Survey Based Sustainable Socio-Cultural Guidelines for Neighbourhood Design in Jeddah

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Abstract. Today, many neighbourhoods around the world are suffering from several problems. These problems affected the culture, social interaction, economic aspects as well as environmental impacts. Accordingly, urban development should address social and cultural aspects of each particular community within the environmental and economical context. The current research aims at developing a set of design guidelines that promotes the concept of socially sustainable neighbourhoods in Saudi Arabia. Several rating systems and urban design codes around the world set guidelines for urban design development and particularly in neighbourhood design. LEED (Leadership of Environment and Energy design) for neighbourhood design, and QSAS (Qatar Sustainability Assessment System); are examples of these rating system. Nonetheless, these rating systems are not applicable in the context of Saudi Arabia without considering its local social and cultural aspects. Therefore, this research resulted as a reaction to the abbreviation of socio-cultural aspects in neighbourhood design approaches. This research depends on an analytical review of different neighbourhood design approaches and case studies. In addition, subjective data is collected from experts and professionals about their points of view and their recommendations regarding neighbourhood design for Jeddah city. The result of the research is a set of design guidelines that consists of design principles adjusted to fit the context of Saudi Arabia (Jeddah City). The formulated guidelines are adapted and tested in an evaluation application of two residential neighbourhoods in Jeddah city. This application validated the proposed design guidelines. Considering the proposed design guidelines; in the design process of Jeddah’s neighbourhoods, this will promote a leading approach to the concept of socially sustainable neighbourhoods in the kingdom.

1. Introduction
Rating systems and evaluation assessments have emerged to target the ultimate goal of achieving sustainability in the built environment. Sustainable rating systems and evaluation assessments are defined as "systems typically designed to evaluate performance of construction projects based on various assessment parameters addressed through credits, which are classified under set of categories. Each credit is assigned a weight reflecting the presumed saved impact achieved by implementing such a credit" [1]. There are numerous attempts in creating evaluation assessments or rating systems targeting sustainability. Most of these attempts are concerned with the building level and the concept of green building design [2-3].

The concept of designing sustainable neighbourhoods as a practice is relatively new. The initial rating system to pursuit the concept of sustainable neighbourhood development is LEED for Neighborhood Development in 2009. However, LEED rating systems accused to be more environmentally oriented abbreviating socio-cultural aspects in neighbourhood design [4]. Rating systems and evaluation
assessments have abbreviated the social dimension of sustainability and become more environmentally oriented. Thus, rating systems and evaluation assessments are lacking the strong bond with social and cultural aspects [5-8]. As a result, other approaches and rating systems are trying to address these lacks according to their own distinctive socio-cultural aspirations and needs. Two regional official approaches are QSAS – Qatar Sustainability Assessment System as well as, Estidama Pearl Rating System by Abu Dhabi Urban Planning Council [9] have been introduced. Both QSAS and Estidama Pearl Rating System aim to address sustainability for their countries. QSAS implemented credits targeting local environment and culture of Qatar [10] whereas Pearl Rating System has added a new principle to sustainability principles, which is culture [9]. Both of these regional rating systems have added the two dimensions that are culture and climate. Table 1 tabulated the differences between LEED, QSAS and PEARL Rating System.

| Table 1. Comparisons between LEED, QSAS and PEARL [11-13] |
|---------------------------------|------------------|------------------|
| **International**               | **Regional**     |
| **Location**                    | LEED             | QSAS             | PEARL |
| United States of America        | Qatar            | Abu Dhabi, United Emirates |
| **Design principles**           | **Identity**     | **Walkable**     | **Pedestrian pathways** |
| 1. Compact                      | 2. Mixed-use     | 3. Regional Materials |
| 2. Walkable                     | 4. Mixed-use     | 5. Neighborhood connectivity. |
| 3. Mixed-use                    | 5. Neighborhood morphology. |
| 4. Connectivity to nearby communities, | 6. Natural Ventilation |
| 5. Neighborhood morphology,     |                  |                  |
| 6. Pedestrian scale,            |                  |                  |
| 7. Safe Travel                  |                  |                  |

Until today, Saudi design approaches are following the same approaches used in the West. Therefore, Jeddah's neighbourhoods are not socially sustainable due to the adaptation of foreign design approaches. These foreign design approaches have neglected the socio-cultural aspects in the design process. Hence, the current research proposed a set of design guidelines governed with bio-climatic considerations and cultural aspects to stimulate social sustainability in Jeddah’s neighbourhoods. Main urban design principles combined with the cultural aspects and bio-climatic considerations to propose a set of design guidelines. The proposed sustainable socio-cultural guidelines for neighbourhood design in Jeddah aim to stimulate social sustainability for Jeddah's neighbourhoods. These guidelines are validated according to professional perspectives in the field.

