

ADAPTING SUSTAINABILITY IN PALESTINE; BARRIERS AND MOTIVATORS IN THE IMPLEMENTATION OF GREEN ARCHITECTURE

H.Sabboubeh and P.Farrell

University Of Bolton, Deane Road, Bolton, BL3 5AB, UK

Email: hebasabboubeh@gmail.com

Abstract: As a developing country under occupation, Palestine has limited resources but huge development needs. Whilst construction is a main driver for the economy, it is also the main source of pollution and the largest consumer of its natural resources. Palestine has no fossil fuel, and has to import petroleum products and electrical energy from Israel. This study aims to create better understanding and classification of barriers and motivators in the development of sustainable construction in Palestine, and links these to a need to implement green architecture.

The main data collection instrument is questionnaire survey, that received 43 replies from construction professionals in Palestine. The questionnaire design was founded on issues in the literature; data reliability was supported by interviewing five Palestinian experts in sustainable construction. Participants agreed that barriers listed in literature were applicable in the context of Palestine. Accordingly, financial, educational, cultural, political and technical constraints were ranked. It is recommended that efforts at all levels: environmental, educational, political and governmental should be combined. Industry stakeholders supported by authorities should formulate legislation, standards and codes to enhance sustainable construction practices, together with training courses, campaigns and workshops on green buildings. Authorities should introduce financial incentives for green buildings.

Keywords: Green architecture, Palestinian construction sector, sustainable construction.

1. INTRODUCTION

Green architecture is defined as "... a current design attitude which requires the consideration of resource reduction and waste emissions for the period of the building's whole life cycle" (Wang et al., 2005).

Energy is considered to be influential in every life aspect, and plays a key role to support the development of economies and the prosperity of the communities on one hand; on the other hand it adversely affects the environment, especially in the case of increased usage of energy where the environment cannot disencumber itself of the negative effects of unrenewable energy consumption. Therefore, reducing the energy consumption is a public responsibility of society and institutions (Brundtland, 1987).

Palestine has a tenuous environment due to: high levels of land degradation and loss of land to Israeli settlements; high price of energy; shortage of fresh water, and; rapid urbanization arising from population increase with its associated problems of air pollution and high pressure on the existing infrastructure such as waste management systems (Enshassi and Mayer, 2005). The Palestinian National Authority (PNA) have made some initiatives to put in place some key stones to promote sustainable development. However, these initiatives are not

enough to promote a strong sustainable construction sector. The success of sustainable construction is highly dependent on the desire of construction industry stakeholders to be committed to change and work towards conformed objectives and goals (Ofori et al., 2015).

1.1 Natural resources in Palestine

There are no fossil fuel resources, and the PNA has to import 100% of petroleum products from the Israeli market and around 92% of electrical energy from the Israeli Electric Corporation; that costs more than 385 million Euros per year (Yaseen, 2008). Israel controls the import of energy and prevents open trade of electricity and petroleum products between Palestine and any other country (Yamin, 2015). The cost of electricity is a huge debt burden and a major concern of the public and private sectors, especially with the political risks that electricity supplies may be cut off or Palestinian energy distributing companies confiscated (Aljazeera, 2014).

According to the International Middle East Media Center (IMEMC), since year 1967, there has been many Israeli resolutions that have confiscated natural resources, including underground water. Palestine has been unable to secure permits to dig new wells. This is an old practice which means once a well is dry, there is no more water; inside Israeli settlements the drilling is free-flowing as it notable from greenery (IMEMC, 2007). Political conflicts have led to the destruction of large parts of the water utilities in the West Bank, such as wells, irrigation systems, reservoirs and water pipelines. This results in a major deficit in underground reservoirs, and an increasing difficulty for the Palestinian population to have access to drinking water on a daily basis (Issac et al., 2004).

2. THE LITERATURE

As populations grow and seek higher standards of living, there is increased consumption of energy. Construction is one of the most important drivers of job creation in Palestine; it is also the largest sector in the Palestinian economy. Construction has grown at an annual rate of 20.5% and made the largest sectorial contribution to overall gross domestic product (GDP) growth since year 2006 (Trust, 2013; Enshassi and Mayer, 2005). Construction has the potential to nearly double its annual contribution to GDP to reach \$2.8bn per year and create up to 64,000 new jobs through to 2030 (Trust, 2013). However, construction is a high contributor to environmental pollution, due to its dependency on conventional machines, material and transportation, in addition to the large quantity of waste produced during the life cycle of buildings and a lack of suitable areas to dump or recycle (Salameh, 2012). Demolition that arises from political disputes places extra pressure on natural resources and energy consumption.

