

Integration of Saudi Arabia's Conservative Islamic Culture in Sustainable Housing Design

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Abstract

The cities of Saudi Arabia have perhaps the largest growth rates of cities in the Middle East, such that it has become a cause in shortage of housing for mid and low-income families, as is the case in other developing countries. Even when housing is found, it is not sustainable nor is it providing the cultural needs of those families. The aim of this paper is to integrate the unique conservative Islamic Saudi culture into the design of sustainable housing. This paper is part of a preliminary study of an on-going PhD thesis, which utilises a semi-structured interview of a panel of nine experts in collecting the data. The interviews consisted of ten questions ranging from general questions such as stating their expertise and work position to more specific question such as listing the critical success factors and/or barriers for applying sustainability to housing in Saudi Arabia. Since the participants were selected according to their experience, the answers to the interview questions were satisfactory where the generation of the survey questions for the second stage in the PhD thesis took place after analysing the participant's answers to the interview questions. This paper recommends design requirements for accommodating the conservative Islamic Saudi Culture in low cost sustainable houses. Such requirements include achieving privacy through the use of various types of traditional Saudi architectural elements, such as the method of decorative screening of windows, called Mashrabiya, and having an inner courtyard where the house looks inward rather than outward. Other requirements include educating firms on how to design sustainable housing, educating the public on the advantages of sustainable housing and implementing new laws that enforce the utilisation of sustainable methods to housing construction. This paper contributes towards the body of knowledge by proposing initial findings on how to integrate the conservative Islamic culture of Saudi Arabia into the design of a sustainable house specifically for mid and low-income families. This contribution can be implemented on developing countries in the region that are faced with housing shortage for mid and low-income families.

Key Words: Islamic culture of Saudi Arabia, housing for Mid and Low-income Families, Sustainable Housing, Semi-Structured Interview, Saudi architectural elements.

1. Introduction

Since the development of the concept of sustainability, nations worldwide have adopted the concept of sustainability and evolved it dramatically since it's conception in 1987 by the U.N. World Commission on Environment and Development (UNWCED). It's well known that the

¹²main factor behind the development of sustainability is to make sure that natural resources are not jeopardized for future generations. There are three basic factors that define sustainability: environmental factors, economical factors and social factors; these three factors formulate the sustainability triangle.

Saudi Arabia is a harsh dry climate country where water is a scarce natural resource. Environmental in addition to social factors of Saudi Arabia make the application of sustainability a challenging task that requires the collaboration of all key stakeholders in the country. Several reasons validate the need of applying the concept of sustainability in Saudi Arabia that include, limited natural resources, rapid urbanization rate, growing social awareness, environmental impacts and economical impacts (EL-Batran, 2008, Gamboa, 2008, Garba, 2004, Henderson, 2002, Karam, 2010, Stensgaard, 2008, Swain, 1998)

Saudi Arabia is experiencing a huge housing crisis (Abdulaal (2011)). In Jeddah, for example, the draft of the Jeddah Strategic Plan indicates the severe shortage of adequate housing for low and mid-income residents. Abdulaal (2011) goes on to declare that, although there are no sound or scientific statistics to back up this claim, continued growth of unplanned settlements is evidence enough of this increasing shortage of adequate housing for this sector of the public, with nearly one million residents currently living in unplanned areas of Jeddah. "It was estimated that the supply of housing units in Jeddah included 697,000 units in 2007, and there is currently a shortfall of 283,000 homes in Jeddah, including 80,000 in the low income sector. The Jeddah Strategic Plan calls for 151,600 new units to be built to accommodate those people currently living in unplanned settlements, with a further 47,500 units to be built annually to meet the demands of population growth. With regard to future requirements, the strategic plan foresees the need for 953,000 units, and an investment of US\$640 billion, over the next 20 years."(Abdulaal, 2011)

This tremendous growth caused strain in various sectors of the Saudi Arabian economy (Mubarak, 1999). Housing is one of the affected sectors, especially among low and mid-income earners (Gamboa, 2008). According to Gamboa (2008), even when one managed to secure housing, it was neither sustainable, nor efficient in the provision of cultural needs of the occupants. And according to Hamed (2003) designing sustainably is no longer a luxury addition to a building, it is now vital to the survival of the present generation and those yet to come.

