arabesque and geometrical patterns. However, it does portray the intrinsic essence of Islamic art especially in promoting social integration among public.

Islam has perceived beauty in a different way as compared to secular or western perspectives. Islamic art is not the only apt terms to describe art in Islam, sacred art, Muslim art as well as Arab Art also been mostly referred as art in Islam. Beauty in Islam is about the Beauty of Allah that reminds human as a vicegerent on earth. It lies in the message of the artwork rather than artist's expression. It is beyond self-glorification, but merely to glorify the Almighty Allah. Concern with the theory of the arts and even of representations was not central to Islam (Al-Faruqi, 1985). The attention is drawn much on the relationship between the image made and the reality that inspired that image. Art in Islam portrays that everything comes from Allah including inspirations.

M.S Khawaja (2011) noted that Islamic art is fundamentally derived from *al-tawhīd* that is from an assent to or contemplation of Divine Unity. The essence of Tawheed is beyond words. It reveals itself in the Quran by sudden and discontinuous flashes. It has its own inner meaning, symbolism, aesthetical, metaphysical and portrayed with a spiritual significance. As far as the sacred art of Islam is concerned, it has been already shown that it is related in both form and spirit to the divine words from Quran and Hadiths.

Apart from that, icon and signature are always being controversial in Islamic perspectives as image and real representations were strictly forbidden in Islamic art due to fear of idolatry. There a few numbers of verses in the Quran proclaims about this issue. As Allah has said "The people of Moses made, in his absence, out of their ornaments, the image of the calf, (for worship): it seemed to low: did they not that it could neither speak to them, nor show them the way? They took it for worship and they did wrong" (Verse, Al-A'raf: 148). "They said: A confused medley of dreams: and we are not skilled in the interpretation of dreams" (Verse Yusuf: 44). From these verses, it shows that representations that leads to idolatry is extremely not permissible in Islam.

Shahid Ashraf (2006) emphasized that the transformation of characters and figures to conform to the Islamic message was achieved primarily through the use of three devices. The first of these, is stylization, which turns the being or objects in nature into denaturalized creation. Secondly, the literary or visual artist has employed the device of non-individuation. No character from a literary work has an individuality of

personality, nor is he described in a way which reveals to the reader his unique and specific character. And thirdly, alter the figures from nature, and thereby make them conform to an overwhelming abstract quality, is that of repetition. The artistic means plays an important role in artistic form, as well as in expressing its contents. All nature, in fact, is disguised and transfigured in Islamic Art. Based on the aforementioned literature, this initial study on art in Islamic perspectives has highlighted some criteria of Islamic values that might be infused in existing public art.

Social values in Islamic perspectives

The study emphasizes on the message of the social values that has been rooted by public art representations from Islamic perspectives. It focuses on signature and iconic character by showing the reflection on Malaysian culture, current issues of social and environmental. Apart from that, this street art brings people together by sharing their various activities along the stretch of the vibrant back alleys. As a result, this place has created a sense of belongings and unity in diversity. Most of all, the art forms were intended to be as a "soft reminder" to the public as we have to take care of our environment and protect whatever we have from now , for the sake of present and future generations. It is all about sustainability of our arts and culture.

According to Swales (1992) reported by Mohd Fabian et al.,(2012), the success of public art projects in the public realm requires four fundamental community values such as, shared history, identity,needs and aspirations. However, the study reviews four social elements that have been derived from the Laman Seni 7 street projects. There are shared history, identity and cultural values, Educational values or reminder and social implications were reflected in the artworks and people's response on them through site observation done. Basically, public attention and academic research concerning the teaching of Islam in social values and a commonly shared human civilization, are barely understood in secular contexts and in public education.Thus, this issue requires more attention, especially the views of Islamic thoughts in evaluating social values.

Islam has drawn us a clear definition of unity and brotherhood and how it can be realized and implemented. The uniting factor is the " *Aqeedah*" (creed) of Islam which defines the belief of a Muslim. Islam unites man irrespective of their race, nationality, and religion (Islami.com, 2014).

The first important point to note is that this brotherhood between believers was established by Allah (swt) Himself, in the Quran: "Believers are indeed brothers" (Al-Hujurat, verse 10). Furthermore, Allah proclaims in the Quran; "The Believers, men and women, are protectors one of another: they enjoin the ma`roof (all of Islam), and forbid the munkar (all that is evil; kufr): they observe regular prayers, pay Zakat, and obey Allah and His Messenger. On them will Allah pour His mercy: for Allah is Exalted in power, Wise." (The Holy Qur'an, 9:71). The concern on brotherhood also

highlighted in several Hadiths. “All mankind is from Adam and Eve, an Arab has no superiority over a non-Arab nor a non-Arab has any superiority over an Arab; also a white has no superiority over black nor a black has any superiority over white except by piety and good action. Learn that every Muslim is a brother to every Muslim and that the Muslims constitute one brotherhood.” Some of the the contents from last Sermon from the Prophet P.B.U.H. Other hadiths that futher elaborates on brotherhood is "A Muslim is the brother of another Muslim. He does not oppress him, nor does he leave him at the mercy of others." (Sahih Muslim).The Prophet also said, "None of you will have faith till he wishes for his (Muslim) brother what he likes for himself." (Sahih Al-Bukhari).It has been proven that Islam urges the believers to apprehend unity in diversity in our lives. Specifically, there is a clear guidelines on how to embrace unity in Islam in regard to elements of shared history, identity and socio-cultural values that has been mirrored in social implications yielded through public art project. Even though, Malaysiana are considered multi cultural society but the national history is remained as mutual concern and memories. Public art acts as bridge to define Malaysians as one organization.

Besides, educational values also being a basic assesments of the study. It purposes to enrich the meaning of public art in the context of public awareness and friendly reminder. Islam encourages the believers to remind each other as long as there is mutual benefit to us. Da'wah (invitation) in the term, used in Islam, to invite people to Islam. It is not mainly purposes to make the person a Muslim, but rather to inform people the faith and teachings of Islam and also to promote social harmony. There is no compulsion to accept the message, and Islam suggests preacher to present and convey the message wisely (Don et al., 2012). Thus, art is seen as a neutral platform for people. It never forces spectators but depends on how they perceive it based on their own understandings and perceptions.

Methodology

The study was conducted through primary and secondary data collection. In supporting the literature review, site inventory and observations are parts of the data collection process. Site observations is the main method employed on collecting data through documentation of photos and on-site evaluation.

The observations were done four times, consisting of twice on weekends and twice on weekdays.Thus, the elements and applications of art works were identified and responses were observed. There is a limition in conducting this study. Since this initial study was done through site observations, the assessment of the artworks only based on the four elements that underlies in social values from Islamic perspectives. The elements are shared history, identity and cultural values, educational values and social implications of the project. These are features being evaluated through the

elements of art, application, message and Islamic perspectives towards the relevant artworks.

Hence, the data collected is to produce a preliminary component of Islamic values in evaluating existing public art.

Study Area: Laman Seni 7, Shah Alam

The study focuses on the art elements and its application in Laman Seni 7, Shah Alam. It is located at a backlane of shop lots area in Section 7. Laman Seni 7 is the second street art project that endorsed by Majlis Bandaraya Shah Alam (MBSA) which was launched on 22nd of June 2014. This is the continuity of street art in Section 2. Most of the projects were the yield of selected artworks from street art competition, which was held in the back alley of business premises, Section 7 in Shah Alam on May 23rd, 2013 that organized by corporate department Shah Alam City Council. It has been classified into four typologies of art forms which are 3D Painting, 3D installation, Painting on site and Street Furniture. Most of the themes have been directed more towards architecture, a tribute to Malaysian's legends and tragedy, as well as culture and environmental appreciation.

Findings and Discussions

By conducting the site observation and literature reviews, the study demonstrates the social values that are reflected through the four elements of social values such as shared history, identity and cultural values, and educational and civic values. It also reveals the social implications as the direct response from public through street art projects. Table 1 shows the summary of findings from the assessment that has been categorized into the following elements.

No	Images	Assesments
A. Shared History		
1	 **Figure 1: Painting on site "*Seniman*"**	**Elements** : Painting On Site, Monochrome colour **Application** : Legend's eyes, Collaborated with wooden benches. **Message** : Celebrating the most famous veteran artists and bring back the national cultural heritage in performing arts. *(* **social values**) **Islamic Perspectives** : The figure drawn is permissible as it was being stylized but to

<table>
<tr><td></td><td></td><td>showing up the figure of famous artists is less encouraged in order to avoid people from people's glorifation rather than God glorification.</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4"> 
Figure 3: Mural of tribute to MH 370</td><td>Elements : Painting On Site, plane went down into a hole that made up from a puzzle.</td></tr>
<tr><td>Application : Relief technique, 3D impact</td></tr>
<tr><td>Message : Tribute to MH 370, copywriting : We are still praying.</td></tr>
<tr><td>Islamic Perspectives :
The simple effort to bring the plane back. Remind Malaysian that we are united in praying. Unity and diversity is highlighted.</td></tr>
<tr><td colspan="3">B. Identity and Cultural values</td></tr>
<tr><td rowspan="4">3</td><td rowspan="4"> 
Figure 4: Courtyard</td><td>Elements : 3D painting ,Theme: Courtyard, Green, Red and yellow colours were emphasized.</td></tr>
<tr><td>Application : Taking advantage of the real setting of the site as part of the artwork.</td></tr>
<tr><td>Message : Previous value of the back yard, especially for Chinese and Malay during the olden days. It was meant for gathering place.</td></tr>
<tr><td>Islamic Perspectives :Appreciating back alleys as gathering places.</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4"> 
Figure 5: Street furniture of "Lepas"</td><td>Elements : Street Furniture, Theme "Lepas".</td></tr>
<tr><td>Application : The sign of male and female figure were highlighted. The use of the back door of the premise as the door of the deigned toilet.</td></tr>
<tr><td>Message : The artist tries to remind visitors that back yard's toilet also should be treated as any special toilet like in the 5 star hotel.</td></tr>
<tr><td>Islamic Perspectives : Concern on the cleanliness and also promotes the culture.</td></tr>
</table>

<table>
<tr><th colspan="3">C. Educational values/ Reminder</th></tr>
<tr><td>5</td><td> 

Figure 6: 3D painting on danger of smoking</td><td>Elements : 3D Painting, Copywriting: A smoker may look healthy on the outside but not inside.

Application : The representations of bad condition lungs that has been affected by smoking habit. It is using the water dripping from the air conditioner compressor as part of the artwork. More impactful.

Message : Friendly reminder on danger of smoking.

Islamic Perspectives : Give awareness to avoid harmful lifestyle. Smoking is also discourage in Islam.</td></tr>
<tr><td>6</td><td> 
Figure 7: Mural of “Blue Mosque”.</td><td>Elements : Painting on site, Theme : Blue Mosque, Horizontal and vertical lines with cool colour effects.

Application : It is well positioned at the perfect angle that draw the eyes into the art piece.

Message : Calmness of sacred place.

Islamic Perspectives : Remembrance of God.</td></tr>
<tr><td>7</td><td> 
Figure 8: 3D installation “MANO”.</td><td>Elements : 3D installation, Gigantic hand model made of paper with the representations of wilting plants that placed below of the hand.

Application : Black background highlights the artwork. Copywriting : Be Kind to All as All is a reflection of our ACTIONS”.