2.1 Motivators in implementing green architecture:

The sustainable construction movement is reshaping the construction industry and its market share is rising internationally (Ahn and Pearce, 2007). Hydes and Creech (2010) stated that the schemes and concepts for sustainable construction are already there, the trick is to control the safety of businesses and dare to innovate. There are many benefits and motivators to encourage societies to go green. Motivators for green architecture are classified thus:

Economic (Financial) and market motivators

Green buildings are more popular and sellable, and there is often customer demand and a willingness to pay for it. Cruickshanks (2012) pointed out that green architecture improves property value. The purpose of all businesses is to ensure they can persistently generate more value; while the main concern of green architecture is environment, developers will always insist it proves its financial viability (Robichaud and Anantatmula, 2011). A study carried out by Fuerst and McAllister (2010) investigated the selling price of buildings with environmental certification on commercial real assets, and found that there is price raise of 10% and 31%. The same fact was confirmed in a later study by Chegut et al (2013), who pointed out that buildings with green characteristics have a positive impact on rental and sales prices, with an increase per square meter between 21 and 26%.

Yudelson (2009), Häkkinen and Bellon (2011) and Langdon (2007) agreed that it is predicted that sustainable construction will have higher initial cost than the conventional construction because of the increase of the unfamiliarity of the design, which increases consultant's fees, and the cost of construction assessment tool documentation. However, the cost is returnable over the project life cycle during maintenance and operation phase (Häkkinen and Bellon, 2011; Pearce, 2008).

Social motivators

Green lifestyles have turned out to be fashionable and socially attractive these days which has formed belief about sustainable demand and has influenced community behavioural intentions and motivations (Kaiser and Scheuthle, 2003).

Studies in behavioural sciences according to Berit (2010) and Heerwagen and Orians (1993) suggest that green buildings sustain: the relationship with nature; sense of community; behavioural control and choice; opportunity for habitual exercise; sensory variability and privacy when needed. McGraw Hill Construction (2013) agreed with Kibert (2007) that social sustainability enhances some social facets such as well-being feelings, aesthetics, health and comfort, safety, security and occupants' satisfaction, suitable living environment and social integration. Behavioural theories support arguments that the features and attributes of buildings are strongly linked to wellbeing of occupants such as ensuring natural ventilation, suitable temperature, and the ability of buildings to adapt to environments to suit personal needs and preferences of users (Heerwagen and Orians, 1993).

Environmental motivators

Construction affects the environment due to the extraction and the use of materials during lifecycle of buildings. Construction activities start with the utilization and processing of raw materials, extending to the supply of inputs such as: energy, water and equipment, and terminate with demolition phase and waste disposal (Gundogan, 2012). Hence, sustainable construction reduces the negative impact of buildings and that is a motivator for the green buildings.

According to a study carried out by United Nations Environment Programme (UNEP, 2009), around 30% of greenhouse gas emissions are produced by buildings. Intelligent design of

green buildings, can lead to a saving of about 12% in water. Studies have shown around 40% of the solid waste produced, arises from population activities when using buildings (Karzam, 2016).

Organisational motivators

Promoting sustainable practice in organisations leads to change in organisational culture. Green buildings may enhance productivity, product quality, increase innovation and time saving (Heerwagen, 2000). Organisations can integrate sustainable strategies into their strategic plans. Zhang et al. (2010) argued that the meaning of green strategy is that organisations can gain sustainable advantage by contributing to environment savings as a part of their social responsibility. This can have an impact on financial performance, because it leads to better employee well-being and satisfaction, with improved morale and productivity.

2.2 The barriers to green buildings

Barriers to green architecture could be categorized as following:

Economic barriers

Higher initial cost is cited as one of the top challenges. Green architecture solutions may be abandoned because clients are concerned about higher financial risks (Nelms et al., 2005). It is important to realise that design fees are largely paid before implementation phases start, and that is before clients decide with certainty whether projects will be developed or not (Chegut et al, 2013). Hence, design fees are very high risk investments.