Compounding the growing housing crisis in Saudi Arabia is the lack of regulations from the government sector concerning the application of sustainable methods. Karam (2010) enforces the lack of regulations by saying that there are no enforceable building codes, nor are there any regulations to follow that integrate the principles of sustainable architecture in the country. He goes on in recognizing the fact that several researchers have debated that

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one of the most significant and cost-effective ways to foster the prevalent use of sustainable practices is setting a comprehensible set of these codes and standards, specifically with regard to diminishing household energy and water consumption (Karam, 2010). These regulations will need to follow the laws of Islam and incorporate the conservative Islamic culture of Saudi residents.

Saudi Arabia is a conservative Muslim country that follows the laws that are transcribed in the Holy Quran and the Sunnah (sayings and living conducts of the prophet Mohammed). In addition, to understand the economic system of Saudi Arabia, one must comprehend that the economic system is based on the Quran and Sunnah, the accumulated knowledge of Islamic jurisprudence generated by consensus (ijma), analogy (qiyas) and independent interpretation (ijtihad) (Astrom, 2011).

As a preliminary study, which was carried out as part of an ongoing PhD research, this paper's focus is how to achieve sustainable housing in Saudi Arabia, with special emphasis or interest on the conservative mosque community. It is based upon this groundwork that this study concentrates in particular on the multifamily detached housing units. It begins with a discussion of challenges that were faced in developing sustainable housing in Saudi Arabia – such as climate, economic and social. It then moves on with the description and discussion of the results from the semi-structured interview, and then finally culminates with some concluding remarks.

2. Challenges Facing Sustainable Housing in Saudi Arabia

High cost of living has discouraged people to implement new 'expensive' sustainable housing. The public perception about this 'new concept' is expensive, and some of the public are still unaware of this 'New Concept'. Although the financial benefits are remarkable in the long term, concerns are sometimes voiced about the initial cost of green projects (Cityscape 2010). Munton in Eden (2000) argues that what will determine the success or failure of this international call to arms, will be the local responses that will make it a practical programme (Eden, 2000). Eden goes on and states that local governance in addition to the planning process and the involvement of citizens are critical to the success of the sustainability programme. But to incorporate the local public, they must first of all be educated on sustainability and they should be persuaded on why they should want to participate (Eden, 2000). With the large estimated population in Saudi Arabia, it is no easy task to apply a new concept to a country that has developed from living in tents as recently as the 1930's. The challenge is not in applying a sustainability scheme to the housing sector, magnanimous as this is, but rather in initially educating the public and government sectors about sustainability, and convincing them that this is the right way to go for the sake of the future as well as strengthening the present.

2.1 Climate Challenges

Harsh dry climate of Saudi Arabia in addition to pollution and global warming raised environmental challenges facing the housing construction industry in the country. The climate in Saudi Arabia is generally harsh, dry desert conditions with extreme temperature

differences ranging from -11°C to 51.1°C (Piccolo, 2010). Another environmental challenge that faces Saudi Arabia and other Arab countries is the scarcity of water. In order to react to the increasing demand of water, several Arab countries relied on non-renewable groundwater provisions to amplify their scarce water supply (Swain, 1998). In addition, due to the extremely limited conventional water resources such as fresh surface water and renewable groundwater, alternative sources such as wastewater reclamation and desalination have been adopted since the 1960's (Stensgaard, 2008). In addition to climate challenges and water scarcity, the ecological footprint in Saudi Arabia is approximately 4.5, hectares/capita - almost two times the global average. Compounding this is the fact that Saudi Arabia is among the top 20 countries that are most environmentally challenged (Al Fadl, 2010).

2.2 Economic Challenges

Saudi Arabia has the largest oil reserve in the world, which has been the main catalyst of the economic growth of Saudi Arabia since the 1930's. This is confirmed by the U.S. Department of State when it states that prosperity from the oil industry has made rapid economic development achievable in the country. (U.S. Department of State, 2011). The near-to-non-existence of mortgage financing is the main factor for the current disequilibrium in the Saudi residential property market. Although there is a substantial pent-up demand for mid or low-end residential real estate, the actual demand – in other words potential investors able to purchase this type of housing without assistance of a mortgage – is quite limited. Therefore, Saudi property developers are reluctant to even build such projects, hence a further increase in the housing deficit as compared to the needs of the community. Independent economist Saud Jleadan reports that with an annual increase of 150,000 units, the country has a current deficit of two million housing units. Experts of the housing industry such as REFCO (Saudi-based mortgage lender "Real Estate Financing Co.") and Clayton Holdings (U.S. consultancy) have estimated that Saudi homeowners are only 30% of the population – a decrease of more than half of the percentage of the Saudi population, which were homeowners only 20 years ago.