Message : It shows the importance of our actions in conserving our environment.

Islamic Perspectives : Respect the environment as the valueable gift from God.</td></tr>
</table>

<table>
<tr><td rowspan="4">8</td><td rowspan="4"> 
Figure 9: 3D installaton “Dasar Sungai”.</td><td>Elements : 3D installations, Theme: Dasar Sungai, Integrated with recycled materials (Plastic).</td></tr>
<tr><td>Application : Manifestation of flowing water by using blue plastics. The hanging artwork gives the different experience to the visitors.</td></tr>
<tr><td>Message : A friendly reminder to take care of our river. Recycled material were used.</td></tr>
<tr><td>Islamic Perspectives : Sustain the environment quality by recycling materials and avoid wastage.</td></tr>
<tr><td colspan="3">D. Social Implications</td></tr>
<tr><td>9</td><td>  </td><td>Elements : Busking Activity
Islamic Perspectives :
Good as the scene of social integration, but the activity that leads to remembrance of God is recommendable.</td></tr>
<tr><td>10</td><td>  </td><td>Elements : Singing and acting.
Islamic Perspectives : Activity that involves with opposite genders, place segregation is more encourage.</td></tr>
</table>

Table 1 : Peliminary components on evaluating public art from Islamic perspectives.

By looking at the art forms in Laman Seni 7, most of the approaches are permissible and comply with the Islamic teachings. Most of them were drawn and portrayed with the natural forms that aims to appreciate nature and reminds people. Despite the art forms are not directly presenting calligraphy, arabesque and geometrical patterns, there are always be accompanied by valuable messages and reminders to all in regards to the betterment of social integration. Hence, the study is conducted to present the values from Islamic perspectives in order to illuminate the elements of art with more defined meanings. It has noted that,although the artwork may not all represented Islamically or symbolize Islamic arts, they do project some Islamic values.

Futhermore, it is not merely about personal achievement of artists, but the satisfactions of visitors can also been seen through their robust of activities. Hence, it

has been proven that public art able to bring people together and subconsciously it creates a great unity and togetherness among society. In addition, Islam has perceived social values in clearer lenses. According to Islamic perspectives, good characters are starting from individual practices and attributes and begins at home. This is the religion's main function and the reason for sending revelations, prophets and messengers. The Prophet said:' make your character beautiful". Then, the sense of humanity from single person will shape the character of the community at large. Therefore, the practice of delivering a good message and virtue is disseminated in Islam. It encourages believers to always be reminded at all times. As the Prophet (Peace Be upon Him) was reportedly asked" Which of our companions are best?" He replied: "One whose appearance reminds you of God, and whose speech increases you in knowledge, and whose actions remind you of the hereafter". Hence, the essence of reminder, always been connected with the beauty of the arts. While people mesmerized with the arts, subconsciously they would be reminded of their duty as vicegerent on earth. As a result, public art is seen as a medium to make people always be reminded of their duty as vicegerent on earth.

Conclusion

Laman Seni 7 is a platform to deliver the noble message to the community. It has meant a lot for the community. Apart from being a soft reminder, it can create a sense of unity and belonging among the public as well as providing safe and healthy environment to the public. Concerning the issue of cleanliness is not the self-responsibility. It is mutual awareness and accountability. Hence, this street art has successfully turned the dirty place to clean space. According to Burckhardt, (1976), sacred art therefore fulfils two complementary functions: it radiates the beauty of the rite and, at the same time, protects it. The worship should be accompanied by beauty as it were enwrapped in it, is also confirmed by the Quran: Oh sons of Adam! We have bestowed raiment upon you to cover your shame, as well as to be an adornment to you. But the remnant of righteousness, - that is the best. Such are among the Signs of Allah, that they may receive the admonition! (Verse, Al-A'raf: 26). It has been proven that complementary of sacred art is the protection. Safety goes parallel with the art in Islam. It can be manifested to protect from danger or from unkempt to clean environment. Definitely, it has been proven that elements and application of public art play a crucial role in the society. It is not merely to justify the meaning of the artistic value through the naked eyes, but the values behind the beauty. Since Islam encourages to appreciate and identify what is beyond the physical appearances, public art could be redefined in the richer perspectives and values.

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RELATIONSHIP BETWEEN THE OUTDOOR NON-CLASSROOM PHYSICAL SPACES AND STUDENTS' SOCIAL BEHAVIOUR

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School environment influences social attitudes and behaviour of students. Thus, both the classroom and the non-classroom spaces should have some influence on the students' social behaviour. Concerned has been expressed for the quality of the design of school facilities, outdoor spaces and other non-classroom spaces but are often the least-considered or are perceived only as places of secondary importance with no direct impact on the principal goals of schools. The research focuses on the relationship between the physical non-classroom spaces of urban schools and the students' social behaviour. The objectives are to find the most favorite physical non-classroom spaces among the students, why these spaces influence students' social behaviour and how these spaces influence students' social behaviour. The study will focus on the design, planning and landscape of the physical non-classroom spaces. The multiple site case study will be of two secondary schools in Shah Alam, Selangor, Malaysia. Three techniques of gathering data have been adopted, for both quantitative and qualitative data: questionnaire survey, field observation and focus group interview. The findings demonstrate that some relationships exist between the physical non-classroom spaces of the schools and the students' social behaviour. Successful schools not only deal with the school buildings, classroom, offices, facilities but the outdoor, non-classroom spaces, as well.

Keyword: physical environment; social behaviour; design elements; planning; layout; landscaping

Introduction

A thorough planning in creating conducive social environment for learning is important to produce students with balance in academic and social ability. Kangas (2010) defines the learning environment as a physical environment expands from classroom and school building to include the outdoors and other purposeful learning places, and to respond in a versatile way to the challenge of young people's physical well-being. Healthy learning environment, interior as well as the exterior environment, should be well planned in raising academic achievement and helping each and every student on his or her potential.

The research is focusing on the relationship between the outdoor non-classroom physical spaces and the students' social behaviour in the urban, secondary schools. It is to identify the most preferred behavioural setting in the outdoor non-classroom physical spaces of the urban secondary schools, to examine why the characters of the outdoor non-classroom physical spaces of the urban secondary schools influence students' social behaviour, as well as to examine how the characters of the outdoor non-classroom physical spaces of urban schools influenced the students' social behaviour. The research is limited to evaluating the effectiveness of the outdoor non-

classroom physical spaces in promoting positive social behaviour through design, site planning and landscape perspective. Students' social behaviour will be on peer group interaction, sense of belonging, sense of curiosity and sense of privacy.

Research Issues

The spaces between buildings or the non-classroom spaces in schools are often considered as not important or as having no function related to learning. What students do in these other places during recess has been either ignored or considered a waste of time, even detrimental to learning. (Kasali et al., 2010). Even when concern is expressed for the quality of the design of school facilities, outdoor spaces and other non-classroom spaces are often the least-considered or are perceived only as places of secondary importance with no direct impact on the principal goals of schools (Catling, 2005).

Schools in Malaysia are facing the same situation whereby the outdoor non-classroom spaces are given least concern in school design. One of the approaches to promote positive school culture and environment is to have conducive outdoor physical environment of the school. As stated by Schulz (1980) in Spencer et al. (2006), '*environment influences human beings*' where the environment comprises of both the physical and social attributes, and that human perceive the environment holistically in terms of the social and physical aspects of the environment. The extent and character of outdoor activities are greatly influenced by physical planning or physical environment (Julia et al., 2009). The outdoor physical environment of the urban high school is assumed to have an influence on the students' social behaviour due to this theory.

Research Background

The two schools that were selected for this study are Sekolah Menengah Seksyen 7, Shah Alam (School 1), which was designed by the consultant (PMC) and Sekolah Menengah Sultan Abdul Aziz Shah, Seksyen 2, Shah Alam (School 2), which was designed by the Public Works Department (JKR). The layout of School 1 is in the form of '*cluster and enclosed*' where the building blocks are all facing towards the center where the assembly field is located, while the design for School 2 was developed in the form of uniform buildings (army barrack like) typical of the old school buildings which were developed and designed by the JKR (Fig. 1 and Fig. 2).

Both schools were chosen because they are located in Shah Alam, Selangor. Selangor is the most developed state in the country where Kuala Lumpur, the capital city of Malaysia, used to be located before being gazetted as the federal territory. The schools selection is based on similarity between socio-economic statuses of the students and the students' achievement in the public examination, PMR and SPM.

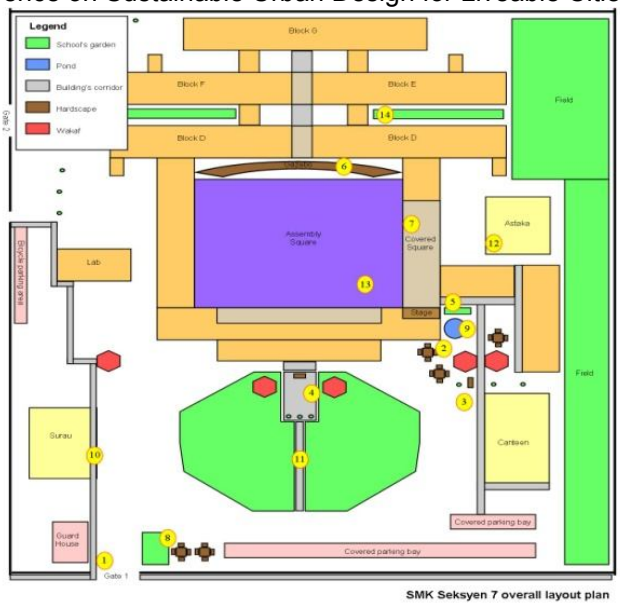

Fig.1. Layout plan of School 1- SMK Seksyen 7(not to scale)

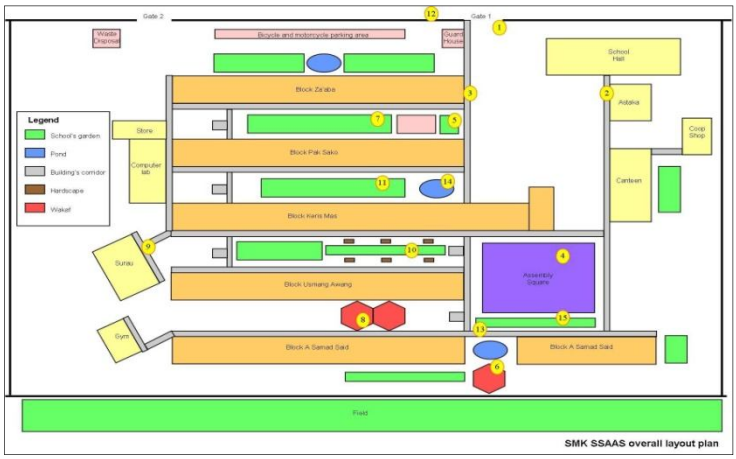

Fig.2. Layout plan of School 2 – SMK SSAAS, Seksyen 2 (not to scale)

The campus's layout design of SMK Seksyen 7 or School 1 is in the form of *'cluster and enclosed' or courtyard design*, with the piazza as the assembly area or the assembly field being at the center of the school's campus. Constructed in 2002, the school campus include the guard house at the main entrance, surau, corridors, parking lots, bicycle shade, wakafs, canteen, school parks or garden, astaka and school fields.