Educational/ awareness barriers

A survey was carried out in Kuwait by Al Sanad et al. (2011), to measure the level of awareness of industry leaders and their understanding and use of sustainable construction strategies. The results showed that whilst there seems to be a good level of awareness, that is not currently well reflected in design and construction practices. On the other hand, engineer Hani Al Hassan (2011) stated in an interview, that the current scattered buildings in Palestine reflect the ignorance and lack of concern and awareness regarding the environment; these buildings do not interact with the surroundings and designs neglect the orientation of buildings in four directions.

Market barriers

Currently in Palestine, the availability of delivered green buildings is very limited. This makes the sustainable buildings market very weak, and there is a lack of exemplar or flagship projects that can be held up as best practice. Furthermore, there is poor availability of sustainable construction materials, technology and skills, and therefore procurement options are very much restricted.

Organisational and legal barriers

The Palestinian National Authority (PNA) and municipalities have basic rules and regulations in regard of green architecture and its development in the country, calling for the inclusion of the environmental conditions in building permits and placing emphasis on it (Hasan, 2011). However, most Palestinian construction companies have weak management systems and processes, so at early stages of development a decision is often made not to go green.

3. METHODOLOGY

A detailed literature review was carried out, to investigate barriers and motivators for implementing sustainable construction in general. A questionnaire was used as the main data collection instrument. A preliminary draft was evaluated by experts and academics in Palestine, to ensure that the questions were valid, clear and precise; subsequently, the questionnaire was modified. Methodological procedures and ethics were adapted from the work of Farrell et al (2016). The questionnaire assumed seven categories which are based on the literature review as follows: people impact, cost impact, time impact, technology impact, market impact, legal impact, political impact. The selected sample were professional people that are working in the construction industry in Palestine (engineers, architects, contractors, academics, developers and construction materials suppliers). Each category was measured using multiple questions; 61 questions across the seven categories. 70 questionnaires were distributed in all districts in Palestine, and 43 replies received representing a response rate of 61%. Interviews were carried out with five key persons in sustainable construction in Palestine. Interviewees were selected according to the recommendation of the Engineers Association of Palestine and from the lead author's experience in the construction field. The aim of these interviews was to collect supplementary data and to cross check the findings of the survey.

3.1 Scoring method

Participants were asked the extent to which they agree or disagree that given barriers and motivators apply in Palestine. A quantitative score of 0 (zero) was allocated to strongly disagree, 1 = disagree, 2 = neutral, 3 = agree and 4 = strongly agree. To analyse the responses, the arithmetic mean was calculated using the following standard:

- ❖ High level of agreement: if the arithmetic mean is more than 2.0.
- ❖ Medium level of agreement: if the arithmetic mean is equal to 2.0.
- ❖ Low level of agreement: if the arithmetic mean is less than 2.0.

Arithmetic means were converted to a percentage score to aid ease of understanding by multiplying by a factor of 25, such that for example a mean score of 3 out of 4 became 75%. An overall mean percentage for the study was determined, and each of the seven categories ranked from most severe to least severe.

4. RESULTS, FINDINGS AND DISCUSSION

For brevity in this paper, results and discussion are limited to barriers; it is hoped to disseminate results about motivators in future work. Table 1 illustrates results for the seven perceived categories of barriers to sustainable construction development in Palestine; the table shows in rank order the arithmetic mean for each category.

Table 1: Barriers overall results, arithmetic mean and ranking

Category	Number of questions/category	Arithmetic mean	Percent	Ranking
Political situation	6	3.21	80%	1
Legal aspects (legislation)	7	3.08	77%	2
Market	6	2.93	73%	3
People	12	2.89	72%	4
Time	11	2.77	69%	5
Technology	5	2.75	69%	6
Cost	14	2.69	68%	7
Summary	61 total questions		72% overall mean score	

The overall mean score is 72% which equivalent to a score of 3, therefore in average people ‘agree’ the suggested barriers are present. That would seem to suggest that there is a lot of work to be done in Palestine to break down these barriers.

4.1 Discussion

The study findings show that participants believe that the main obstacle to sustainable construction implementation is the political situation, which scored 80%. Although the Palestinian National Authority (PNA) was established more than twenty years ago, Israeli occupation impedes development. Palestine has limited sovereignty on its land, borders and resources. It is recognised that this barrier is not easily overcome. Investors, developers and construction leaders are often cautious and afraid to bring new ideas to the table, and this confirms the view of Halas (2016), that future development depends on the ability of the PNA to control its own resources, without dependence on foreign aid. There is consensus from participants that occupation inflicts damage upon urban landmarks, especially in the Gaza strip (Wattan, 2009). Furthermore, the construction industry and its supporting technologies are restricted, since the PNA do not control policy on the trade movements across borders (Yaseen, 2008). Moreover, 88.3% of the sample think that access difficulties cause extra cost, since there are several check points within Palestinian territories, and closure may occur anytime, thus requiring that alternative longer routes have to be taken for materials, plants, and labour.