For the world's largest oil exporter, these are striking numbers signifying an alarmingly uneven distribution of wealth and benefits. (Karam, 2010). And what makes matters worse is that there are no regulations or a set of standards that that would safeguard the safety, health and security of tenants (Colvin, 2006, 23). The tendency of Saudi residents to rent over owning originates from the fact that they simply cannot afford to buy a house in the current real-estate market. Houses are being provided by developers at more than SR1 Million (\$270,000), but demand is strongest within the SR500,000 – SR750,000 range – evidence resulting from the fact that the average income of Saudi households ranges most generally from 5,200 to 6,000 Saudi Riyals monthly (Savard et al., 2010).

2.3 Social Challenges

The Saudi culture is defined by the teachings of Islam and is governed by what the Qur'an and the Hadith of the prophet Mohammed (PBUH) state. The culture of Saudi residents is a family oriented culture where all family members are close and the elderly are respected and

are considered the wise members of the family. It is not uncommon to find extended families reaching to three or four generations may living in the same house (North and Tripp, 2009). With this multigenerational household in mind, it is evident that the Saudi house would be larger in scale as opposed to those where a single family live in a two bedroom unit or similar.

One of the major social challenges facing sustainable housing in Saudi Arabia is achieving privacy. Privacy is crucial in the design of a Saudi house, and the concept of privacy is perceived from three different areas as stated by Daneshpour (2011), between the neighbours dwelling as well as the street, between the sexes and privacy between individual family members (Daneshpour, 2011). Abu-Gazzeh (1996) states, "The concept of privacy has become a subject of growing concern for people, architects, urban designers, landscape architects and social scientists involved in development projects in Saudi Arabia." Al Surf and Susilawati (Al-Surf and Susilawati, 2011) further discuss that unplanned distribution of the residential areas has been the instigating factor resulting in a potentially dangerous mixture of foreign single labour forces living in or nearby previously designated family residential areas. This has led to many serious security issues across the city of Riyadh in addition to the rest of the Kingdom.

The house design should separate private and public life, maintaining their independence. Alhazmi and Nyland (2010) point out the importance of gender segregation where it is fundamental to most people's educational, social and political activities. To incorporate this fundamental requirement in housing design, the housing designer should divide the house into three distinct areas: private areas for the inner family members such as the father and the mother, semi-private areas for the whole family, such as the living room. And finally, public guest zones for men and guests. According to El-Shorbagy (2010) the traditional Islamic-Arab house layout segregated the house between what is public, semi-public and private areas of the house. He also adds that the design of the house is an inward looking design where the outside walls are generally featureless, which discourage strangers from looking inside.

3. Semi-structured Interview

This research pursues to investigate and interpret the theoretical and practical knowledge of challenges facing sustainable housing in Saudi Arabia. Above and beyond that, this research aims to construct meaning through an interpretation and understanding of the participant's theories, experiences and knowledge. The participant's views are critical to forming the findings of this research and stipulate a specific and locally constructed reality. This paper utilizes a semi-structured interview with experienced professionals as the main research method for its primary data. Careful selection of the panel is necessary to the success of the semi-structured interview. The following criteria were used to correctly identify eligible participants for the interviews:

- Established practitioners/stakeholders considered knowledgeable by the housing construction industry and have extensive working experience in housing construction for Low and Middle-income households in Saudi Arabia.

- Experts directly involved in housing projects (either currently or recently) with a sustainability focus, and
- Experts who are in decision-making roles in organizations or companies associated with sustainable housing projects.
- Knowledge of the local capabilities; and
- Objectivity with respect to sustainable housing policy options and criteria.

3.1 Semi-Structured Interview Background

A total of nine professionals agreed to participate in the semi-structured interview. There were a total of ten questions ranging from broad themes to more specific issues, the first of which was of very general nature, asking of the participant's work experience and relation to the construction industry. Only five questions are discussed in this paper, including one about culture and privacy, due to its significance to the outcomes of this paper. There were a total of ten questions that started from very broad themes, as in discussing the participant's work experience, to very specific issues related to the research. The following were the questions that all nine participants answered to where only the first five questions are discussed in this paper including a question about privacy due to its cultural significance to the findings and outcomes of this paper:

1. What is your interpretation of Sustainable Development, specifically in the housing industry (sustainability definition)?
2. What parameters/factors of sustainability do you account for when dealing with a housing project (the triple bottom line of sustainability)?
3. What are the critical success factors and/or barriers for applying sustainability to housing in Saudi Arabia and how can barriers be managed?
4. In your opinion, does the Saudi Building code discuss or relate to the cultural needs of the Saudi population and their unique cultural characteristics?
5. One of the crucial elements in the design of a Saudi house is it must provide a private environment and out of the sight-range of passing pedestrians. In your opinion how can privacy be achieved in a sustainable way in a Saudi house?

