

# The Benefits and Challenges of Green Business Practices in the Lebanese Construction Industry

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## Abstract

Growing awareness of environmental concerns, including the depletion of natural resources and the degradation of environmental quality, sparked the latter's interest. Green business concepts still have a shaky foundation, as seen by the wide range of definitions that can be found for them. The research relied on the survey approach to get data since it was well accepted that questionnaires were an effective way to gather data from many individuals. The sample included 181 respondents, including project managers, engineers, quantity surveyors, architects, and clients, who completed the survey, including those in Lebanon and those working outside the nation. The data was collected using google forms and then analyzed by the SPSS statistical tool to generate and analyze results.

Going green might be a massive opportunity for Lebanon, a country with a vast budget deficit and economic difficulties, as energy bills continue to climb. Although the green business concept has been pushed to help Lebanon's businesses preserve the environment, many companies are still unable to apply it to all aspects of their operations. Many companies in Lebanon are already preparing to implement the Green Business model, which is expected to happen shortly.

## INTRODUCTION

Growing awareness of environmental concerns, including the depletion of natural resources and the degradation of environmental quality, sparked the latter's interest. Green business concepts still have a shaky foundation, as seen by the wide range of definitions that can be found for them. It is also important to note that businesses worldwide haven't yet adopted and implemented green business practices, with noticeable variances in company adoption of "green" concepts in different nations. Another factor may be that going green is still primarily seen as an additional burden (in terms of cost increases or revenue losses), and a third may be due to cultural, political, and economic differences across the various countries, according to (Osobajo et al., 2020).

As described by (Opoku & Ahmed, 2014), a "green business" is an entity that adheres to eco-efficiency principles in its operations, strives to use renewable energy sources, and undertakes efforts to mitigate the harmful environmental effects of its operations. The construction industry consumes a large amount of natural resources and energy. Construction is one of the most polluting industries accounting for 30% of solid waste (Marichova, 2020). The negative environmental impacts of the construction sector have long been recognized, and governments have responded by adopting strict environmental regulations to limit environmental harm. Construction is likely to rise steadily in the coming decades. Factors driving the industry's growth include expanding populations in developing nations, the need

to modernize infrastructure globally, increasing residential development, and anticipated renewable energy and telecommunications expenditures.

## LITERATURE REVIEW

### Sustainability Concept

As defined by Alqadami et al. (2020), sustainability is a development that satisfies the demands of the current context without jeopardizing the capacity of future generations to meet their own needs. Ecological sustainability is concerned with preserving the planet's ecosystems for future generations. Ecological balance and judicious use of non-renewable natural resources are essential considerations. (Alqadami et al., 2020) said that, in the future, the economy would have a higher chance of sustaining itself, and society would be able to create more sustainable living options. For (Fathalizadeh et al., 2021), ensuring that present demand is met while maintaining future generations' possibilities and without harming the environment is crucial to every activity undertaken. There must be a balance between preserving today's resources and ensuring their availability for future generations. An organization's structure and policies must support the implementation of sustainable practices. Otherwise, it might be dangerous and should not be implemented until relevant research is completed. Even though (Fathalizadeh et al., 2021) emphasized the importance of sustainability, they did not consider the real-world issues that may arise when implementing their ideas.

### Sustainability Concept in Construction Industry

Constructions that are resource-efficient and ecologically responsible are classified as "sustainably constructed" (Onubi et al., 2020). To achieve long-term prosperity and a good standard of living, the construction sector can minimize its negative environmental effect while still fostering new economic prospects. To be sustainable, companies must strike a balance between using natural resources and preventing their decline. When it comes to depleting renewable resources and creating new ones, the construction sector takes a significant toll on both. One of the sectors that has had a detrimental influence on our environment is building, according to further research. The sustainability movement in the building sector has studied this empathetic consideration extensively, therefore reinforcing the significance of using environmentally friendly procedures. Sustainable building methods have a lower environmental effect than standard construction methods (Powmya & Abidin, 2014). There are several short- and long-term advantages to the construction industry's stakeholders if sustainable building methods are effectively embraced by the construction industry. Conventional building procedures are only geared upon maximizing the profit and happiness of the employer.