The second barrier was legislation. Palestine is a newly developing country with limited capacities, managerial skills, financial resources, and experiences; in addition legal and administrative systems are limited in their support of development, and codifying and

formulating strong regulations (Enshassi and Mayer, 2005). Williams and Dair (2007) identified lack of sustainability measures by stakeholders as the most commonly recorded barrier. The attainment of sustainable development needs to activate the cooperation of the international community in both capital and expertise, and needs the application and development of systems for economic and environmental strategies (Enshassi and Mayer, 2005).

There are clearly, multiple stakeholders and local bodies in charge of the environment, which creates complexity in relations between different programmes. The Palestinian construction industry has not yet succeeded in application mechanisms; big efforts are there but they are not interconnected with each other and there is weak coordination between different parts of the country to provide the possibility of building green materials becoming available locally. Moreover, questionnaire participants agreed that a lack of strategic planning hinders the start of a sustainable construction movement in Palestine, and there are inadequate institutional structures at a local level.

The country should have mandatory controls on the use of new buildings licences. New construction rules should be set for projects at early stages of development and the licensing phase. According to Karzam (2011) as sustainable construction is not compulsory in Palestine, authorities should provide economic incentives that include tax reduction on green building related goods, and encourage easy availability of finance; the private-sector should provide incentives such as discounts on green buildings' insurance fees, and give preference to green buildings housing loans. High interest rates are a lead obstacle in promoting sustainable development, and banks may restrict loan facilities for such projects, especially when any predicted gains may not come to fruition (Yaseen, 2008). Enshassi and Mayer (2005) agreed with Karzam (2011) and confirmed that sustainable construction should be a natural result of legislation and sustainable development. A lot could be achieved by integrating the sustainable concept into management systems including planning and design, and action must include long-term structural change in policy frameworks, market incentives, technologies and legislation. Authorities should form new codes to protect the industry. 88.5 % of the questionnaire participants think that there are no clear regulations to protect national products and thus enhance a sustainable materials industry.

An interesting finding of the study is that the third barrier for implementing sustainable construction is markets, which conforms with Williams and Dair's (2007) work that identified the lack of demand by clients as a commonly recognised barrier for implementing sustainable construction. People in Palestine are not familiar with green architecture, and not aware of its benefits. The importance of "doing the right thing" as a motivator for green building is not common, as sustainable behavioural patterns are a long way from being achieved. "Doing the right thing" may explain why the green building market has matured internationally, and has become more visible and standard in some countries; market-driven factors may have supplanted the early-adopter vision as a trigger for choosing sustainable construction (Benjamin, 2016).

A further problem related to market, is the availability of sustainable materials. Locally manufactured green building materials are very limited, and successful projects usually need products to be imported from elsewhere (Osaily, 2010). There is industry dependence on using natural unrennewable resources such as natural stone, and quarries and stone crushers are scattered all over Palestine. These pose environmental threats in many ways: the uprooting of vegetation which leads to a sharp decline in pastoral and agricultural area, and

impeded biodiversity including in surrounding areas, as has happened in Seir, which contains more than 30 species of rare plants threatened with extinction as a result of quarries. Quarrying is also changing the topographic features of land by making huge cavities, with depths varying from 10 to 40 meters, causing a distortion of the landscape of the earth. There can be weak compliance with occupational health and safety matters in these quarries (Wafa, 2011), and consequently there is a threat of collapse to surrounding houses. The survey also showed that 86% of the sample think that there is too little interest or demand for sustainable construction by both clients and designers. There is belief that green labelled products are used for marketing reasons more than for environmental conditions. Also, most developers think that there is absence of distributors and importers for the sustainable materials, in addition to restrictions and obstacles imposed on importing materials, including high import taxes. 83.7% of participants expressed the view that Palestine local raw materials are not able to support the construction of green buildings. Environmental alternatives are often unavailable or substantially more expensive than in other countries. There are no strong regulations to protect local products.