2. Methodology

In order to utilize the proposed socio-cultural guidelines for neighbourhood design in Jeddah, the authors of the current research believed that it should be validate through the perspective of professionals and experts in the field of architecture and urban design. This is done through subjective assessment of self-directed/closed ended questionnaires for experts in the field. The questionnaire included 14 questions with time limit of five days starting from 1st to 5th of May 2016. The total number of experts participated in the questionnaire are 62 experts and professionals. The questionnaire covers their opinion regarding the different proposed guidelines through closed ended questions in a rating scale of five points from 1 to 5, starting with strongly agree, agree, neutral, disagree and strongly disagree. These questions include design factors such as walk-able distance, street width, and building heights. In addition, this category of questions include the effect of the climatically factors on the performance of the open space such as the effect of the ventilation, shading, orientation and vegetation. The third and last category is an open-
ended question asking about the expert opinion regarding additional important aspects that can affect the performance of the open space of Jeddah's neighbourhood.

3. Results and Discussion
3.1 Problems faced in the neighborhood of Jeddah
The analysis presented some problems facing neighbourhoods of Jeddah from the perspective of professionals. These problems are taken to be the main factors affecting negatively social interaction in Jeddah's residential neighbourhoods. Jeddah's residential neighbourhoods are not walkable from the perspective of 40.3% of experts (Figure 1). Moreover, the adequate walking distance comfortable for Saudis taking into consideration socio-cultural aspects and weather conditions range from 200 – 300 m according to 45% of the respondents (Figure 2).

![Figure 1. Walkability of Jeddah's neighbourhoods](image1)

29% of experts found that the weather conditions of Jeddah is the main discouragement for utilizing open gathering spaces which validate the point of view of the author regarding the relationships between the bio-climatic aspect and the socio-cultural aspect of Jeddah's residential neighbourhood. Whereas another 29% of experts found that both weather conditions and cultural restrictions are the main discouragements for utilizing open gathering spaces (Figure 3). 41.9% of experts believed that 15 square meter is the proper green area per capita suitable for Jeddah's neighbourhoods. 32.3% believed that adequate green area per capita in Jeddah is 12.5 square meter while 25.8% of experts found it better to be 10 meter square per capita (Figure 4). 46.8% of field professional strongly agreed that cultural identity and character are neither well reflected nor considered in the design of Jeddah’s neighbourhoods (Figure 5).

![Figure 2. Walking Distance in Jeddah](image2)

![Figure 3. Levels of Utilizing Open Spaces In Jeddah (from left weather conditions and towards the right is cultural restrictions)](image3)

![Figure 4. Green Area Per Capita](image4)
Figure 5. Reflection of cultural identity in Jeddah's neighbourhoods

3.2 Validating Proposed Sustainable Socio-Cultural Guidelines for Neighbourhood Design in Jeddah

Validating sustainable socio-cultural guidelines for neighbourhood design in Jeddah through the perspective of professionals is the main concern of this section. The results from the survey are tabulated in Table 2. Social sustainability (socio-cultural aspects) in Jeddah's neighbourhoods is achieved through the consideration of Bio-Climatic conditions in respect to cultural aspects. 22.6 % strongly agreed to this statement while the other 27.4 % responded neutrally. From the perspective of 51.6 % of experts; orientation of buildings, streets and open spaces is a main aspect to achieve ventilation. 56.5 % found ventilation as a main consideration for urban designs in the context of Jeddah due to its weather conditions. Shading elements are major motivations for utilizing gathering spaces and walkways according to 61.3 % of professionals. Dadamouny [14] revealed that although according to Hagen [15] ventilation is considered the most important aspect that could enhance the thermal performance of open spaces in the hot humid climate; the shading comes at the first priority. Ventilation is being created by the difference in the air pressure, which comes from the difference of air temperature. Difference of air temperature could be found when sunny and shaded area found. From that end, creating shaded areas to lower the air temperature than sunny areas forces the air to move and create the ventilation. 38.7 % of experts find that achieving privacy in residential neighbourhoods, along with its associated residential units is essential in the design of Jeddah's neighbourhoods. Linking the neighbourhood to adjacent ones will increase both social interaction and economic base in accordance with 46.8 % experts (Figure 11). In response to 37.1 %; economic facilities located in the neighbourhood will benefit both the residents of the neighbourhood and adjacent ones. The role of community and their involvement along with neighbourhood council will increase social interactions and relationships as stated by 46.8 % of professionals.