As a result, typical practices in the built environment treat the environment as insignificant, resulting in enormous environmental damage. Soil erosion, flooding, landslides, and other natural disasters are all caused by traditional building methods, and this has a severe influence on natural resources. As a result of using conventional building materials like cement, steel, rubble, and other raw materials, these materials have more embodied energy and contribute to global warming on a much bigger scale. The amount of energy used by conventional structures is also enormous, as is the amount of CO<sub>2</sub> emissions they contribute to. Most building methods assume that including sustainable solutions would raise the final

product's price, which will affect both the end-users and the market as a whole (Chin Yee et al., 2020). As a result of these worries, a small number of people in society have begun to publicize and debate environmental problems, and the difficulties that active and mass industries like manufacturing and building generate. To meet the industry's high demand for raw materials, a significant amount of air pollution has resulted from harvesting and transportation. The over-exploitation of these natural resources has also impacted the variety of life on Earth, including plants and other living things.

It takes a lot of energy to make, transport, and dispose of materials, which releases emissions that contribute to ozone depletion and global warming. As a further complication, building operations may create pain and disruption and exacerbate health conditions for employees and those living nearby. LEED (Leadership in Energy and Environmental Design) and the United States Green Building Council (USGBC) have been a part of the conversation about environmental degradation for a long time. Still, it wasn't until the past two decades that the real discussion started (USGBC). LEED asserts that sustainable building has a triple bottom line, which encompasses economic, social, and environmental issues (Abuzeinab et al., 2016; Khan et al., 2018). Construction expenses, job opportunities, and more are all addressed in the bottom line. The social component considers all the advantages and costs to all the individuals engaged in the construction project's life cycle, including design and construction phase participants, building end-users, and the communities and neighbourhoods around the structure. Earth management, effective use of energy and water, and air emissions are all examples of environmental impacts that should be considered while developing a sustainable environmental policy (Opoku & Ahmed, 2014; Osobajo et al., 2020). Despite these concerns and debates, sustainable techniques in the building sector have not yet been recognized or adopted. Understanding the obstacles that prevent the adoption of sustainable building techniques is essential. A large number of enterprises and employment are generated by the construction sector in any nation, according to Osobajo et al. (2020). Thus, the building sector must use sustainable methods to return the business's extraordinary results to the economy.

### **Green Business: Challenges and Practices**

According to a literature assessment on the subject, this industry's future (in terms of sustainability) is not looking good, as shown by the low level of awareness and lack of understanding among its stakeholders. In reality, in industrialized nations, the attention is mainly on the economic elements of sustainability, which is a similar image. Furthermore, the review found that lack of education and training on sustainable construction (SC), technologies, capacities, and, most importantly, policies for the development and successful implementation of sustainability practices are the main factors preventing the implementation of sustainability in the construction industry. It's widely accepted that the building sector has a long way to go before it can be considered sustainable; yet, it's essential to acquire a clear image of the existing situation as a starting point. To establish sustainability indicators in Spanish construction project management. (Khan et al., 2018) have done research based on risk management principles. According to the (Osobajo et al., 2020) study, a system was developed to identify an indicator for a project that encompassed all participants in the project's life cycle. Sustainable issues are being dealt with environmentally and socially responsible (Opoku & Ahmed, 2014).

As outlined in "Agenda for Sustainable Construction in Developing Countries," this document explained how to put these recommendations into practice at the local level via creating regional and national action plans. For starters, several roadblocks must be overcome before a more sustainable route may be taken. A study done by Khan et al. (2018) has been undertaken to accomplish the sustainable construction of structures. The goal of this study is to have a positive impact on the ongoing effort toward achieving sustainable development. Finally, that essay has recommended a basic, practical structure and tools aimed at aiding the creation of sustainable buildings and structures. Indicators and frameworks for sustainable development have existed for some time, according to (Opoku & Ahmed, 2014).

Research shows that if significant social and psychological hurdles are not addressed, environmental advances in building design and construction will continue to halt. Individual, organizational, and institutional obstacles are all levels of barriers that may be assessed using surveys. There are seven particular techniques: problem framing; demographic targeting; education, structural and incentive change; indemnification risk; green building standard upgrades; and tax reform. (Khan et al., 2018; Marichova, 2020) has developed a novel method for project feasibility studies that incorporate sustainable development ideas about China's building sector. They used a case study approach to conduct their research.