That leads directly to the fourth barrier (people impact), as there is a lack of awareness of sustainable construction, which accords with the findings of Häkkinen and Belloni (2011). There are no live examples for green houses or “demonstration projects”, and people are still not familiar with the idea of green buildings and sustainability. Every new idea is challenging in the beginning, but as communities realise benefits they may become established. Karzam (2012) argued that unfortunately, the Palestinian community are not aware of the necessity and importance of developing green architecture, which has the potential to make a significant contribution to economic growth. 76.7% of participants believe there is an absence of sustainability culture and there is resistance to change. Palestinian society is very cautious and there is a clear reluctance by all parties to try new ideas, and thus avoid risks. There is too little evidential data about capital and running costs associated with environmental improvements, and hence clients, developers and other organisations can be reluctant to invest.

Time barrier was the fifth in the study list, and scored 69%. Time barriers were: weak time planning skills; time for training workforce; time risk in providing sustainable materials as they are not readily available, and; a lack of exemplar buildings in Palestine, that facilitate templates to prepare accurate plans. It can be argued that time constraints can be overcome if there is careful planning.

The effect of technical barriers is ranked as the sixth barrier. There is a lack of technology implementation, and a lack of trust in technology which perhaps derives from too little experience. Rydin et al (2006) asserted that designers and developers in the construction industry are not confident in their own knowledge about sustainable construction. Whilst the availability of technical information on sustainable construction is substantial for designers, contractors responsible for implementing designs, have problems gaining access to such information at an affordable rate (Osaily, 2010). Construction industry leaders are not open to admit that there is shortage of experiences and skills related to technologies in sustainable construction in Palestine. Inadequate professional training among engineers on new applications and schemes in sustainable construction and green architecture is also an obstacle. The results suggest that technological capability in both human, institutional and other resource terms is relatively weak.

Surprisingly, cost turned out to be the last barrier, which contradicts literature sources that suggest high influence of financial barriers e.g. Häkkinen and Belloni, 2011; Nelms et al, 2005; and Hydes and Creech, 2000. The survey identified fear of higher investment costs, ignorance of lifecycle costs, lack of financial resources and dependence on external funds, absenteeism of local currency, risks in exchange rates as more than one currency is used, and finally the financial investment in building up capacities to provide sustainable materials. The additional financial cost of sustainability of construction has been cited by many researchers as being a major barrier to the realisation of sustainable construction (Ofori et al, 2015), though it is documented that the long-term benefits are worth initial increases in investment (Safadi, 2016). Since there are limited initial budgets available to clients, sustainability implementation may lead to an increase in construction costs in the short term. 80% of participants believe that financial barriers are an important obstacle halting sustainable construction development. It is also relevant that there is an important socio-economic barrier, which is the low income of the families in Palestine, which makes them unable to cover the initial cost of green homes. In addition, most large construction projects depend on international funding with many constraints imposed on budgets, so designers often need to focus on achieving the function of buildings with available limited means. There is also a reluctance from funders to adopt innovative technologies, due to high risks in politically unstable conditions. The need to import sustainable materials makes cost predictability uncertain, and there is an issue in procurement systems over which parties to contracts accept price volatility movements as work progresses on sites. If contractors are asked to accept risks, this may lead to very high tender bids. Palestine does not have its own currency, and uses alternatively the Jordanian Dinar, Israeli Shekel and US Dollar. Contractors deal with different currencies under the same contract, and may get paid in one currency and have expenditure in another. There can be rapid fluctuation in exchange rates, which is in addition to delays in payments by funders, can impose risks that money loses its value over time.

5. CONCLUSIONS

Incentives to enhance green buildings in Palestine are inadequate. Regulations do not insist on higher standards of building design and construction, which leads developers to produce buildings at the lowest price and in the shortest time possible. It is noticeable in the survey and interviews responses that apparently, the education and raising awareness of the necessity of green architecture would achieve improvement in the building culture in Palestine; authorities should start working on an environment education movement by funding educational initiatives in this sector. Another important role for authorities is to set clear mandatory regulations and update building laws in Palestine, and introduce energy-efficiency regulations and code changes so that market demand can be created.

To support successful implementation of sustainable construction, authorities with the help of construction industry stakeholders, should formulate training courses, discussions, seminars, campaigns and workshops. Developers should include sustainability credentials in their design briefs and authorities need to consider introducing financial incentives. The environment for constructing green buildings should be enabled, to successfully start sustainable construction and promote construction sustainability for the benefit of the society at large.