Table 2. Survey results on socio-culture

| Aspects                                                                 | Responses (%) |
|------------------------------------------------------------------------|---------------|
| Achieving social sustainability for Jeddah’s neighbourhood            | Strongly agree| Agree | Neutral | Disagree | Strongly disagree |
| Importance of Orientation                                              | 51.6          | 30.6  | 8.1     | 1.6      | 8.1               |
| Importance of Ventilation                                              | 56.5          | 29.0  | 0       | 9.7      | 4.8               |
| Importance of Shading                                                  | 61.3          | 22.6  | 6.5     | 3.2      | 6.5               |
| Privacy levels in Jeddah’s neighbourhood                               | 38.7          | 33.9  | 16.1    | 1.6      | 9.7               |
| Locating economic facilities in the neighbourhood                      | 37.1          | 37.1  | 11.3    | 9.7      | 4.8               |
| Community and neighbourhood council role importance to                | 46.8          | 33.9  | 11.3    | 3.2      | 4.8               |
increase social interactions and relationships

As a result of the conducted survey, the primitive proposed design guidelines were updated according to the gained perspectives. The results assure that both Bio-Climatic conditions and cultural aspects are main factors affecting social sustainability in Jeddah's neighbourhoods. The Bio-Climatic considerations and Cultural aspects are arranged according to its importance rates from the perspective of professional in the field as shown in Figure 6. The elements of the Bio-Climatic conditions factor were arranged such way that having shading as the first priority. After that comes ventilation and then orientation. Next are density and the use of local materials. On the other hand, elements of the cultural aspects factor are also arranged according to importance. First is the economic base then community role and the neighbourhood council. Subsequently, privacy and lastly religious aspects.

Figure 6. Guidelines according to professional's perspectives

4. Conclusion
The community way of thinking need to be reform through affective design approaches to bring back social interactions into Jeddah’s neighbourhoods. In accordance with 29 % of experts, both bio-climatic considerations in respect to cultural aspects are major factors for stimulating social interactions and social sustainability in Jeddah’s neighbourhoods. The study proposed Sustainable Socio-Cultural Guidelines for Neighbourhood Design in Jeddah. These guidelines can utilize by urban designers in the process of designing neighbourhoods in the context of Jeddah city. These guidelines are summarised in the following points:

1. The first factor of the proposed design guidelines is Bio-Climatic considerations. This factor aims to design considering shading, ventilation, orientation, local materials and proper densities. Urban designers should consider the mentioned factors in order to achieve natural thermal comforts in urban spaces.

2. Cultural aspects are considered the second factor of the proposed design guidelines. To design urban spaces that invite users and inhabitants, their culture and life style should be address.
The proposed design guidelines have set important cultural aspects (economic base, community role, neighbourhood council, privacy and religious) should be taking into consideration when design for the context of Jeddah.

References
[1] Attallah S, Kandil A, Senoucy A, Alderham H and Elwakil E 2014 Modeling Impact of Sustainability Policies in Qatar using Agent Based Approach and Life Cycle Analysis Computing in Civil and Building Engineering (2014)
[2] Haapio A 2012 Towards sustainable urban communities Environmental Impact Assessment Review 32 165–169
[3] The Business Case for Green Building U.S. Green Building Council.
[4] Black E 2008 Green Neighborhood Standards from a Planning Perspective: The LEED for Neighborhood Development (LEED-ND) Focus 5
[5] Ameen R F M, Moursed M and Li H 2015 A critical review of environmental assessment tools for sustainable urban design Environmental Impact Assessment Review 55 110–125
[6] Emmanuel R 2012 Assessment of sustainability in the built environment: possible directions for developing countries Built-Environment Sri Lanka 11 1
[7] Opoku A 2015 The Role of Culture in a Sustainable Built Environment Sustainable Operations Management Measuring Operations Performance 37–52
[8] Masri M, Yunus R M and Ahmad S S 2016 Underlying Concerns of Socio-cultural Aspects in Green Building Rating Systems towards Improving Quality of Life Procedia - Social and Behavioral Sciences 222 710–719
[9] Banani R, Vahdati M and Elmualim A 2013 Demonstrating the importance of criteria and sub-criteria in building assessment methods Sustainable Development and Planning VI
[10] Lewis E Estidama Pearl Rating System Sustainaspeak 107–108
[11] Attallah S O, Senouci A, Kandil A and Al-Derham H 2013 Utilization of life-cycle analysis to evaluate sustainability rating systems for construction projects with a case study on Qatar Sustainability Assessment System (QSAS) Smart and Sustainable Built Environment 2 272–287
[12] Alawadi K and Benkraouda O 2017 What happened to Abu Dhabi’s urbanism? The question of regional integration Journal of Urban Design 23 367–394
[13] Ameen R A framework for the sustainability assessment of urban design and development in Iraqi cities. Thesis
[14] Dadamouny M A and Schnittler M 2015 Trends of climate with rapid change in Sinai, Egypt Journal of Water and Climate Change
[15] Hagen K and Stiles R 2010 Contribution of Landscape Design to Changing Urban Climate Conditions Urban Biodiversity and Design 572–592