Researchers gathered feasibility study reports from various initiatives to get a sense of how well each project is working out. Besides these, the report also discusses factors affecting economic, social, and environmental well-being. It was also concluded that a transformation from a conventional approach to project feasibility studies to one that incorporates concepts of long-term sustainability is required. Oman's building industry has been surveyed by (Chin Yee et al., 2020) to understand better the progress and challenges of implementing green construction in Oman. The two most important factors were insufficient demand for green building and a lack of government push. Even if many more efforts are needed, the authors have concluded that the government must play a significant role in developing green buildings.

## **METHOD**

The research relied on the survey approach to get data since it was well accepted that questionnaires were an effective way to gather data from many individuals interested in the issue under study. Since emails and social media are more efficient than other forms of distribution, we used them to distribute the online survey. Anyone with internet access could take their valuable time to complete the survey without hassle, and the survey's distribution was both cheaper and more environmentally friendly. The questionnaire was designed into three sections covering the benefits of sustainable constructions, environmental aspects and challenges to sustainable constructions. The participants in this study were chosen using a non-probability selection approach. The sample included 181 respondents, including project managers, engineers, quantity surveyors, architects, and clients, who completed the survey, including those in Lebanon and those working outside the nation. The data was collected using google forms and then analyzed by the SPSS statistical tool to generate and analyze results.

## Pilot Study

A pilot study is a preliminary test done to see whether the questions in the questionnaire are simple. Pilot study results were not analyzed since they were not linked to the fundamental values of this particular study. When conducting pilot research, be sure to gauge the significance, difficulty, and overall interest of the study's participants by asking various questions. It is also important to note that they examine the flow of the questionnaire and how it relates to the respondent's interests and mental health. The questionnaire for this study was tested and validated by three Lebanese construction industry experts in a pilot study. However, the pilot study results were not analyzed since they were not linked to the essential values of this particular research.

## Data Analysis

The collected data were analyzed using SPSS statistical software, and the results were presented in the form of descriptive and inferential statistics. Variables and data are the two main elements of SPSS. Different variables may be found in the variable feature, whereas the data feature helps gather data. SPSS is used to gather data from surveys and display that data in terms of descriptive statistics, regression analysis, and validity and reliability analysis

## RESULTS AND DISCUSSION

### Results

The following section will address the descriptive statistics for the three variables: benefits of sustainable constructions, environmental aspects, and challenges of sustainable constructions.

### Benefits of Sustainable Constructions in Lebanon

The study sought to determine the benefits derived from sustainable constructions in Lebanon. To determine the benefits, the researcher employed descriptive statistics for four variables with a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly

**Table 1 Benefits of Sustainable Construction in Lebanon**

	N	Minimum	Maximum	Mean	Std. Deviation
Minimizing Construction Costs	181	1	5	4.55	.951
Being Competitive on Project Bids	181	1	5	4.20	.970
Minimizing the Environmental Damage	181	1	5	4.40	1.047
Valid N (listwise)	181				

Agree).

*Source: Author Work*

The following results aimed to address the benefits of sustainable construction in Lebanon, and the results will be reported as follows:

For the statements questioning the benefits of sustainable constructions, the respondents replied as agree. They stated that "Minimizing Construction Costs" is one of the

essential benefits of conducting sustainable constructions in Lebanon and going green, and it scored a mean of 4.55.

However, employees agreed with preference to the statement "Being Competitive on Project Bids". They considered one of the main benefits of going green in the construction sector since it will give the company the priority to increase business without damaging the environment. This statement scored a mean of 4.20.

The respondents replied by agreeing to the statement "Minimizing the Environmental Damage" since it scored 4.20, meaning that if the construction sector in Lebanon decided to go green, this would benefit the environment by reducing waste.

