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Drivers for Green Construction in Oman and its Future Prospects

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Abstract: The pressure of modernization and urbanization has stimulated positive growth in the Oman's construction sector especially in infrastructure development. The slower pace of construction progress in Oman in the past provides huge opportunity for the green concept to be integrated alongside the growth of the country. The lack of evidence on green progress may suggest that the green concept or environmental values are not yet at the forefront of the construction industry agenda. Proactive actions from the government, private companies and professional bodies are crucial to drive the concept and bring 'greener' change to the industry. Through survey, this paper discusses the drivers that shall motivate construction players to participate in implementing green into their projects and explore the perceptions of these players on the future outlook of green concept in Oman. This study shall shed lights into the current status of green application in the Omani construction practices and enable further recommendations be made to improve and promote wider application in the future.

Key words: Oman Construction Industry · Green Concept · Sustainable Building · Construction Barriers

INTRODUCTION

The Middle East Region main problems are water shortage and hot temperature during summertime. Many argued that these conditions create unique set of difficulties in incorporating green elements in the project [1, 2]. As they are blessed with oil reserve, little attention is given to the need to save energy. Middle Eastern countries are at the top of the list of largest per capita ecological footprint [3]. The booming of construction sector has resulted in escalation of domestic energy consumption per capita [4] and has put these countries as among the highest contributor to CO^2 emission per capita [5].

While its neighboring countries such as U.A.E. and Qatar are fast developing, the Sultanate of Oman took a much slower pace and focused their attention to improving the internal affairs of the country such as education and quality of living. Oman has seen a stable growth in terms of health, education and income in the last 40 years (UNDP, 2010). Nonetheless, Oman also realized the need to improve its infrastructures and buildings. The government has been investing continuously in developing infrastructure all over the Sultanate. Thus, in the last five years, the country has seen a rapid movement in the construction sector.

The concept of green, although has been lauded by many countries, is quite new to GCC countries. However, Middle Eastern region has made great progress in recent years with more designers pursuing green design [3]. The current construction progress in Oman provides huge opportunity for the green concept to be integrated alongside the growth of the country. As a booming country, Oman has many new projects in store. As such, it is pertinent to push the sustainable or green concept diligently into the construction industry to optimize the opportunity of building green for many new projects.

This paper discusses the current progress of green in the Omani's construction industry. A survey has been conducted to explore the underlying reasons for pursuing green construction and discusses a 5-year future outlook as perceived by the respondents. The findings suggest that many more efforts are necessary to push green construction to the forefront and the government should play the major role in this development.

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Green Progress in Oman: The Sultanate of Oman is experiencing economic growth thanks to backing from oil-fueled state coffer. The construction and infrastructure sectors had a growth of 11.9% in 2012 and further growth of 8.4% in 2013 [6]. The Government of Oman is focusing on large-scale infrastructure projects and the development of industrial capacity in line with its 'Oman Vision 2020'. Some of the ongoing or planned key infrastructure projects in Oman are International Railway Project, Al-Madina A'Zarqa (Blue City), Muscat International Airport, The Wave Muscat, Duqm Development Project, Sohar Industrial Port and Oman Convention and Exhibition Centre [6]. The government has also increased their spending for construction sector in 2012 by 23% over the corresponding figure for 2011. The allocation for the housing sector have surged 21.5% from RO266 million in 2011 to RO323 million in 2012, including the allocation of housing units for low income citizens [7]. In the Eight Five-Year Plan (2011-2015), US$ 6.5 billion a year has been allocated to investment projects, US$ 1.2 billion to housing, US$ 4.2 billion to airport expansion and construction, US$ 3.1 billion to road projects, US$ 1.3 billion to seaports and US$ 1.2 billion to the utilities sector [8].