The participants were approached by email invitations that were sent a few times to get their approval to participate, the duration of which took more than one month. The participants ranged from academics to architects to government workers to private contractors, as can be seen in the following table.

Table 1 Participant Profiles

ID	M/ F	Age	Current Position	Education	Job Sector	Years of experience	Worked with sustainable projects	Have Knowledge about the subject	Knows the Saudi Building Code
A-1	M	30-40	Director of Research and Assessment	Master	Private	8	Yes	Yes	Yes
A-2	M	30-40	Architect	Bachelor	Public	12	No	Yes	No
A-3	M	40-	Architect	Master	Public	12	Yes	Yes	Yes

ID	M/ F	Age	Current Position	Education	Job Sector	Years of experience	Worked with sustainable projects	Have Knowledge about the subject	Knows the Saudi Building Code
		50							
A-4	M	30-40	Architect (Academia)	PhD	Public	10	No	Yes	No
A-5	F	30-40	Architect	Bachelor	Private	3	No	Yes	Yes
A-6	M	30-40	Architect (Academia)	Master	Public	6	No	Yes	No
A-7	M	30-40	Consultant (Academia)	PhD	Public	12	Yes	Yes	Yes
A-8	M	50-60	Contractor	Bachelor	Private	32	No	Yes	No
A-9	F	50-60	Consultant/Advisor	Bachelor	Private	15	No	Yes	No

3.2 Results and Discussion

Due to the constraints of this paper, not all the results are revealed. Only the important results that were controversial or had a great impact on the researcher's expectations are presented and discussed.

For the first question, the participants had the chance to tell the researcher about their work experience and if they had any contact with sustainable housing projects. The outcome of the question was that three of the nine participants had been in contact with sustainable construction projects, and they were A-1, A-3, and A-7 as illustrated in table 1, while the remaining six have not been in any contact with any sustainable project.

All the participants had a great deal of knowledge when it came to answering the second question, which was about how would they define sustainable development. Al Surf and Susilawati (Al-Surf and Susilawati, 2011) discussed such awareness by stating although "the sheer new-ness" of the concept is the main barrier, still there is a marked rise in awareness among the public as well as professionals, as we see from the following responses:

- Sustainable housing is any housing, which proves to be environmentally friendly, has low-cost long-term maintenance and is affordable to the consumer.
- A sustainable housing development is a development that is built from local material, which is suitable for the local environment and culture while employing (absorbing) the local weather for its advantage in energy efficiency.
- Sustainable development is mainly the conservation of resources for future generations. It is concerned with the conservation of energy resources for the longest possible period of time.

For the third question, the participants agreed on most of the sustainable design factors, which demonstrated that the participants are aware of the factors that should be incorporated into the design of a Saudi house. The following table illustrates the response rate in relation to the sustainability factor descending from the highest selected factor to the lowest:

Table 2 Sustainability factors in housing projects

Category/ Theme	Total
Water Management	8
Resources (Materials)	7
Day Light	6
Energy	5
Cost	5
Natural Ventilation	5
Quality	4
Recycling	3

Responses to the fourth question highlighted barriers in applying sustainable methods to housing construction in Saudi Arabia, as revealed in table 3:

- Lack of public awareness of the positives of sustainable housing.
- Lack of stakeholder interest in applying sustainable housing.
- Shortage in sustainable construction material.
- High cost of sustainable housing and long period of return of investment.
- Low levels of investment in sustainable housing.
- Lack of alternative designs of housing and focusing only on the villa typology.
- Lack of awareness from designing firms of how to design sustainable housing.

Table 3 Barriers to applying sustainability on housing

Critical Success Factors	Worked in Sustainable Projects			Never Worked in Sustainable Projects						Total
	A-1	A-3	A-7	A-2	A-4	A-5	A-6	A-8	A-9	
Lack of stakeholder interest		X	X			X	X	X	X	6
High cost	X	X	X	X	X					5
Lack of public awareness		X		X	X				X	4
Shortage in sustainable construction material			X				X			2
Low levels of investment		X				X				2
Lack of alternative designs	X									1
Designing firms lack of awareness	X									1
Total Barriers selected	3	4	3	2	2	2	2	1	2	

The results deducted from Table 3 makes it clear that those having direct contact or real experience with sustainable projects are more inclined to understand the barriers, as these participants are the ones which selected 3 or more of these selections. It is therefore imperative that such persons should be consulted for formulation of a sustainable rating system unique for Saudi Arabia.