There may be a perception amongst some officials that sustainable development is only for rich people, and is not an aspiration that most Palestinian people can aim for; that needs to

change, since sustainability is key to a prosperous future for all. There is desperate need to find solutions to the energy crisis and enhance green architecture, but given that Palestine continues to face many political challenges, it can be difficult for administrators to implement medium and long term initiatives, when there are always short term political issues that take priority. Never-the-less, it is important to pursue research in this area, in order that small windows of opportunity are grasped when sustainability choices do become available.

6. REFERENCES

- Ahn, Y. and Pearce, A. (2007) Green Construction: Contractor Experiences, Expectations, and Perceptions. *Journal of Green Building*.
- Aljazeera, 2014. Aljazeera.net. [Online] Available at: <http://www.aljazeera.net/news/ebusiness/2014/5/21/%D9%82%D8%B7%D8%A7%D8%B9-%D8%A7%D9%84%D9%83%D9%87%D8%B1%D8%A8%D8%A7%D8%A1-%D8%A8%D9%81%D9%84%D8%B3%D8%B7%D9%8A%D9%86-%D8%A3%D9%85%D8%A7%D9%85-%D8%AA%D8%AD%D8%AF%D9%8A%D8%A7%D8%AA-%D8%AC%D8%AF%D9%8A%D8%A9> [Accessed 27 June 2016].
- Al Sanad, S. Gale, A. and Edwards, R. Challenges of Sustainable Construction in Kuwait: Investigating level of Awareness of Kuwait Stakeholders. of Sustainable Construction in Kuwait: World Academy of Science, Engineering and Technology. *International Journal of Environmental, Chemical, Ecological, Geological and Geophysical Engineering*. Vol 5, 201.
- Benjamin, H. 2016. LEED/ World Green Building Trends in 2016: Motivators and Obstacles. [Online] Available at: <http://www.usgbc.org/articles/world-green-building-trends-2016-motivators-and-obstacles> [Accessed 25 July 2016].
- Berit, S. 2010. Impact of Sustainability on Property Values , s.l.: University of Regensburge Germany.
- Brundtland, G. H. 1987. *Our Common Future*, Oslo: the United Nations.
- Chegut, A., Eichholtz, P and Kok, N. 2013. Supply, Demand and the Value of Green Buildings, California: Urban Studies Journal Limited.
- Cruikshanks, G. 2012. Motivation for Green Buildings. [Online] Available at: [http://www.ey.com/Publication/vwLUAssets/Motivation_for_Green_Buildings/\\$FILE/130304%20Inform%20Vol%203%204-7.pdf](http://www.ey.com/Publication/vwLUAssets/Motivation_for_Green_Buildings/$FILE/130304%20Inform%20Vol%203%204-7.pdf) [Accessed 22 July 2016].
- Enshassi, A. and Mayer, P.E. 2005. Barriers to the Application of Sustainable Construction in Palestine, London: Taylor and Francis Group
- Farrell, P. with Sherratt, F. and Richardson, A. 2016. *Writing Built Environment Dissertation and Projects. Practical Guidance and Examples*. 2nd ed. United Kingdom: Wiley Blackwell.
- Fuerst, F. and McAllister, P. (2010) “Green noise or green value? Measuring the price effects of environmental certification in commercial buildings”, *Real Estate Economics*, 39, 1, 46-69.
- Gundogan, H. 2012. Motivators and Barriers for Green Building Construction Market in Turkey. s.l.:s.n.
- Häkkinen, T. and Belloni, K. 2011. Barriers and Drivers for Sustainable Building. *Building Research and Information*, 39(April/ 2011), p. 239 – 255.
- Halas, R. 2016. Dunia Al Wattan. [Online] Available at: <http://pulpit.alwatanvoice.com/content/print/391499.html> [Accessed 10 August 2016].
- Hasan, H. A., 2011. Marginalized Green Homes in Palestine/ Wattan TV [Interview] (01 Dec 2011).
- Heerwagen, G. and Orians, H. 1993. Human, habitats and aesthetics. In S R Kellert and E O Wilson(Eds) *The Biophilia Hypothesis*. Washington DC: Island Press Shearwater Books.
- Heerwagen, J. 2000. *Green Buildings, Organizational Success and Occupant Productivity*, London: Building Research and Information.
- Hydes, K. and Creech, L. 2000. Reducing Mechanical Equipment Cost: The Economics of Green Design. *Building Research and Information*, 28(5/6), p. 403–407.
- IMEMC. 2007. IMEMC Agencies. [Online] Available at: <http://imemc.org/article/46460/> [Accessed 03 August 2016].
- Issac, J. Rishmawi, K. and Safar, A. 2004. *The Impact of Israeli's Unilateral Action on the Palestinian Environment*, Jearusalem: Applied Research Institute.
- Kaiser, F. and Scheuthle, H. (2003) (Tow Challenges to a Moral Extension of the Theory of Planned Behavior: Moral norm and Just World Beliefs in Conservationism) *Personality and Individual Differences*, vol 35, P1033-1048.
- Karzam, G. 2011. [Online] Available at: <http://www.maan-ctr.org/magazine/Archive/Issue36/topic4.php> [Accessed 13 August 2016].