Excessive development without proper attention to environmental need shall lead to irreversible impact to its environment and the surrounding [9, 10]. As Oman is still at the early stages of construction booming, the negative impact of unsustainable construction may not be apparent yet but if it continues to ignore the importance of being green, the country may suffer the same ill-fated problems faced by many countries. Currently, Oman faces water scarcity and periodic droughts [11]. Due to the geophysical and climatic setting of the country, 75 % of the country total surface is covered by desert, which leaves 25% remaining land to be shared for different purposes of the Omani society. While land consumption by residential use, services and transport infrastructure is increasing steadily, suitable land for agriculture is decreasing. This supports rural-to urban migration or transition and thus recreates new demands on shrinking land resources. Urban settlement patterns are created through random additional of freestanding villas on walled plots, consuming high amount of energy for conditioning [12]. The residential sector is the largest consumer category with its consumption taking more than half of the total system energy (67%) in 2011 [13]. Buildings are usually designed by engineer, thus creating stereotype in design, poor design quality and lack of design ingenuity normally found in architecturally-designed buildings [14]. Oman' economy is heavily dependent on oil and gas sectors. However, Oman's oil fields are generally smaller, more widely scattered and pose higher production costs than other Arabian Gulf countries. The annual demand curve for energy reflects the climate in Oman and is highly seasonal. The average summer demand is more than double of the average winter demand. The future demand on energy in Oman is expected to rise due to increase in population, expansion of new industries and more tourism projects which will require substantial power demand [15]. As Oman experienced less rain in the past, attention was not given to drainage system. But the change of climate in the last 3 years has seen a more frequent rain which leads to scattered flooding due to poor or no drainage system.

Oman has a sound record of environmental law, enforced by the Ministry of Environment and Climate Affairs. Energy conservation and developing renewable energy, along with preserving the environment, are among the priorities of Oman's Eight Five-Year Development Plan (2011-2015) [16]. Research and development was not given much attention in the past with R&D was evaluated at 0.1% of GDP in 2007. The government aimed to address this deficiency by creating The Research Council (established in 2005 by royal decree) to promote research and innovation on environmental protection, green building and eco-design [11]. Oman Green Building Council, which has been newly established in 2012, is a non-profit non-governmental organization established with the objective of promoting green building concept and its principles, save the environment and ensuring sustainable development. It has been actively promoting green concept through conferences and seminars. Oman has 15 projects registered with LEED but none of the projects has been certified yet [17]. Some of the projects in Oman pushing for LEED certification are Muscat International Airport, Oman Botanic Garden, The Jebel Al Akhdar Hotel, Salalah International Airport, The Oberoi Resort at Bander Al Khiran, The Novotel hotel in Muttrah, The Ibis hotel in Sohar and Oman Convention and Exhibition Centre.

Pursuing Green Construction: Construction practitioners worldwide are beginning to appreciate sustainability and acknowledge the advantages of building sustainable. Sustainable buildings would contribute positively to better quality of life, work efficiency and healthy work environment. The approach of sustainable construction will enable the construction players to be more responsible to the environmental protection needs without neglecting the social and economic needs in striving for better living. The right motivation will push the industry to enter into green construction.

The purpose of all business strategies is to ensure how a business can persistently create more value [18]. While the main focus on green building is its positive impacts to the environment, research shows that developer's decision to go green remains rooted in its financial viability [19]. The green building costs can be lower than conventional method and saves energy as demonstrated by Hydes and Creech [20]. These buildings achieve superior long term performance making them attractive investments for facility owners and developers in both public and commercial sectors [21]. Some of the economic benefits of green building are savings in capital and operational costs; improve marketability and public profile [22].

The benefits of green buildings for the Middle East are not only environmentally-related, but extended to economic and social aspects. Lower long term operating cost can be achieved via reduced energy consumption, reduced emissions, improved water conservation, temperature moderation and reduced waste [3]. Other benefits associated with green building for the occupiers include gains in employee productivity, reduced absenteeism and building-related health problems lead to reduction in health and safety costs, improved morale and better employee retention [23]. There is a strong positive correlation between the work performance of employees and the building in which the process takes place. Studies have proven that the increase in productivity gains is related to the improvements of the indoor environments [24].

One of the essential and effective driving forces in promoting green building is the government's involvement. To meet these objectives, each country has its own concern and establishes the corresponding policy instruments for the building industry [25]. Regulations and rules ensure a minimum standard of quality to be safeguarded. Most government offers monetary incentives to attract green construction [26]. Financial incentives including tax credits/abatement, fee reduction/waiver, grants and revolving loan funds are a highly successful means of encouraging developers to follow green building practices [27].

Field Study: A survey has been conducted to investigate the current progress of green construction in Oman from the view of its players. Specific focus will be on the factors that motivate the pursuance of green in the construction projects and the future outlook of this development. A total of 67 questionnaires were obtained for analysis. The data gathered was analyzed qualitatively (open-ended questions) and quantitatively (scale-typed questions). The results are discussed next. Majority of the respondents are from contractors company (47.8%), followed by developers (17.9%), engineering consultants (16.4%), university and government sector (16.4%) and lastly architectural firms (1.5%). A total of 50.8% respondents have more than 10 years experience working in the construction industry and another 32.8% have work experience between 5 to 10 years. Their range of project profiles varies from individual villas to commercial buildings, governmental offices and infrastructures projects.