### Environmental Aspects

**Table 2 Environmental Aspects**

	N	Minimum	Maximum	Mean	Std. Deviation
Air Cleanliness is affected by construction activities	181	1	5	4.22	.777
The water cleanliness is affected by construction activities	181	1	5	4.19	.829
There is a high level of electricity consumption at the construction site	181	1	5	4.11	.912
The construction waste is damaging the environment	181	1	5	4.14	.973
Valid N (listwise)	181				

*Source: Author Work*

Referring to the above descriptive statistics, which aim to measure the environmental aspects of implementing green practices in the construction industry, the results stated that the employees agree that construction activities tend to impact air cleanliness and that the electricity consumption at the construction site is more than required and that the waste problem in the construction sector is damaging the environment very badly. It can be noted that the means of this variable ranged from 4.11 to 4.22, which falls under the agreed scale.

### Challenges to sustainable constructions and practices in Lebanon Descriptive Statistics:

**Table 3 Challenges Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
Region is not favorable to sustainability	181	1	5	4.79	1.049
The economic situation of the company is not enough to consider sustainability	181	1	5	4.92	1.027

Employees do not want to change	181	1	5	4.75	1.110
There are not enough resources and infrastructure to go green	181	1	5	5.29	1.103
Valid N (listwise)	181				

**Source:** Author Work

The above table represents the descriptive statistics of the questions related to Lebanon's challenges to sustainable constructions and practices. It can be noticed that the number of respondents that replied to the questionnaire is 181 respondents, and all of them have answered the questions based on a scale of 1 "Strongly Disagree" to 5 "Strongly Agree". It can be noticed that each statement had a different mean, and the analysis will be explained deeply as follows:

Most of the respondents replied to the statement that "Region is not favourable to sustainability" since it scored a mean of 4.79, which falls into the agreed category according to the used scale in this research. This means that most of the employees stated that the region is one of the most critical factors to ensure sustainability in terms of construction.

The respondents scored a 4.92 on the statement "Economic situation of the company is not enough to consider sustainability", and it falls into the agreed scale. The respondents stated that not only the economic situation of the company is necessary to ensure green practices and sustainability, but also many other factors should be taken into consideration.

The respondents stated that "Employees do not want to change" and agreed and scored a mean of 4.75. This means that employees' willingness to change and implement green practices in the construction field is one of the most critical factors to having sustainable green business in the construction sector in the long run.

At last, the respondents responded by Strongly Agree to the statement "There are not enough resources to go green" since it scored a mean of 5.29, falling into the Strongly Agree scale. Due to the absence of construction plans and technological infrastructure in the construction sector, many construction companies cannot go green.

## Regression

**Table 4 Regression Analysis**

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.880 <sup>a</sup>	.774	.772	.292

a. Predictors: (Constant), Information Quality, E-Service Quality, Perceived Usefulness, Intention to Use and Patient Satisfaction

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.749	.074		10.098	.000
	Benefits of Sustainable Constructions	.241	.031	.194	7.800	.000
	Environmental Aspects	.736	.020	.870	36.927	.000
	Challenges of Sustainable Constructions	.371	.048	-.347	7.7291	.045

a. Dependent Variable: Sustainability

Source: Author Work

The regression analysis was conducted to test the relationship between the variables and validate the research hypotheses based on a margin error of 5%. It can be noticed that the benefits of green practices (0.000), Environmental Aspects (0.00), and Challenges (0.045) are significant since they scored a level lower than 0.05. This means that the alternative hypotheses are accepted, and the null hypotheses are rejected.

$$Y = A + BX1 + BX2 + BX3$$

$$\text{Sustainability} = 0.000 + 0.194 \text{ Benefits} + 0.870 \text{ Environmental Aspects} - 0.347 \text{ Challenges}$$

This means that:

- For every 1 unit increase in benefits in sustainable constructions, sustainability will increase by 19.4 units.
- For every 1 unit increase in Environmental Aspects, sustainability will increase by 87 units.
- For every 1 unit increase in challenges, sustainability will decrease by 34.7 units.