On the other hand, the following statements were considered to be critical success factors (CSFs) to applying sustainable methods to housing construction in Saudi Arabia, which can also be found in detail in table 4:

- All designing firms should be educated on the Saudi building code

- Take advantage of local media to create public awareness of Saudi building code.
- New housing projects must use the Saudi building code
- Renovate Old housing projects to reach the minimum level of the Saudi building code
- The Saudi building code should address and solve local environmental problems

Table 4 Comparison between participants regarding CSFs

Critical Success Factors	Worked in Sustainable Projects			Never Worked in Sustainable Projects						Total
	A-1	A-3	A-7	A-2	A-4	A-5	A-6	A-8	A-9	
Implementing new laws	X	X	X	X	X	X		X	X	8
Educating firms	X	X	X		X	X		X	X	7
Educating the public	X	X	X		X	X		X	X	7
Environmental comfort	X	X	X	X	X	X	X			7
Grey water treatment			X				X			2
Using solar energy		X					X			2
Rainwater collection	X	X					X			3
Total CSF's Selected	5	6	5	2	4	4	4	3	3	

From table 4 it is evident that participants who worked with sustainable projects have selected five or more critical success factors (CSF's) while the other participants who did not have any interaction with sustainable projects have selected less CSF's, illustrating the fact that exposure to sustainable projects greatly impact their judgement of CSF's and how they apply to sustainability on Saudi housing. One of the noticeable results from this table is that the utilisation of solar energy is one of the least selected CFS's. This can be due to the high cost of installing solar panels as well as the high maintenance cost of such a system.

In relation to the fifth question, which was asking the participants to discuss the Saudi building code (SBC), it was shocking to see that six of the nine participants did not know that there was even such a building code. But it is not surprising to find out that the three participants who have had some interaction with sustainable projects have knowledge of the SBC as it is illustrated in the table 1.

In response to this reaction, the first thing is that the Saudi building code was not introduced until 2007, which means that is relatively new in the construction industry. The second reason is that the Saudi Building Code National Committee (SBCNC) did not introduce itself to the construction industry well enough so that all the construction industry was informed of the Saudi Building Code. The following outcomes from the participant's responses should be considered as a guideline for the SBCNC:

- All designing firms should be educated on the Saudi building code
- Take advantage of local media to create public awareness of Saudi building code.
- New housing projects must use the Saudi building code
- Renovate Old housing projects to reach the minimum level of the Saudi building code

- The Saudi building code should address and solve local environmental problems

The question regarding the adaptation of privacy in current and future sustainable Saudi housing design had an agreement across the board, which indicates that all the participants agree on the importance of this aspect, both culturally and religiously. Several methods of achieving privacy have been outlined by some of the panel members, which include:

- Refrain from the design constrictions of fenced villas.
- Employment of Mashrabiya concept
- Provision of clearstory fencing along the room walls instead of typical windows
- Designing a house with an introverted concept (looking inside a court).
- Introduce camouflage and pattern in the house, in addition to the idea of a courtyard.

Overall, the concept of privacy can be achieved in the design process of a sustainable Saudi house, which can serve both the cultural and religious needs of its occupants. Designers should incorporate a minimum level of privacy that can fulfil the occupant's needs and any additions or alterations can be done according to the extent and willing of the homeowner.

4. Concluding Remarks

High cost of living has discouraged people to implement sustainable housing concept. The public perception about this 'concept' is expensive, and some of the public are still not aware about this 'concept'. With the large estimated population in Saudi Arabia, it is no easy task to apply a sustainable housing concept to a country that has developed from living in tents in the 1930's to having a sustainable scheme applied to the housing sector and convince them that this the right way. The findings from the interview suggest accommodating the conservative Saudi Culture in design requirements for sustainable houses. The following points are also derived from the interview:

- Enlightening architectural and construction firms on sustainable designs
- To implement regulations resulting in enforcement of application of sustainable methods in housing construction.
- Encourage Saudi government to erect affordable sustainable housing units.
- Promotion of green energy to become the main energy source for housing.
- The importance of rainwater collection.
- The value of grey water treatment systems

This discussion of the applicability of sustainable methods on the housing construction industry in Saudi Arabia can be utilised for other developing countries in the region that are faced with similar housing shortage especially for mid and low-income families.

Further research is on-going as part of the researcher's PhD, and results from the first and second Delphi rounds, which are additional research methods used in the PhD thesis, will be available as they arise along the timeframe of the PhD thesis that will discuss further agreement between participants on the research topic.

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