SMK Sultan Sallahuddin Abdul Aziz Shah, Seksyen 2, Shah Alam or School 2 campus's layout is in a linear form, with five main building blocks sitting parallel to each other. It is a typical campus layout for old government school buildings in Malaysia. Constructed in 1978, School 2 started with 2 blocks of 3 storey buildings. Now the school has added several more infrastructures and utilities as the number of students' increases. The outdoor spaces of School 2 includes the guard house at the main entrance, surau, corridors, parking lots, bicycle shade, wakafs, canteen, school parks or garden, astaka and school fields. Both schools have different campus's layout

with similar outdoor spaces, facilities and utilities. Only the design and character of the outdoor non-classroom spaces, as well as the landscape, soft and hard landscapes will determine the conducive outdoor learning environment.

Methodology

Three techniques of gathering data have been adopted for both quantitative and qualitative data: questionnaire survey, field observation and focus group interview. The questionnaire was conducted with 301 students from School 1 and 283 students from school 2, which involved students from all forms. Ten students were selected for the focus group interviews for each School 1 and School 2. The questionnaires include open-ended questions and questions using 4 Likert scale measurement which are totally agree, agree, disagree and totally disagree. Respondent's agreement on the statement is used to measure the degree of preferred spaces in the outdoor school environment and how the characters of these outdoor spaces could strongly influence the students' social behaviour.

Both nominal and ordinal scale data are used. For the nominal scale, the Chi-square test is used to test the significance of the data collected, whereby the Cramer V correlation test is used in order to test the strength of the relationship between variables. For ordinal scale, Spearman rho correlation test is used to test the strength of the relationship between variables. The non-parametric test such as the chi-square was used to analyse the Likerts scale with correlation analysis done using Spearman R, whereas, for the descriptive analysis, frequencies and percentages are used. (Chua, 2006)

As to get the general pattern of the data collected from the survey, the focus group interviews for both schools are carried out after the questionnaires have been distributed. Field observations were conducted in a four-day visit for each school. The visit includes assessing the school campus design layout, spatial quality of each outdoor space, the availability of amenities and the circulation. During the field observation, the spatial quality and space occupancy as well as the students' social behaviour were observed and recorded. The field observation mapping form was used to record the students' activities for each outdoor space chosen in the interval of one hour, for ten minutes observation. Photographs were taken as to support the data taken.

Result

Students' most preferred behavioural setting

Majority of School 1 students prefers to spend their recess at the assembly field (36.4%) and at the school canteen (35.4%). For School 2, the students are more likely to spend their recess at the astaka (44.6%) and at the school canteen (37.5%). This finding is being supported by the focus group interview as well as from the field observation. In both schools, record shows the importance of school canteen as a preferred behavioural setting, where activities such as eating and gathering took place. From the observation, it is shown that the canteen for both schools were congested and could not cater for all the students at one time during recess. Some students have to spend their time at other places adjacent to the canteen such as the assembly field

(School 1) and astaka (School 2). This give an implication that designing and planning of school canteen should be given an attention, as well as to provide comfortable spaces for the students to gather with their friends.

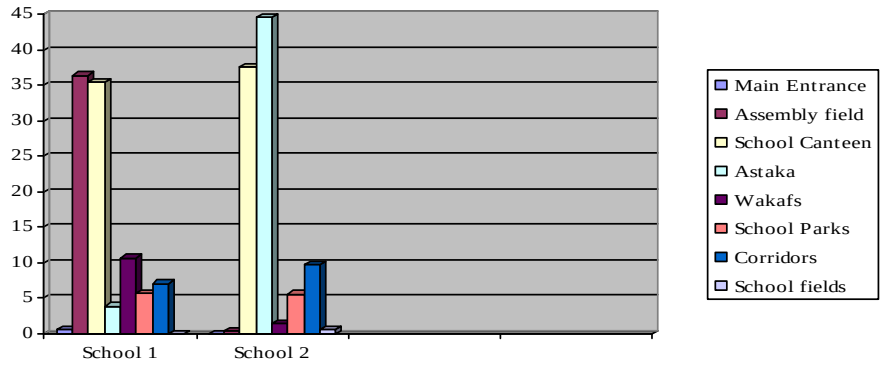

Fig. 3. Students' most preferred behavioural setting during recess.

Fig. 4. Students in School 1 spending their recess at the assembly field (left) and at one of the school parks (right).

Fig. 5. Students in School 2 spending their recess at the Astaka (left) and at one of the school corridors next to the canteen (right)

Fig. 6. View of school canteen during recess. School 1 (left) and School 2 (right)

Student space assessment

In regards to the question why students like to spend their time at this place during recess, it shows that places that has record more than 20% by the respondent are places that are related to eating and peaceful environment.

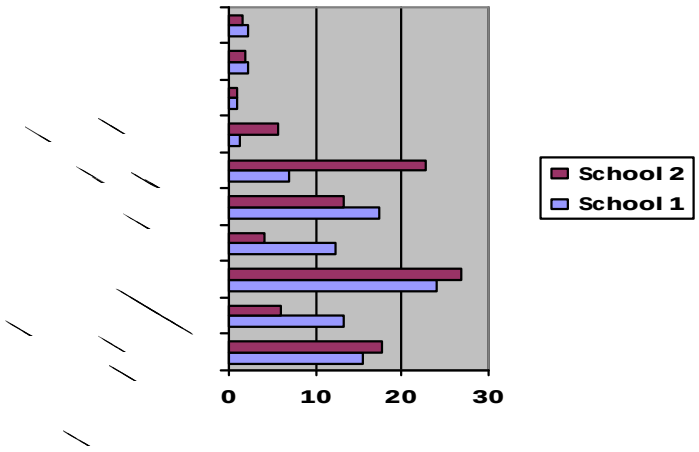

Fig. 7. The reasons why students like to spend their recess at this place according to questionnaire

In regards to students' activities during their recess, both schools recorded the highest percentage of peer interaction, although twice more students in School 2 (30.3%) spend their free time to rest compared to School 1. (Table 1). This data indicates peer interaction as the most important activities during recess. School designers and planners should take this into consideration as to provide space for this activity.

Table 1. Students' activities during recess for both schools

Activities	School 1	School 2
Talking to friends (Peer interaction)	44.8	39.4
Seating/ Being at favourite place (Sense of belonging)	15.3	28.5
Resting (Sense of privacy)	15.6	30.3
Looking at others (Sense of curiosity)	24.4	1.9

In regards to the relationship between students' most preferred behavioural setting and students' activities in School 1, the result from the analysis is significant ($x^2(24, N = 274) = 79.32$, $p<0.05$). The value of Cramer V correlation at 0.26, however, it suggests an extremely weak degree of association between the most preferred behavioural setting and students' activities.

As in School 2, when analysing the relationship between students' most preferred behavioural setting and students' activities, the result from the analysis is significant ($x^2(42, N = 269) = 184.97$, $p<0.05$). The value of Cramer V correlation at 0.33 also shows a weak degree of association between the most preferred behavioural setting and students' activities. The results for both schools indicate a weak degree or extremely weak degree of association between the most preferred behavioural setting and students' activities due to the limitations where by students could only be at certain places around the canteen area during recess. This regulation is set by the school management.

Just like adults, teenagers like to have their privacy as well. Somehow, not even one of the places mentioned in both schools is hidden from public thus offers privacy.

Some students developed a sense of curiosity as they like to sit or stand around at a place to see all the activities around them. In regards to the students' opinion on whether they like to be at the place because the place is the most strategic place to see all the outdoor activities, majority of students from School 1 and School 2 said 'No' to all the places as the places have not offered such activities. This is due to the limitation of students' where about during recess, as being the regulation sets by the school management.

Characters of the outdoor physical environment. How the characters of the outdoor physical environment of the urban schools influence the students' social behaviour.

Most of the students in School 1 agree that the built-up area for all the spaces is adequate for their activities. Somehow, majority of students choose to be at the assembly field and the school canteen simply because the location of these two spaces is near to the classes and the spaces are shaded. This findings are supported by the data collected from the field observation, the questionnaire and the focus group interview

Majority of students in School 2 agree that the built-area is adequate for their activities except for the main entrance which is quite small. Anyhow, majority of students like to spend their time at the astaka and the school canteen mainly because both spaces are located next to each other and nearer to the classes. Thus, location plays an important role in determining the whereabouts of the students during their limited free time.

Table 2. The built-up area for this space is adequate for the activity in School 1 and School 2

	Totally agree		Agree		Disagree		Totally disagree	
	S1	S2	S1	S2	S1	S2	S1	S2
Main Entrance	7.7	5.9	14.0	19.9	33.7	32.4	44.6	41.9
Assembly Field	31.7	24.3	44.3	47.1	12.9	15.1	11.1	13.6
School Canteen	18.5	25.4	43.9	46.3	26.5	20.6	11.1	7.7
Astaka	18.8	38.2	41.7	47.1	24.3	9.6	15.3	5.1
Wakaf	14.1	14.0	39.6	41.7	29.3	25.8	17.0	18.5
School parks	15.7	11.4	41.3	44.5	27.6	26.5	15.4	17.6
School corridors	12.6	14.0	30.9	37.1	33.3	25.7	23.2	23.2
School Field	32.5	34.6	35.3	32.0	14.0	16.2	18.2	17.3

Majority of students in both schools agree and totally agree that the application of colour at the wakaf, the school parks and the school corridors make the students happy. These places are also the favourite places of the students. Thus, as to promote positive behaviour among the students, application of colours to the students' favourite places is very crucial. This will also enhance the students' sense of belonging.

Being in nature is argued to be beneficial to an individual in many ways, also for young people. (Kirsi, 2008). Both schools share similar findings on landscape availability. The green area that exists at the wakafs and the school parks for both schools make the students feel peaceful. From the focus group interview and the field observation, it is found out that landscape plays an important role in promoting

positive behaviour among students as they enjoyed the green areas. Students even suggested to plant big trees as to provide shaded area for them to gather with their friends. This is also will promote their sense of belonging.

Fig. 8. Landscape availability. School 1 (left) and School 2 (right)

Table 3. School 1 and School 2 – Landscape availability on each area that makes students feel peaceful

	Totally agree		Agree		Disagree		Totally disagree	
	S1	S2	S1	S2	S1	S2	S1	S2
Main Entrance	9.4	7.4	29.3	26.6	34.1	38.4	27.2	27.7
Assembly Field	4.9	4.4	27.8	24.4	41.7	41.0	25.7	30.3
School Canteen	8.4	4.1	25.4	24.7	42.2	43.5	24.0	27.7
Astaka	8.7	2.1	29.3	43.9	37.3	19.2	24.7	14.8
Wakaf	12.2	18.1	53.1	46.3	18.9	20.4	15.7	15.2
School parks	22.3	26.2	49.1	47.6	17.8	15.5	10.8	10.7
School corridors	8.4	15.5	30.8	35.4	40.2	29.5	20.6	19.6
School Field	7.0	15.9	26.8	28.4	37.6	32.5	28.6	23.2

Discussion and Conclusion

Students in School 1 like to spend their recess at the assembly field and at the school canteen. The assembly field of School 1 offers large built-up area for activities such as eating, sitting, talking, resting, and reading. Some of the students choose the assembly field as a place for them to do the activities since the school canteen could not provide enough space for all the students. The assembly field is also covered and provided shade for the students. Besides the assembly field and the school canteen, students in School 1 also choose to spend their time at the wakaf, as the wakaf provide shade and sitting area. The wakaf is located in between the canteen and the assembly field.