- Karzam, G. 2016. Wattan/ Green Buildings as a Priority in Development Policies in Palestine. [Online] Available at: <http://www.wattan.tv/news/168923.html> [Accessed 22 July 2016].
- Kibert, C. J. 2007. Sustainable Construction; Green Building Design and Delivery. New York: John Wiley and Sons).
- Langdon, D. 2007. The cost and benefit of achieving green buildings, Sydney: Davis Langdon and Seah International.
- McGraw-Hill Construction. 2013. World green building trends: Business benefits driving new and retrofit market opportunities in over 60 countries. Bedford, MA: McGraw-Hill Construction.
- Nelms, C. Russel. A, D and Lence, B.J. 2005. Assessing the Performance of Sustainable Technologies for Building Projects. Canadian Journal for Civil Engineering, Volume 32, pp. 114-128.
- Ofori, A. Clinton, A and Kwame, A. 2015. Barriers to Successful Implementation of Sustainable Construction in Ghanaian Construction Industry. Ghana, Elsevier B.V.
- Osaily, N. 2010. The key Barriers to Implementing Sustainable Construction in West Bank –Palestine, UK: Robert Kennedy College / Zurich University of Wales .
- Robichaud, L. B. and Anantamula, V.S. 2011. Greening Project Management Practices for Sustainable Construction. Journal of Management in Engineering, 27(1/ Jan 2011), p. 48 – 57.
- Rydin, Y., Amjad, U., Moore, S., Nye, M. and Withaker, M. 2006. Sustainable Construction and Planning. The Academic Report. Centre for Environmental Policy and Governance, The LSE SusCon Project, London: London School of Economics.
- Safadi, F. A. 2016. [Interview] (09 July 2016).
- Salameh, W. 2012. Towards Sustainable Construction Systems Of External Walls Of Buildings In The West Bank Of Palestine. Nablus: An Najah National University.
- Trust, T. P. 2013. Beyond Aid: A Palestinian Private Sector Initiative for Investment, Growth and Employment, London: The Portland Trust.
- UNEP. 2009. Buildings and Climate Change, Paris: United Nations Environment Programme UNEP/ Sustainable Buildings & Climate Initiative.
- Wafa. 2011. Palestinian News and Info Agency. [Online] Available at: <http://www.wafainfo.ps/atemplate.aspx?id=3090> [Accessed 22 June 2016].
- Wattan, D. A., 2009. Dunia AL Wattan. [Online] Available at: <http://www.alwatanvoice.com/arabic/news/2009/04/08/136752.html> [Accessed 12 July 2016].
- Williams, K. and Dair, C. 2007. What is Stopping Sustainable Building in England? Barriers Experienced by Stakeholders in Delivering Sustainable Developments. Sustainable development, 15(3), pp. 135-147.
- Yamin, M. Z. 2015. EcoMENA. [Online] Available at: <http://www.ecomena.org/tag/energy-sector-in-palestine/> [Accessed 19 July 2016].
- Yaseen, B. 2008. Renewable Energy Applications in Palestine , Ramallah: Palestinian Energy and Environment Research Center (PEC) – Energy Authority Technical Department Director (PEC) .
- Yudelson, J. 2009. Green Building Through Integrated Design. 1st ed. New York: McGraw Hill.
- Zhang, X., Shen, L., Wu, Y. (2010) “Green strategy for gaining competitive advantage in housing development: a China study”, in: Journal of Cleaner Production, 19 (2011), 157-167.