RESULTS AND DISCUSSION

Drivers for Green Construction: A total of 13 driving factors have been identified as potential reasons to encourage acceptance and implementation of green construction. Each factor was rated in a scale between 'very low' (1) to 'very high' (5). Further support to this findings were available through open-ended question while enable the respondents to express their opinion on the matter. The result from the survey is summarized in Table 1 and ranked in ascending order.

Based on Table 1, the top driving factors to pursue green construction in Oman is related to environmental reasons i.e. 'to protect the environment' and 'to show the company cares for the society and environment'. It is also seen as a safe way to avoid infringement of laws and regulations as this approach will cover the bases of environmental-related law. The economic benefits of green are ranked as no. 4, 5, 6 and 8 i.e. for company's image, money saving in long run, future opportunities and profit generation. 'Knowledge on green', which is dubbed as one of critical factors to stimulate green acceptance [28], is ranked at the 9th place. Governmental support is also within moderate level (3.57) and incentive from the government is ranked among the lowest. According to Zainul Abidin et al [29], government is one of the main institutions that have a major influence over the development of any industry. Majdalani et al. [30] stated that changes imposed by the government will bring about behavioral shift in the construction sector because the government is a regulator, major customer and industry sponsor. The study also indicates the lack of awareness and interest among key players in the industry on green construction (the lowest in the rank). As key players, their awareness and interest should be the upmost important in creating a sustainable industry as they are the ones initiating, constructing and building the projects [10]. Some additional driving factors to pursue green construction provided by the respondents are to reduce energy usage, to encourage green city in Oman, to use safer materials, aesthetical benefit and to be at par with other MENA countries.

Table 1: Driving factors for green construction in Oman

Driving Factors	Average Mean	Rank
It is good way to protect the environment	3.97	1
Green building show that the company cares for the society and environment	3.67	2
Green building is a safe way to avoid infringement of laws and regulations	3.66	3
It is good for company's image	3.64	4
The potential of saving money during operational of the building in the long term	3.60	5
Venturing into green building ensure more opportunities in the future	3.58	6
The government support green building	3.57	7
Green building can get more profit	3.51	8
The increase of knowledge on green building	3.40	9
There are many incentive by the government to encourage green building	3.36	10
Green construction will become a trend in Oman	3.27	11
There is good market for green building in Oman	3.24	12
More developers / contractors / builders are aware and interested about green construction	2.97	13

In general, the highest average mean is 3.97 and the lowest is 2.97. The study shows that the driving factors are within 'moderate' level except for the lowest factor which fell within 'low' category. This indicates that on overall, any present actions to push green construction concept in Oman may not have significant impact to the industry yet as the driving forces which should stimulate green growth are still on low-moderate level.

The respondents provided some recommendations on how to encourage green construction in Oman. The recommendations can be divided into 3 categories: governmental support/action, knowledge and awareness, and private and professional initiatives.

Many respondents highlighted the actions that can be undertaken by the government and governmental agencies. First of all, the aspects related to environmental protections and green concept should be made compulsory at Municipal level. For example, every new construction must be bound to provide green belt or plantation area. The current municipality building regulations did not stress on green design and green practices. The respondents recommend that modifications to the present regulations are necessary to enforce better green requirements for all new projects. A few respondents stated that the government has not encouraged the builders to pursue green building concept. If there is any effort from the government side, it was not widely known to many practitioners. As one of the client, government also needs to show their interest on this approach. Government itself should go green to encourage others to do so. Law and regulations are the most effective action that the government can take to ensure wider implementation of green aspects. The government can give relaxation in tax and introduce other Benefits for building green.

Recommendations have also been made to improve knowledge and awareness. According to the respondents, majority practitioners in Oman have no or little knowledge on green building and its advantages. The best step to promote green construction is to reach the people through media, advertisement, seminars and trainings. Education can start early either from school or higher education level.