**Validity and Reliability**

**Table 5 Validity and Reliability**

	Component Cronbach Alpha
Benefits	.794
Environmental	.873
Challenges	.887
Sustainability	.889

Source: Author Work

The validity and reliability analysis had been implemented to test whether the data collected is valid or not based on an indicator called Cronbach Alpha. Suppose the Cronbach Alpha is below 0.5. In that case, the data collected is not valid and reliable. If the Cronbach Alpha is between 0.5 and 0.7, the data is valid but contains bias. If the Cronbach Alpha is higher than 0.7, the collected data is valid reliable. The following results can be maintained from the above table:



- The benefits of sustainability are valid since it scored a Cronbach Alpha of 0.794
- Environmental Aspects is valid since it scored a Cronbach Alpha of 0.873
- Challenges of Sustainability is valid since it scored a Cronbach Alpha of 0.887
- Sustainability and Green practices are valid since it scored a Cronbach Alpha of 0.889

This means that all the above variables are valid and reliable for data analysis

## **Discussion**

Going green might be a massive opportunity for Lebanon, a country with a vast budget deficit and economic difficulties, as energy bills continue to climb. Although the green business concept has been pushed to help Lebanon's businesses preserve the environment, many companies are still unable to apply it to all aspects of their operations. Many companies in Lebanon are already preparing to implement the Green Business model, which is expected to happen shortly.

Several green projects have been established by real estate and construction enterprises in Lebanon. Since Lebanon's deforestation continues to increase, some real estate companies opted to invest in a luxury resort project with three guiding themes: luxury, "green," and water, all of which are environmentally friendly such as installing energy-saving LED lighting in their workplaces, and they are continually training and inspiring their employees to practice energy and water conservation. Some Lebanese real estate companies also installed retractable solar screens and low double glazing to minimize the heating and cooling loads, resulting in lower energy and fuel consumption in the building.

According to the research findings, creating environmentally-friendly structures may be costly soon since photovoltaic systems, new appliances, and advanced technology are typically more expensive. Depending on the systems' sophistication, the cost of a Green Building concept can range between 0% and 20% more than traditional construction. Nevertheless, while most green buildings cost an additional 2%, they generate ten times as much throughout the building's life. The financial savings come from more efficient utility usage, which results in lower energy costs. Going green can reduce monthly utility costs by implementing a solar power system and lowering paper consumption.

Additionally, businesses will need to install solar panels due to the conversion to solar power. Going green can save money in the long run, but it doesn't necessarily make up for the initial outlay. As a result, some eco-friendly equipment and materials can be highly costly for some customers.

## **Recommendation**

The research aimed to determine the most significant issues with adopting sustainable practices in Lebanon's building industry. Sustainable builds in Lebanon have been shown to lower project costs, enhance competitiveness, minimize the environmental effect, and increase customer satisfaction. A further investigation of Lebanon's sustainable constructions found that the company's economic status, waste management, air quality and lack of markets were among the six major obstacles confronting Lebanon's sustainable constructions. Due to a lack

of sufficient education and awareness, building professionals and stakeholders in Lebanon are keen to apply sustainable construction techniques. As a result, the study recommends that construction companies and the government give their employees additional training and awareness programs to educate them on sustainable practices better.

It is recommended that the government of Lebanon reassess and revise national policy by developing a financial incentive plan for green development, creating new laws, and so on. Just a few construction companies in Lebanon have adopted sustainability principles. According to findings from the literature, construction companies should reexamine and revise their organizational policies to better reflect the sustainability movement. Studies show that material makers should make efforts to create their goods in a less harmful way to the environment. In addition, they should keep an eye on how much energy is incorporated into their building materials. Such inventive ideas may be compensated financially by the government, such as tax breaks. However, as this study merely looked at the issues facing Lebanon's sustainable building sector, it is possible that future studies could uncover answers and methods for overcoming these obstacles.

## CONCLUSION

When it comes to green business practices in the construction industry in Lebanon, this study aims to show what kinds of green initiatives have been put in place, how successful these efforts have been, and what types of problems have been encountered during this process. This study's conclusions revealed that the construction industry is held to various standards for practicing environmental friendly business. Green business practices in the construction industry can have significant inferential consequences, as the findings in this study show. To sum up, the owner who was interviewed most frequently emphasized the competitive advantages of environmentally friendly businesses and cost/benefit advantages. Adding to the present literature, this study examines green business strategies globally, focusing on Lebanon. Our findings are consistent with the results of other researchers in green business practices (Abuzeinab et al., 2016; Chin Yee et al., 2020). Finally, an organization's financial condition and performance can only be improved if management recognizes and understands the significance of adopting environmentally friendly business practices.

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