Students in School 2 like to spend their time at the canteen, followed by the astaka which is located adjacent to the canteen. Students in School 2 also like to spend their recess at the corridors link to the canteen and the astaka. The school has provided seats along the corridor for the students to sit while eating, resting and gather with friends. In both schools, space preference is influenced by the atmosphere of the place such as spacious, peaceful, comfortable, shaded, and they could gather with friends.

Somehow, students could not have their privacy in both schools. It is the schools regulation as to limit the students where about during recess as to control students' movement as to avoid any misbehaviour of students. In regards to the school's layout, School 1 has a centralized layout, where all the spaces are closer to each other and

facing to the '*piazza like*' assembly field. The layout of School 2 is a conventional '*grid*' layout, which could offer some privacy to the students. Anyhow, students from both schools could still enjoy looking at others doing their activities as they could sit around while spending their break time. Some of the young people had carved out highly personalised spaces in the open air in order to create the privacy they want. (Upitis, 2007).

Students from both schools enjoy being at the park and the wakafs as they provide not just seating areas but also plants and water elements. Students from both schools are longing to have more green areas, as well as more seating areas that are shaded. School designers and planners should take into consideration students' opinions on how to design a more conducive outdoor non-classroom physical environment as the design of those spaces could and will influence students' behaviour and to promote peer interaction, sense of belonging, sense of curiosity and sense of privacy.

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IRAN SUSTAINABLE ARCHITECTURE: TRENDS AND CHALLENGES

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The current status of sustainable design in Iran architecture is that of an experience rather than a science. That is, a change of attitudes toward methods of implementing architectural design, the development of scientific knowledge-bases that provide skills and techniques of durable architecture is urgent. To enhance sound and environmental sustainability, three main principles of sustainable design, economy of resources and life cycle design that play important roles should be revitalized and paid more attention in Iran. The present study scrutinizes the interaction between these principles and the latent realities of Iran architecture. At a consequence, Architects must be educated about architecture issues during their professional training and universities have to foster scientific awareness, introduce students to educational programs, and develop their skills and knowledge-base in sustainable design.

Keywords: sustainable architecture; Iranian art; durability

Introduction

The main idea of sustainability is to concentrate on environmental conditions to achieve a designed product with maximum internal attributes of environment so that it can minimize the undesirable aspects of these constructions (Zabihi, Habib & Mirsaeedie, 2012). In Iran, building industry creates lots of environmental problems due to lack of scientific understanding and application of principles of sustainability. Therefore a key step to achieve sustainability in building industry is that Iranian universities need to establish special academic programs regarding sustainable architecture. Although there is a strong tendency to profit from Iran's traditional and vernacular architecture modern and postmodern architecture yet have significant status in architectural education competitions, and current projects. These activities are not occurring with holistic and fed back approach Moreover use of traditional aspects is more physical than performative (Moosavi and Shoarian Sattari, 2013). The present study pays direct attention to concepts of sustainability, sustainability indicator frameworks, sustainable architecture focusing on trends and challenges of Iran architecture.

Concept of Sustainability

Sustainability embodies the concept that human is able to consciously contribute towards meeting the needs of the present generation, while ensuring that the needs of future generation is not compromised. The concept is interdisciplinary in nature, which demands participation from every level of the community, aiming at maintaining a balanced ecological, social and economic system (Ibrahim, 2009). There have been a number of efforts to define sustainable architecture since the introduction of the term 'sustainable development' in the Brundt land Report (World Commission on Environment and Development, 1987). Design approaches in support of sustainable architecture are 'green architecture' (Vale & Vale, 1996), 'environmentally responsive design' and 'ecological design' (Yeang, 1998). Sustainable architecture echoes the concept of 'sustainable development', targeting on the architectural issues. Sustainable architecture covers the tri-domain of social-environment-economy parameters.

Sustainability Indicator Frameworks

From the perspective of environmental research and regulatory policy, there are two fundamental questions that underscore the need for indicators of progress toward sustainability (Kates, 2001):

- How can today's operational systems for monitoring and reporting on environmental and social conditions be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?
- How can today's relatively independent activities of research planning, monitoring, assessment and decision support be better integrated into systems of adaptive management and social learning?

Based on the three pillars concept, a sustainability indicator can be defined as a measurable aspect of environmental, economic, or social systems that is useful for monitoring changes in system characteristics relevant to the continuation of human and environmental wellbeing (Fiksel, Eason & Frederickson, 2012). The use of sustainability indicators and corresponding metrics is essential for an integrated systems approach to the addressing challenges of sustainability. When carefully chosen and implemented indicators can help managers and policy makers to (modified from "An overview of sustainability assessment methodologies" (Singh, 2009) :

- Anticipate and assess conditions or historical trends
- Provide early warning information to prevent adverse outcomes
- Benchmark against other systems
- Communicate ideas
- Support decision-making
- Formulate strategies and establish improvement goals

Sustainable Architecture

1. Sustainable design principles

While the practical application varies among disciplines, some common principles are as follows**:**

Energy efficiency: use manufacturing processes and produce products which require less energy.

Emotionally durable design: According to Professor Jonathan Chapman of the University of Brighton, UK, emotionally durable design reduces the consumption and waste of natural resources by increasing the resilience of relationships established between consumers and products (Chapman, 2009).

Renewability: materials should come from nearby (local or bioregional), sustainably managed renewable sources that can be composted when their usefulness has been exhausted.

Sustainable planning: Urban planners that are interested in achieving sustainable development or sustainable cities use various design principles and techniques when designing cities and their infrastructure. These include Smart Growth theory, Transit-oriented development, sustainable urban infrastructure and New Urbanism.

Robust eco-design: robust design principles are applied to the design of a pollution sources (Ben-Gal, Katz & Bukchin, 2010).

2. Economy of Resources is concerned with the reduction, reuse and recycling of the natural resources that are input to a building. By economizing resources, the architect reduces the use of nonrenewable resources in the construction and operation of buildings. The three strategies for the economy of resources principle are energy conservation, water conservation, and material conservation (Jong-Jin Kim, 1998).

3. Life Cycle Design provides a methodology for analyzing the building process and its impact on the environment. This "cradle-to-grave" approach recognizes environmental consequences of the entire life cycle of architectural resources, from procurement to return to nature. LCD is based on the notion that a material transmigrates from one form of useful life to another, with no end to its usefulness (Jong-Jin Kim, 1998).

Each of these principles embodies a unique set of strategies. Studying these strategies leads architects to more thorough understanding of architecture's interaction with the greater environment. This allows them to further disaggregate and analyze specific methods architects can apply to reduce the environmental impact of the buildings they design.

Trends and challenges of Iran architecture

Although Persian architecture has manifested its own particular characteristics and originality throughout its prolonged history and it was also based on a multi-thousand

years of experience which, according to A.U. Pope, was popular, modern Iranian architecture is a showpiece of all designs implemented in the West in the 20th century. Even in contemporary century with the help of new design methods, new construction material and a lot of technological devices, the present buildings are very expensive and uncomfortable to live in and according to the energies sources which today we use, we will have some problems in near future. So, it is not bad to have a look at the way of design and the natural systems which our ancestors used (Eiraji& Akbari Namdar, 2011). In Iran, the old experienced designers had paid attention to environmental elements. So, the way of their design was based on the region they were going to do. As a consequence, modern Iranian architectures and designers had better do pay attention to the regions they are going to work and sustainable architectures instead of following western techniques and minimizing construction expenses in order to save and make money. On the other hand, experienced urban planners should replace traditional contractors.

The Art of the Architect

Architects are artists in the sense that they are generalists at heart, not specialists. Society rewards specialization and some architects have become specialists in some sub-set of the discipline. For example, some have become code experts; some specialize in building envelopes or in hospital design. While architecture is a field of study, it is one that requires the synthesis of information from a wide range of academic disciplines. Architects are not geologists or landscapers but must understand the site on which they set the building. They are not sociologists, but must create a building that fits into the surrounding context. They are not structural engineers, but must understand engineering to develop a structural design that supports the design idea and parameters. They must pick materials that are appropriate to the project requirements and will fit the owner's budget and schedule. They are not physicists or chemists but must avoid material interactions that could cause corrosion or deterioration of the building envelope. They are not lawyers but must create a design that meets all legal and code requirements for that building type and size within that jurisdiction. While not psychologists they must so fully understand human perceptions of space and finish that they achieve these ends and do it so as to create a "Wow" experience for all who enter the building (Haines, 2012).

Not only should Iranian policymakers boast all architectural designs and their process, but also they have to pay serious attention to architectural training of their architects to see differently, to resolve problems and provide truly creative and artistic solutions. Architectural training of architects is only the beginning of learning how to use that process to fulfill the owners' needs, comply with all relevant codes, provide a structurally sound, storm and fire-safe building that is weatherproof, moisture-safe,

thermally efficient, low maintenance and durable, built of materials and construction technologies that fall within the schedule and is presented in an artistic form that lifts the spirit of the building inhabitants (Haines, 2012).

The Architect in Sustainability Education

Iranian architects traditionally train architectural students in the theories, history and practice of architecture. Most architectural programs could increase and deepen information and problem solving abilities in energy, materials and durability issues around sustainability. Some programs need to make those changes and find better ways to have students address sustainability. While having architects capable of designing zero energy buildings and sustainable construction projects is clearly important, it is also more important to have owners who understand the issues, pick architects capable of delivering sustainable projects and demand truly sustainable solutions. So, Iranian society should be well informed about the importance of sustainable development.

Architects who are knowledgeable about energy resources and energy use in buildings generally have a broad perspective. While engineers who are usually specialists know more about their specialty, they frequently know less about the building envelope and its potential both to reduce energy loss and to provide renewable energy harvest. However, there will be some exceptions to this. Architects also likely are better attuned to the critical people issues that engineering will not resolve. The engineering is necessary but not sufficient. The architect's expertise provides ample options for coursework in energy resources, energy efficiency and renewable energy critical to any business operation. Information on material resource management and Life Cycle Analysis could be separate courses or combined into the energy material for a less extensive format (Haines, 2012).

Architectural Curricula in Higher Education

Environmentally responsive design and energy efficiency in buildings have been taught at many schools of architecture all over the world for many years. However, most such programs have run in parallel to, and often in competition with, more mainstream options. For years, architectural education has been slow to respond to a new set of requirements tending to assume the general view that the environmental aspects of buildings were the role of the engineering profession. It is only very recently that the perception of environmental design and energy efficiency has shifted from specialist technical concern to a more relevant position on the agenda of architectural education. However, while this is appreciable, this change of perception has not yet been consistently matched by a pedagogy fully embedding sustainable environmental design at the core of the architectural curriculum.

It seems obvious therefore that to ensure that deep environmental competence is integrated with creative skills of students, a new interdisciplinary educational program that supports effective, deep learning and knowledge transfer is required to bridge the 'historic' divide between the disparate and often conflicting domains of the technical lecture and the imaginative studio. Such a program should equip graduates of architecture with a meaningful level of environmental competence, where technical knowledge is synthesized within studio, i.e. the natural forum for creative exploration of design solutions. Evidently, this challenge requires an intrinsic restructuring of most of the existing educational practices, and achieving a balance will pose several interesting challenges, whereas the implications of sustainability should be widely shared by both students and educators, in the environmental laboratory / lecture theatre as in the design studio (Altomonte, 2009).