For private and professional initiatives, it is proposed to add green-related conditions on the construction contracts by the clients and the consultants to ensure implementation. Research and development should also be encouraged to promote local green products. Due to lack of expertise locally, the construction sector should bring in expertise from other countries to introduce this concept in new projects and at the same time provide learning opportunity to local engineers, architects and contractors to gain experience and be exposed to this new concept. Prototypes of green buildings are another way to improve knowledge and sparks interest. Green features and green technologies should be pushed during design stage. For example, the use of solar and wind power for electricity, use recycle materials, use good quality insulating windows etc.

Future Prospects for Green Construction: The respondents were asked about their perception on the future outlook of green application in the industry and why such opinions were given. It was revealed that the majority of survey respondents (37%) perceived that the changes will maintain at moderate level, 34% respondents perceived it to be good while 25% perceived that the prospect is poor. This is illustrated in Figure 1.

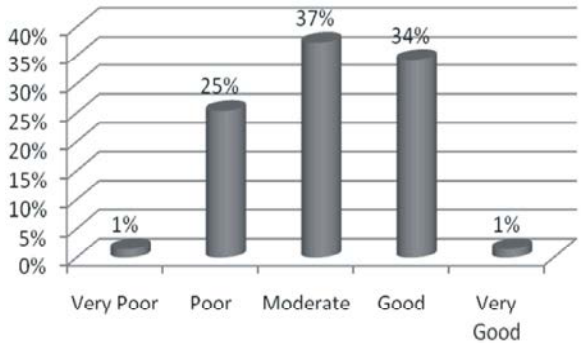

Fig. 1: 5-Year future prospect for green construction in Oman

The respondents who support the positive outlook believed that the government has beginning to take interest on this issue, which should bring positive change in the near future. A few government bodies and private companies have collaborated to build their new buildings by using sustainable design technique. It is believed that the government will introduce incentive and subsidy soon especially to promote windmill and solar system. There are a few new prototypes of green buildings in the region such as Eco house project. The fast interest on green within MENA region also will push Oman to follow their green development. Working closely with Oman Green Building Council, the authorities are keen on having Oman green building code. One respondent also states that the government is coming forward and introduced laws to use locally manufactured products in its project. The consultants are given instruction to use natural resources. Although this is not widely practice now, it will most likely improve in the future. One of the current barriers to such practices is knowledge and awareness. The respondents agreed that presently, awareness on this concept is very poor. Once awareness is raised, the concept will be slowly applied to the projects.

The respondents who believed that the progress will either be 'moderate' or 'poor' stated the following issues. Majority of construction players in Oman are still not familiar with green concept. It will take a longer time for things to change to green direction. With the lack of pressure from the demand side, many are not interested to know or get involved with green-related initiatives. The respondents also state that currently, the trend of green is not here yet. Only a very small developers or builders talks about green and the attention was only to large projects. Oman consists of many small and medium size projects which are still persist on their own conventional way. Changes to the industry will only be visible if these sizes of projects, which dominate the market, are onboard with this concept. One respondent stated that the government bodies themselves are not fully understanding of green building issues. Thus, initiatives for green buildings are not full-scale. The market in Oman is still confined to local standards and practice. There is not much globalisation happening in Oman to promote business in the country which can provide the desired pay back to the developers / investors to go for green building design. One respondent stated that although there is a general acceptance of the importance of green in Oman, the steps of enforcing it are not there yet.

One respondent proposes that whether the prospect of this concept in Oman is leaning towards positive side or remain in status quo depending on the collective efforts of engineers, architects, planners in association with the policy makers and environmental leaders. He stated that the construction players should look beyond their own locality, be innovative, seek a balanced solution, engage various stakeholders, adopt a holistic approach and give sustainability the benefit of any doubt. Change can only come when people are ready to embrace it.

CONCLUSION

The push towards green construction is relatively new in Oman, but actions have been initiated by several parties to bring this concept to the forefront of the country agenda at par with other developing countries. In a nutshell, the progress of green construction is still at initiation stage. The drivers to push this concept into new construction projects have been identified, however, the low-moderate findings across the driving factors indicated that any actions to push green construction concept in Oman may not have significant impact to the industry just yet. The recommendations put forth on how to encourage better green are divided into 3 categories: governmental support/action, knowledge and awareness, and private and professional initiatives. Majority respondents perceived that the current scenario is unlikely to change in the next 5 years (poor-moderate level). Several factors that influenced this perception are discussed. Nonetheless, silver linings are seen by a third of the respondents, who perceived that the application will improve due to actions that are being set in motion nowadays.

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