The curricular challenges of schools of architecture in universities of Iran are mostly related to changes in social, cultural and professional networks of the society. There should be a major transformation of education methods to enable architects to be the leaders of collaborative design and construction processes with nesting scales of responsibility to ensure achievement of sustainability in use of land, water, transportation, engineering, and building materials, assembly and electronic and mechanical systems, as well as maintenance of building and its adaptive use.

Generally, in spite of large differences in professional structures, economic conditions geographical limitations, cultural, political and historical backgrounds, education of architecture in most developing countries face similar challenges. Education of architecture in general and education of sustainable architecture in particular, feces same challenges in Iran. Most of these challenges are related to following shortages (Moosavi and Shoarian Sattari, 2013). :

- More scientific research on theoretical nature of the specific subject of sustainable architecture and its adoption to local society of Iran is necessary
- It is necessary to provide diverse options and degrees for education of sustainable architecture in higher education for the mass, in order to distribute meaningful and applicable science among millions who wish to learn and upgrade their professional capabilities and opportunities.
- Lifelong education must be provided to professional body of architecture that seek not only formal degrees, but to keep up and readapt to a rapidly evolving technical changes and evolutions.
- Universities and higher education institutes must be able to act as contributors of sustainability, providing their societies with fundamental opportunities for sustainable development and maintenance of sustainable knowledge, independent thinking, social identity and values

- More conscious planning for adoption of new technologies in education of architecture is vital to redefine and reconfigure socio-cultural and economic character of sustainable architecture.

Results and Discussion

Sustainability in architecture is referred to imagination of design and construction for future. Sustainability aimed at not only physical sustainability, but also sustaining and protection of earth and its energy resources. Although sustainable design and construction strategies for Iran are not under scrutiny, sustainable architecture education is urgent. The goal of sustainable architecture education is to access scientific knowledge about environmental resources, ethics, values and skills in line with the objectives of sustainable development. If policy makers are equipped with required information to assist urban planners in coping with unsustainable architecture, they cannot only improve efficacy of construction programs, but also they can save their time, expenses and energy. Besides, this study aims to encourage policy makers and urban planners to pay serious attention to architecture education and psychological dimensions of sound architecture. More importantly, the study revealed that sustainable architecture is distinct from cursory constructions that some contractors build, and it is closely related to academic education. One area which has been less thoroughly paid attention lies in the relationship between poor constructions and public satisfaction in society. Although it might seem at first glance that public satisfaction would be less influenced by poor construction, some studies have revealed that sound architecture shows the ability and capacity of that society.

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Environmental Sustainability of Public Squares in Historic Cities (A Case Study of Qazvin-Iran)

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Abstract

Nowadays, sustainable development has turned into a wide area that encourages all techniques in different stages of human activities to save energy and natural resources. Thus, environmental sustainability as a main feature of the concept has considered the environmental problems as global warming, climate change, waste management. The main propose of the paper is to investigate the definition, typology and function of public squares in new growth and suburbia in historic cities. This study has been carried out focused on 'environmental sustainability' throughout one example of historic and recently developed square in Qazvin-Iran as a distinctive representative of the world historic cities. Thus, a number of environmental issues caused by city adaptation with the new 21st century-style of city growth would be highlighted. A mix method approach has been employed to investigate on issues the results revealed that the main values of environmental sustainability in design of new public squares in such cities. This opens new doors to future researches concerning adoption of historical cities with new developments as regards to the concept of environmental sustainability.

Keywords: Public Square, Environmental Sustainability,, Historic Cities, Sabze Maydan

1.1 Introduction

According to Brundtland (1987) sustainability is to complete the requirements of the current exclusive of compromising the ability of the future to meet its own needs in a system. Currently, the raise of population on the Earth has concerned remarkable attention to the 'Sustainability' concept. In city segment, it proposes the entire stages of design and building process to decrease the negative effect of built environments on

resource consumption such as energy and water. Furthermore, to make realistic but realistic economic systems with responsibility within social values (Lawrence 2000). For sustainable and lively environment the high standards of urban design are important. When urban areas (i.e. public square) fall into disrepair the facility of such areas refuse. Quality of life is reduce, which cause people to move out. However, how high-quality urban design can be assessed and how planning, and design of public spaces interface, is not a well investigated area. In a further important analysis, environmental sustainability is recognized on these features: protecting of the earth's liveliness and variety; employ renewable assets sustainably; reducing the use of non-renewable assets; decreasing of pollution to the environment and the healthiness of living makers; and preserve of the historical environment and cultural (Lawrence, 2000).

1.2 Urban public squares

The square is determined by the same formal factors as the street, with the difference that the buildings should form continuity around the space. A significant point in Iranian urban spaces is the hierarchy and flexibility role of spaces. Squares are where people meet and greet not only during ordinary days but also during holidays and festive seasons as well (Iranmanesh and Etaati, 2011). The city squares are decorated with fountains, monuments, statues and other works of art and are used for public celebrations, state proceedings and exchange of goods and services. However, all these began to transform in the modern times, when the squares of the cities begin to be used as car parks and the relationship between them and public buildings around them are almost totally detached (Madanipour, 2003; Sitte, 1986). The current urban design dogma, which emphasizes on the urban public open spaces, especially in squares and streets as the elements of city development, is in debt to Sitte (1986). Bendikat (2002) argued that in a modern city, besides high-rise buildings, traffic also played a pivotal role as it structured, divided and connected urban space. In this study, public urban square is described as an open space enclosed by buildings and used for public demonstration. From this viewpoint, most of Iranian current squares able to be considered. Nevertheless, several of them are carrying out another function like; linking the urban space (during transportation), business districts, etc.

1.2.1 From environmental view the typology of public urban squares in historic urban area are following:

Closed squares: are from environmental view, these squares are officially structured open spaces which buildings surrounded that. This in turn, provides appropriate sunshine, and natural aeration in with these squares.

The street Plazas*:* fundamentally, this kind is being provided with seating place and green district with sufficient sunshine in cloudy region and plenty of shadow in desiccated and waterless parts.

The dominate squares*;* this kind of squares direct to the buildings. These public squares are normally being directed to mosque, palace, as well as opening a view toward a river or mountain. They are providing lots of sunshine for nearby buildings in cloudy districts. Furthermore, they supply additional natural aeration in contrast with the earlier form.

The amorphous squares perform as a variety of catchall for the prior types. Although, they do not indicate any exact artistic. Furthermore, in contrast with the prior types they are performing the lowly sound masking, the maximum sunshine, the peak flow of traffic, and thus the lowest pedestrian pleasure.

1.2.2 Case study

Qazvin is the largest city and capital of the province of Qazvin in Iran with an estimated population of 331,409 in 2005. It is located some 165 km northwest of Tehran. It is a historical city in Iran; the city is a former capital of the Persian Empire. It is a provincial capital today that has been an important cultural centre throughout history (Charkhchian and Daneshpour, 2009). It is founded based on partnership, cooperation and interaction between the urban planners and citizens. Each year, there are several festivals and celebration events, particularly at the heritage district, where the public open space is very lively and colourful. These hubs refer to some commercial areas of the city such as the areas along Imam Khomeini Street, the open space opposite Chehelsotoon mansion some tourist hubs such as the areas around the old market whereas the parks in this area have not been used (Varjavand, 1996).

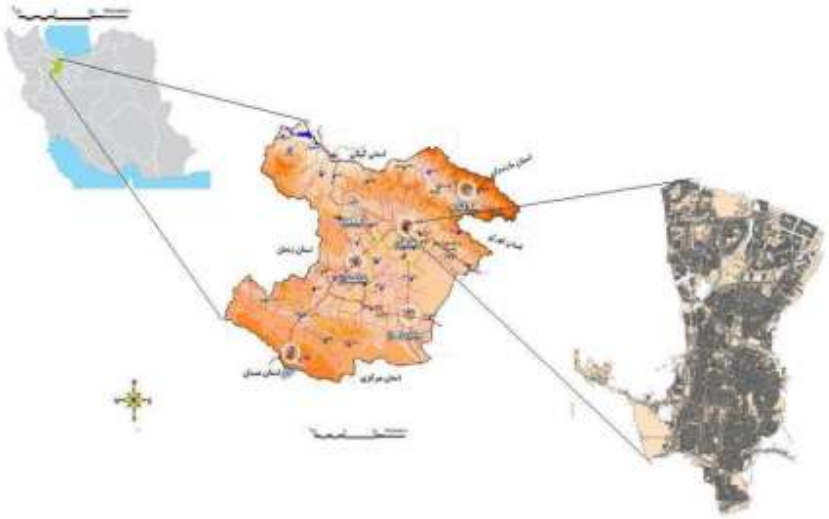

Figure 1.1 Qazvin Province in Iran

1.2.3 Sabze Maydan Square

At present, the Sabze Meydan square area is located in the centre of the historical district, immediately beside the main street (Taleghani), where major public transportation areas is located. Sabze Meydan was chosen as a case study for these reasons: The first step in selecting the case study to look for a square, which had clear, visually identifiable physical elements and background. There are many varieties of activities in the urban square, which lead to many people to use their facilities, including staff and personnel. They visit various agencies, their clients, vendors, purchasers, physicians; patients. Imam Khomeini, Taleghani, Naderi, Ferdowsi, Peighambarieh and Helal Ahmar streets are the main arteries that shopkeepers frequent to several times during a day they came to these centres. It was built to connect the north and south parts of Qazvin to each other and many places were built after that, which contributed to its historical backgrounds (Habibi, 1996). As Sabze Meydan is a core, historic location with heritage value, it has buildings of historical and architectural significance and civic open space and has been a commercial zone for centuries, therefore deserves a research effort (Varjavand, 1996). Sabze Meydan is connected to many major streets and the city centre. It is accessible to pedestrian traffic and various modes of transportation. The street is also considered one of the most popular in the city (Habibi, 1996).

Figure 1.2 Design of the square

1.3 Methodology

This study has been carried out on a mixed method (quantitative and qualitative) to investigate on issues in the case study (Qazvin-Iran). The questionnaire is the major contribution of this study in terms of exploring the environment sustainability of public urban squares for citizens according to their own views. The convenience sampling method (non-sampling) carried out and the population to be sampled resides within the boundary of the city of Qazvin and visit Sabze Meydan square. Sample size was 208 participants, which have been closed throughout the above noted technique over the summer 2012. Several questions concerning environmental role of Sabze Maydan square in the individual's daily life was presented. Lastly, both data sets (qualitative and survey) are integrated with each other in order to provide the synthesized findings in terms of being environmental sustainable.

1.4 Discussion

1.4.1 Case study observation findings

By observing the series of photos taken in summer of 2012, several problems regarding people's behaviour in Sabze Maydan have been noted. Sabze Meydan is accessible by different means of public transport. The square is very close to the centre and two bus stations. People activities and the accumulation of cars around of the square have caused strong clash between pedestrians and cars. Furthermore, the green landscape location and a pool in the centre of the Sabze Maydan square are not designated for pedestrian access. Generally, there are some functions designated for the square such as

commercial role and connecting role. Taleghani, Naderi and Peighambarieh streets, as the three old and main streets, built throughout first contemporary development in Qazvin. Therefore, there is a dramatic load of traffic in the street near the square in peak hours per day. These in turn causes reasons of high air and noise pollutions in the area on that time. As a result, the new development of the square is not matched with the flow of urban activities (i.e. commercial activities and shopping). This square was part of King Tahmasb palace in the past, so the designers from sun orientation view, designed the Sabze Maydan square in a logical approach (in terms of positioning the surrounded buildings), this square attracts the lowest solar heat in the hot season (summers) and highest rate of solar energy in winters (Figure 1.4).

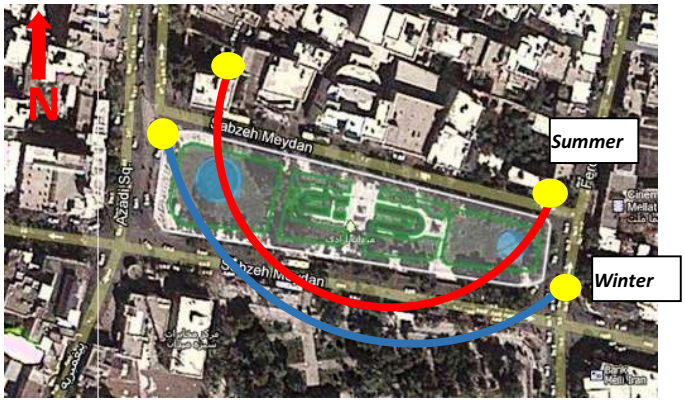

Figure 1.3 Solar Orientation in Sabze Meydan square

In theme of traffic as a resource of energy waste, residents were asked to select as numerous activities as they believe, they usually do in Sabze Maydan. This act has been accomplished to high light the effectiveness of noted squares in terms of energy waste of natural sources (causes of global warming). The major well thought-out task in this issue has been traffic. Due to traffic streets that cross all around the square, what people perceive as the square is the field enclosed by streets not by surrounded buildings. It means that the square is detached from its edges, which are essential zones to place people and engage them at the square. Figure 1.4 exposed that, the main purposes to visit there were relaxing for a while (30.8 %) and just passing by the square (26.4 %). Another

purpose was some activity such as an official function (12.5 %) and relational activity (12.5 %).

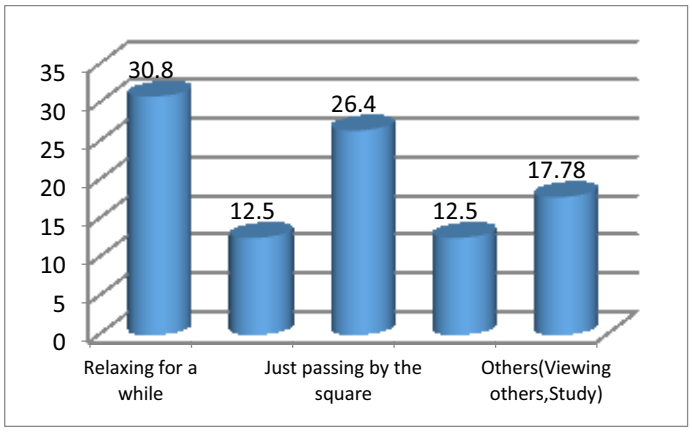

Figure 1.4 Activities of people in the Sabze Maydan

Figure 1.5 shows 35.42% of respondents indicated that Sabze Meydan square is needed a recreation ground and 27.08 % believe that this square is for cultural ground. All respondents agreed that the Sabze Meydan square was a place for gathering and make communication in the past.

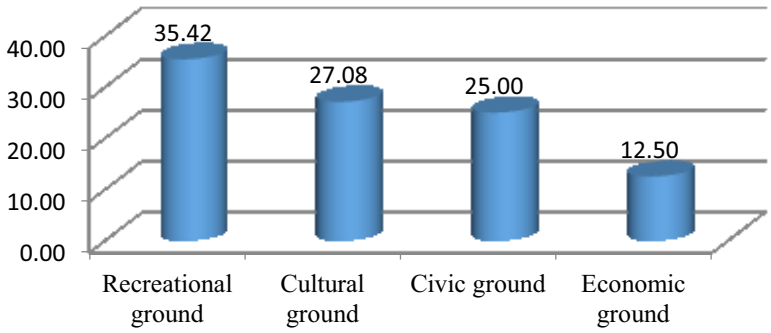

Figure 1.5 Major function of Sabze Meydan

Generally, Sabze Maydan square as the recent historical developed square in Qazvin is dealing with conflictions amid accumulate cars which can be reason some environmental issues. As the prior evaluations concerned, the most important issues would be in term of noise pollutions and traffic. Moreover, the inventions of motorized traffic, squares have been turned into vehicular crossings of facilitating safe and effective

movement. From now, an important consideration should be paid in the clarification to resolve these issues in future. Sabze Maydan square can encourage many citizens from diverse social classes to use the space for different reasons with a well-designed organization of spaces. Furthermore, it presents good city natural aeration, acoustic calm and energy efficiency in its surrounded building.

1.5 Conclusion

In recent development of public urban squares of historic urban environmental problems should be attending: good management strategy; sun orientation in designing a logical flow of traffic (with regards to transport system and development of population), the sound green landscape is recommended to be used in order to carry out a suitable acoustic calm and city thermal behaviours. This study has prepared new sign to additional researches regarding reasonability and complexity of designing innovative and new public squares in new cities.

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II

SUSTAINABLE PLANNING, LANDSCAPE AND ENVIRONMENT

A REVIEW OF MALAYSIA'S AGEING POPULATION AND ITS POLICIES FOR LIVABLE CITIES

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The Livable City concept is gaining more prominence throughout the world. While the Oxford dictionary defines it as an environment appropriate to live in, global experts in the environment and planning units relate the term to quality of life with access to good jobs, housing, healthcare, transportation, commercial developments, healthy social interactions and a safe neighbourhood for both urban and rural dwellers. In its efforts to make Malaysia a more livable city, several policies have been put in place. Notable for mention is the 10th Malaysia Plan, National Urbanization Plan and National Physical Plan 2 to build a sustainable environment in strategic conurbations that enhances the quality of life. While these plans are highly commendable, Malaysia has not taken due consideration of the rising number of aging population, forecasted to increase by 6.4 percentage over the total population of 38.6million people in 2040. Although a revised National Policy for Older People in 1995 was put in place, yet these growing populations is often marginalized and not taken into consideration. The lack in appropriate housing designed for the aging, poor accessibility and connectivity through transportation, outdoor spaces and buildings, healthcare and community support, communication and information, civic participation and employment, respect and social inclusion and social participation has increased the morbidity and dependency rate of the aging population to either caregivers or to children who are working adults. This paper reviews the existing policies towards creating a livable city.

Keywords: Livable Cities, Ageing Population, Policies

Introduction

The Livable City concept is gaining more prominence throughout the world. While the Oxford dictionary defines it as an environment appropriate to live in, Hagermen (2008) describes it as a neighborhood that is well connected, with accessibility to transportation and basic amenities. CitiesPLUS (2003) translates

livability to a system that inculcates equality, respect, friendly atmosphere and ensures the wellbeing of its people - from the mental state of mind to personal development that offer social inclusion while adhering to cultural norms.

Hahlweg (1997) relates it to the quality of life - a place to live and play for every citizen; young and old with access to nature, outdoor spaces, commercial development, transportation and healthy social interactions. Evans (2002) stresses on obtaining jobs with decent salaries enough to sustain a home, without trading the right to enjoy nature. Interestingly, Lennard (1997) outlines the basic principles to livable cities as one where people are well connected to each other - a city where people are not secluded from the society.

He continues that it is a built environment that preserves history with new architecture that enables communication to take place, thrives with activities, festivities, celebrations that congregate people from all generations together regardless of stature, education and position.

As these experts share their definition of livable cities, Malaysia on the other hand progressed in its modernisation path to be a more livable city after her independence in 1956, where several Malaysia plans were put in place.

The First Malaysia Plan (2014) from 1966 - 1970 gave priority to transport and communications whereby consolidated public development expenditure consist of RM141.3 million was spent on industrial development, RM544.9 million on roads, bridges, railways, civil aviation and ports, RM681.4 million for electricity and water supplies, RM146.6 million for health and RM197.2 million for housing.

The Second Malaysia Plan (2014) from 1971 - 1975 saw 12,200 low cost houses built throughout Malaysia to assist the urban poor. In addition, 6,700 families living in squatters were resettled into flats and other accommodations. Modern healthcare services such as new polyclinics, dental clinics, outpatient clinics and health offices-cum maternity and child-care centres were completed to assist the lower income families in the urban community. Public transport services such as mini-bus and commuter train service in Kuala Lumpur and its surrounding areas were developed.

From 1976 to 1980 saw the development of the Third Malaysia Plan (2014) where the usage of motor vehicles increased from 669,300 to 2,200,700. Construction of East-West highway, Kuala Krai - Gua Musang road, major highways in Sabah and the completion of the First Trunk Road System and the initiation of the Second Trunk Road system in Sarawak took place. Telecommunication services expanded to telephones, telex, telegraphs, broadcasting, civil aviation, police, customs and fisheries with a total of 400,000 subscribers. Communication from Peninsular Malaysia was extended to Sabah and Sarawak through satellite and

troposcattersystem. The submarine cable between Kuantan and Kuching also made Subscriber Trunk Dialling (STD) and International Subscriber Dialling (ISD) possible. Electricity supply increased from 2,178 million kilowatt hour (kWh) to 7,266 kWh. Low cost housing were built by the state governments and City Council (Dewan Bandaraya) with subsidised Federal loans`at RM12,500 per unit for flats, RM8,500 for terrace and other types of houses, while RM10,000 per unit in Sabah and Sarawak. To keep the cost of the houses within these limits - higher density construction was adopted, while reducing the built up areas to 51 sq.meter for flats and 69 sq.meter for other types, reducing the frontage, standard infrastructure facilities and economising on the quality of the finish. Healthcare was also provided with 15 new hospitals built - six in Peninsular Malaysia, Sabah - five and Sarawak - four, bringing a total of 97 hospitals from 1971 - 1980. Renovations and improvement works to include the outpatient department, operation theatres, additional wards, intensive and coronary care units, radiological support services, laboratories, blood banks and mortuaries were also carried out on 75 existing hospitals throughout Malaysia. In addition, 16 polyclinics in Alor Setar, George Town, Johor Bahru, Kuala Lumpur, Malacca, Seremban and Taiping - providng outpatient services, dental, maternity and child care services were decentralised to reduce the overcrowding in outpatient departments. Meanwhile, four rehabilitation centres to house approximately 640 physically handicapped inmates were established. Eight shelter homes for the old and destitute were further improved.

During the Fourth Malaysia Plan (2014) from 1981 to 1985, total roads networks increased from 28,870 kilometer in 1980 to 42,330 kilometer in 1985. The Jeli Kelantan-Grik, Perak highway, Kuantan-Segamat and Kuala Krai–Gua Musang highway came to a completion. The railways and its services under the purview of Keretapi Tanah Melayu Berhad (KTMB) were increased. Telecommunication services provided by Telekom Malaysia increased from 660.500 lines to 1.8 million lines in 1985. New services such as videotexts, telefax and automatic radio telephone system were introduced. Electricity consumption for households and industrialization increased to 679.6 petajoule. Water supply to households increased to 4,218.6 million liter per day. Healthcare services improvised with the increase of 1000 doctors bringing it to a total of 4,510 doctors nationwide. Nine new general hospitals and seven dental clinics were built. To care for the aging community, one old folk’s home in Sibu, Sarawak was built.

During 1986 to 1990, under the Fifth Malaysia Plan (2014), the building and completion of the North-South Highway and the New Klang Valley Expressway (NKVE) took place to provide convenience for travel. Healthcare was not neglected, when 33 new government hospitals and 170 healthcare centres were built in both

urban and rural communities. Meanwhile the Special Low Cost Housing Program was initiated to encourage the building of low cost homes. Under this program, a total of 83,940 units of homes were built. RM7.5 million was utilized for the upgrading and repair work of 294 old folks home throughout Malaysia, while another RM12 million was utilized for the upgrading and repair works of homes with disabled children and those with special needs.

Like the previous Malaysia Plans, major developments also took place during the Sixth Malaysia Plan (2014) from 1990 to 1995. Malaysians witnessed the construction of Kuala Lumpur City Centre (KLCC), the Light Rail Transit and Kuala Lumpur International Airport which boosted the economy. The upgrading and renovation works of Kuala Lumpur-Karak highway and building of the highway in Shah Alam to connect Kuala Lumpur and Port Klang also took place. The building of the Light Rail Transit (LRT) system began with a 12 kilometer stretch under Phase 1 from Ampang to Jalan Sultan Ismail reaching completion. The building works of Phase 2; a 15 kilometer stretch from Bukit Jalil to Sentul began in August. The demand for telecommunication increased with new technologies such as the digital fibre optic system, wireless technology, broadband, Multi Access Radio System (MARS), Radio in Local Loop (RiLL) and fixed wireless systems. The construction of Kuala Lumpur Sentral that will provide commuter services under Keretapi Tanah Melayu Berhad, Light Rail Transit, bas, taxi and the Express Rail Link under one roof began. Major improvements were made to healthcare with 21 new hospitals built with Magnetic Resonance Imaging (MRI), Computerized Tomography (CT-scan), mammography and echo cardiography.

As the aging population increased, the government built eight old folks home - where each could hold 2,500 occupants. These were catered mainly for those who did not have other family members to care for them.

In year 2000, Malaysians celebrated the end of the Seventh Malaysia Plan (2014) with a positive outcome although the nation was struck with the economic downturn between 1997 and 1998. Investments from private sectors were forthcoming due to the East Corridor of development which boosted the economy. This caused the increase in migration to 23.27 million people from rural areas to the urban fabric. During this time, the government had taken the necessary measures to improve the urban setting to eradicate flooding, squatters, traffic congestions, vector disease, and water and air pollution. Subsequent achievements were also seen in the Eighth and Ninth Malaysia Plan. Meanwhile, as per our topic of discussion - livable cities, it is notable to mention that the government had also taken subsequent measures to provide a work and play environment in the 10th Malaysia Plan; Thrust 4 (2014). This will be achieved through a better provision of healthcare services, public

transportation, electricity and water. The element of social inclusiveness will also be nurtured.

In addition to the Malaysia Plan, these aspirations are also highlighted in the National Urbanization Policy (2006) and the 2nd National Physical Plan (2010).

National Urbanization Policy aims to provide quality transportation and infrastructure in a sustainable environment. In addition, the policy reaffirms its goal to create a sustainable, peaceful urban environment by the year 2020. The 2nd National Physical Plan however, has set its stakes high by aiming to achieve a national framework to ensure the sustainable use and development of land that urban development be given priority with a focus on strategic conurbations based on the National Urbanisation Policy. It also aims to create a model society of affordable developments with infrastructure that is self-sufficient.

While the Malaysia government should be highly commended for its effort in developing the country to what it is today, however, it has not taken due consideration of the rising number of aging population, forecasted to increase by 6.4 percentage over the total population of 38.6 million people in 2040 (Department of Statistics Malaysia, 2012). Although a revised National Policy for Older People in 1995 (NPE, 2011) were put in place, yet these growing population is often marginalized and not taken into consideration. The lack in appropriate housing designed for the aging, poor accessibility and connectivity through transportation, outdoor spaces and buildings, healthcare and community support, communication and information, civic participation and employment, respect and social inclusion and social participation has increased the morbidity and dependency rate of the aging population to either caregivers or to children who are working adults. This paper reviews the existing policies and makes recommendations towards creating a livable city for an aging population.

Research Methodology

This report relies heavily on secondary data as well as discussions with experts in specific areas. As issues concerning the elderly are multidisciplinary in nature, data and information are obtained from different ministries and departments. Data pertaining to the population projection in Malaysia from 2010 - 2040 are drawn from the Department of Statistics, Malaysia (2012). The census conducted in year 2013 has yet to be published. The only disadvantage about using the census is that it does not cover details about issues specific to the elderly such as their health status (morbidity and mobility, activities of daily living etc.), their contribution towards society and family, involvement in social and charitable activities etc. Where data gaps exist, they are supplemented with research findings from smaller studies with limited

geographical coverage. Although these studies may be small, the findings provide useful information and hint the need to address the structural efficiency of the National Policy for Older People 1995 (NPE, 2011), and the accountability and transparency of various bodies, government, private or non-government in their dealings with older Malaysians.

Global Ageing Population and Urbanization

Populations around the world are rapidly ageing and increasingly concentrated in urban areas as shown in Figure 1.

A study from the World Health Organization (2007) reveals that as of 2006, over half of the global population lives in cities. Mega-cities with 10 million inhabitants or more, increased tenfold from 2 to 20 during the 20th century. The number and proportion of urban dwellers will continue to rise over the coming decades and particularly in cities with fewer than five million inhabitants. The study suggest that by 2030, about three out of every five people in the world will live in cities and the number of urban dwellers in the less developed region will be almost four times as large as that in the more developed region as shown in Figure 2.

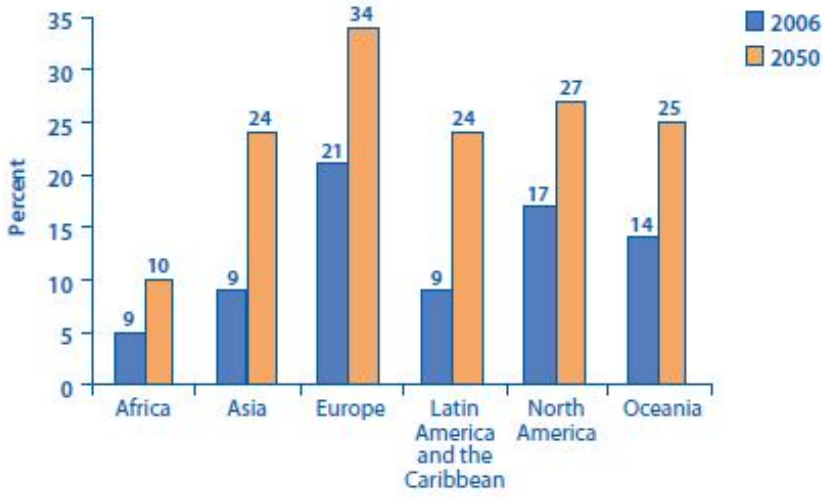

Figure 1. Percent distribution of world population 60 or over by region, 2006 and 2050 (Adopted from World Health Organization, 2007)

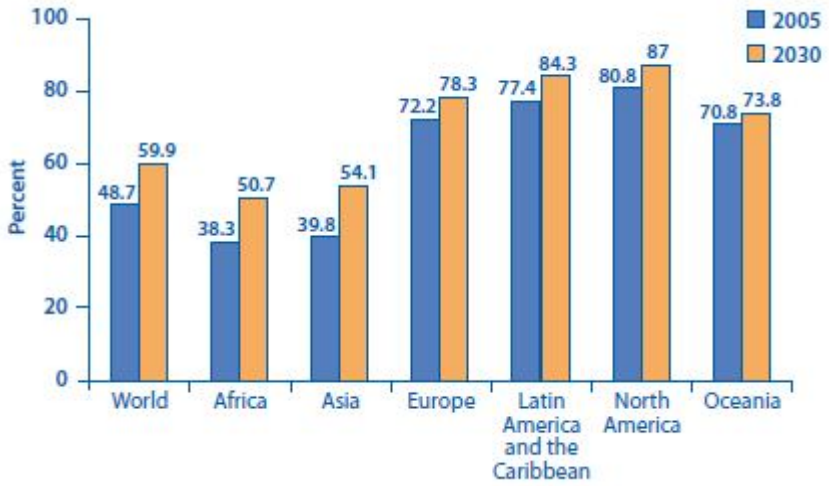

Figure 2. Percentage of Urban Population in Major Areas (Adopted from World Health Organization, 2007)

Malaysia and its Ageing Population

A. Population Projection

Data from Department of Statistics Malaysia (2012) suggest that Malaysia's population is projected to increase by 10 million (35%) from 2010 to 38.6 million in 2040. However, the annual population growth rate decreased from 1.8 per cent in 2010 to 0.6 per cent in 2040, as shown in Figure 3. This situation is in tandem with the targeted decline in fertility rate and international migration.

B. Age Structure

According to Department of Statistics Malaysia (2012), population for the age group 0-14 years is projected to decline from 27.4 percent to 19.6 percent for the period of 2010 - 2040. However, the population for the age group 15-64 years and 65 years and over is expected to increase by 1.4 and 6.4 percentage point respectively for the same period. This trend contributed to the increment of the median age from 26.3 to 36.0 years as described in Figure 4. During this period, the population aged 65 years and over is projected to increase more than three folds of the 2010 population.

The increase will lead Malaysia to become an aging population in 2021 when the population aged 65 years and over reach 7.1 per cent. Changes in the age structure of the population can be seen from the population pyramid in Figure 5. In 2010, the shape of Malaysia population pyramid is regressive and is expected to remain until 2040. Regressive population pyramid has a smaller base which indicates a low birth rate and have convex slopes which reflects that the adult population mortality rate is low. In 2040, the pyramid shows a flat and boarder apex indicating a rise in the elderly population.

Figure 3: Population Projection and Annual Population Growth Rate, Malaysia, 2010 – 2040 (Adapted from Department of Statistics Malaysia, 2012)

Table 4: Population projection by age group, Malaysia, 2010 – 2040 (Adapted from Department of Statistics Malaysia, 2012)

Tahun *Year*	0–14 ('000)	%	15–64 ('000)	%	65+ ('000)	%	Umur penengah *Median age*
2010	7,822.1	27.4	19,341.4	67.6	1,425.1	5.0	26.3
2015	7,733.4	25.4	20,971.9	68.8	1,779.9	5.8	28.2
2020	7,780.7	24.0	22,445.9	69.2	2,214.6	6.8	29.9
2025	8,009.5	23.4	23,533.4	68.6	2,751.3	8.0	31.5
2030	8,087.9	22.5	24,542.0	68.2	3,335.7	9.3	33.0
2035	7,893.4	21.1	25,606.1	68.5	3,889.9	10.4	34.5
2040	7,537.2	19.6	26,615.6	69.0	4,405.1	11.4	36.0

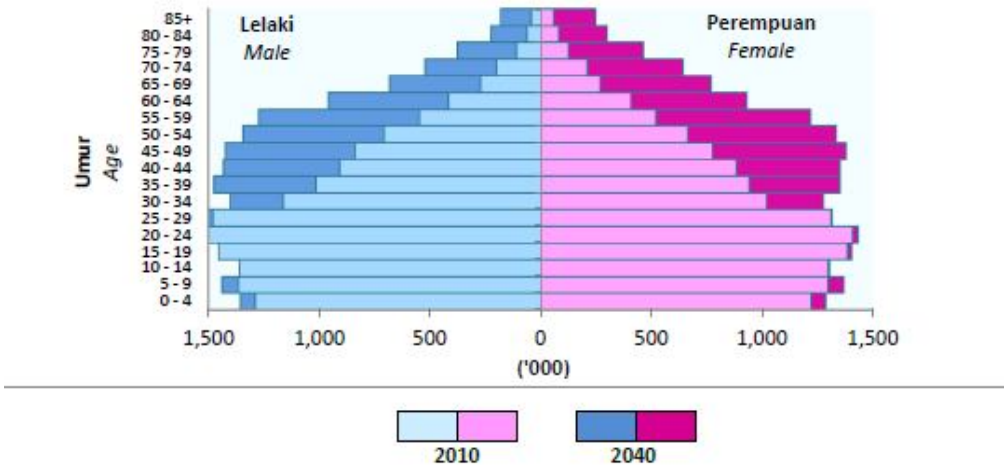

Figure 5: Malaysia population pyramid, 2010 and 2040 (Adapted from Department of Statistics Malaysia, 2012)

C. Dependency Ratio

Department of Statistics Malaysia (2012) also suggest that the total dependency ratio is projected to decline from 47.8 to 44.9 for the period of 2020 - 2040 as shown in Figure 6. This trend is affected by the decline in young age dependency ratio from 40.4 to 28.3. Old age dependency ratio is expected to double from 7.4 to 16.6. This means that the working age population between 15 - 64 years would have to bear the increasing number of old age population.

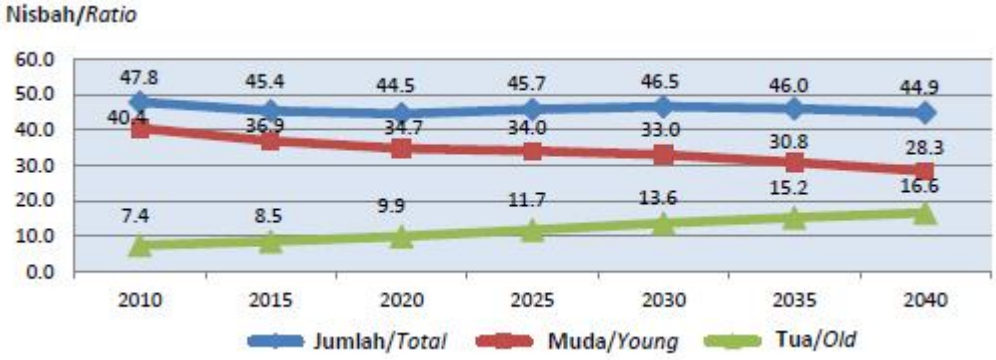

Figure 6: Dependency ratio, Malaysia, 2010 – 2040 (Adapted from Department of Statistics Malaysia, 2012)

D. Sex Ratio

Population distribution recorded by Department of Statistic Malaysia (2012) shows that male exceeds female for the period of 2010 - 2040. Nevertheless, the percentage of male population decreased from 51.5 per cent (2010) to 50.8 per cent (2040) whilst the percentage of female increased from 48.5 to 49.2 per cent for the same period. This directly contributes to the decrease in sex ratio from 106.3 to 103.2. Sex ratio by age group shows a difference in trend. Sex ratio for the age group 0-14 years shows a slow increase each year commencing 105.3 in 2010 to 105.6 in 2040. In contrast, the age groups of 15-64 years decrease from 107.8 to 106.4 for the same period. For 65 years and over, the number of male is lower than female with a ratio of 93.3 males for every 100 females in 2010. This ratio is expected to further decrease to 82.1 in 2040. The contributing factor is due to the higher life expectancy for females as compared to males.

E. Ethnic Composition

On the whole, Department of Statistic Malaysia (2012) suggest that all ethnic groups are expected to record an increase in the total population. The Malays recorded the highest increase of more than six million people from 14.3 million in 2010 to 20.9 million in 2040. This is followed by other Bumiputera and Chinese with an increase of 1.8 million and 0.7 million respectively. Indians and non-Malaysian citizens,

however, increased by 0.4 million, while the others posted a low of 0.2 million for the same period.

The population growth rate varies by ethnic group. Changes in the growth rate over the projection period are due to differences in levels of fertility, mortality and migration rates for these ethnic groups. The average annual population growth rate for others remain high at 1.94 as compared to other ethnic group which achieved less than one per cent in 2040. This situation occurs due to high fertility rate for this ethnic.
For non-Malaysian citizens, average annual population growth rate decline from 0.73 per cent to 0.41 per cent for the period of 2010 to 2040. The percentage distribution of the Chinese and Indians showed a reduction as the annual growth rate keep on decreasing during the period of 2010 - 2040. The percentage of the Chinese population has declined from 22.5 in 2010 to 18.4 per cent in 2040 as the result of the decrease in fertility rate.

The National Policy for Older People 1995

In 1995, the Malaysia government introduced the National Policy for Older People (NPE) 1995 and 1998, which was respectively reviewed and approved by the government in 2011. This policy sets out to establish a society of the elderly who are contented, dignified, possessed with a high sense of self-worth and optimizing their potential as well as to ensure that they enjoy all opportunities besides being given the care and protection as members of a family, society and nation. Three objectives that were identified in this policy are to enhance the respect and self worth of the elderly in the family, society and nation; to develop the potential of the elderly so that they remain active and productive in national development and to create opportunities for them to continue to live independently and to encourage the establishment and the provision of specific facilities to ensure the care and protection of the elderly. To achieve these objectives, five strategies were outlined with clear definitions as highlighted below:

A. Respect and Self Worth

• To enable the elderly to live with respect and self-worth as well as safe and free from oppression and abuse

• To ensure that the elderly receive fair and just treatment irrespective of age, sex, ethnicity, religion, handicap or other conditions, without being affected by their ability to contribute.

• To enable the elderly to enjoy every opportunity to realize their optimum potential.

• To facilitate the accessibility of the elderly to resources of education, culture, the spiritual and recreation in society.

B. Independence

• To ensure the basic needs of the elderly are met through a source of income, support from the family and society as well their own efforts.
• To help the elderly to opportunities to continue to be of service and to contribute to the nation.
• To ensure that the elderly enjoy an environment that is safe and easy to adapt to consistent with the ability to change.
• To enable the elderly to continue living with their family and society as long as possible.
• To provide early preparation to the elderly to plan for their continued contribution to national development according to their expertise and capabilities.

C. Involvement

• To enable the elderly to play their role in society and to involve themselves actively in the formulation and implementation of policies related to their well-being and to pass on their knowledge and skills to the younger generation.
• To give opportunities to the elderly to contribute voluntarily to society according to their capabilities and interests.
• To encourage the elderly to form societies or organizations to carry out activities for their well-being.

D. Care and Protection

• To create facilities for care and protection within the family and society appropriate to the system and values of society.
• To facilitate the elderly in receiving health care to assist them to maintain or restore their physical, mental and emotional health to an optimum level as well as to prevent the infection of diseases.
• To enable the elderly to benefit from institutional services providing care, protection and social and mental stimulation in a safe and comfortable environment.
• To facilitate the elderly in receiving social and legal services to advance the autonomy rights of the individual, their protection and care.
• To ensure that the elderly enjoy the basic rights of the individual when receiving care and treatment with respect to their dignity, beliefs and needs.
• To establish a comprehensive social security system to ensure a stable income and welfare for the elderly.

E. Research and Development

• To promote research on the elderly with the purpose of gathering information to be

used in the planning of development programmes for them.

• To establish a National Advisory and Consultative Body for the Elderly to help in the coordination and identification of activities required for the elderly.

For the success of the implementation of the National Policy for the Elderly (NPE, 2011), an integrated and comprehensive action plan was devised. In order to develop their maximum potential, education and training were made accessible, while the school curriculum thought the younger generation to understand and appreciate the elderly. Senior citizens were also encouraged to continue contributing to the national development through employment. Participation in society was encouraged through the involvement in family and societal activities. Due importance was also placed on organizing recreational activities in housing areas, parks and sports centres. Transportation - specifically the public transport system was to provide suitable facilities to enable the elderly to move comfortably from one place to another. Housing - another essential component in the National Policy explains that both existing and future houses should include facilities suitable for the elderly to enable them to live comfortably. To ensure that the elderly continue living with their family, the policy dictates that a support system for the family needs to be established in housing areas. This is to assist families in caring for the elderly. NPE (2011) also outlines the need for health and medical facilities appropriate and specific to the elderly, a comprehensive social security scheme and research and development to be carried out to obtain information to enable better planning for the senior citizens.

Challenges Faced by the Ageing Population

Although it has been 19-years since the National Policy (NPE, 2011) was put in place, the ageing population amongst us face numerous challenges and is often marginalized. The Human Rights Commission of Malaysia points out that the National Policy for older persons has not been adequately promoted and implemented, as is evident from the lack of awareness on the age-related issues among marginalized groups and public at large. Krishnapillai et al (2011) stresses that the expansion of services for older people in Malaysian primary care is even slower despite the need for long-term management of this vulnerable group in the community.

Although preventive and other specialised programmes for the older people in the community were planned, their implementation in public primary care clinics is sporadic. The main impediment remains the shortage of a trained primary care workforce. In terms of transportation, Sadullah (2010) points out that there is no National Transport Policy, that there are design, construction and maintenance issues and integrity, enforcement and sustainability issues.

Challenges for Sustainable Development in Malaysia's Ageing Population

Hamid and Yahaya (2008) affirms the need to address the structural efficiency of the various bodies, government, private or non-government and strive to be more accountable and transparent in their dealings with older Malaysians as the audience will no longer be satisfied with one-off or gloss over efforts to appease their demands. If the public loses confidence in the state's ability to provide for the security of their old age, the government will have failed in discharging its responsibilities to protect the welfare and interest of its people.

While the government's emphasis on the family is to be applauded, there must be equally attractive options available to those who do not have a family to turn to in late life. Government policies, programmes and initiatives must ensure the optimal utilization of the elderly workforce and move beyond the welfare-oriented approach towards older persons.

Proper research, proper planning and proper evaluative strategies are deemed crucial if the NPE is to be implemented well. A more aggressive approach towards the issue of old age and ageing is also vital. Without a clear focal point to snowball the efforts on population ageing, the programmes and activities remain in isolation.

Ong et al (2009) concludes that it is important to review the NPE (2011) and the Plan of Action. Equally important in the review is the delivery mechanism that must take into account of geographical divides, the uneven distribution of demand and facilities between urban and rural areas, and the varying needs of differing groups. These include women, who may be particularly vulnerable and the oldest old, who often have more needs compared to younger old people. The latter are likely to be more independent and may be a resource for the community to draw on for providing assistance to those who are more dependent, in the form of old-to-old volunteers.

Conclusion

This study strongly supports the view that appropriate measures should be taken to create a livable city for the aging population in Malaysia. However, more research work is needed to obtain supportive data to identify the various elements involved to build a sustainable and conducive livable city for the aging population that they may age in place.

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