ENVIRONMENTAL SUSTAINABILITY AND ITS IMPACT ON THE UK CONSTRUCTION INDUSTRY

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Chapter 1: Introduction

Introduction

To enhance sustainability in the business operations, organisations of modern era try to use renewable energy for reducing air pollution. It is found out that, due to lack of natural resources, the operations of the organization leave negative impacts on the environment. In this context, the construction industry needs to be careful, and they should focus on the green construction project for enhancing the sustainability of the organisations. It helps to reduce the negative impact on the environment. Hence, in this chapter, an overview of the topic will be included along with a reason or problem statement for conducting the research. Aim and objectives will be set for efficiently completing the study. Significance and structure of the dissertation have been elaborated for understanding the effectiveness of the study.

Overview of the topic

As per the viewpoint of Wong & Zhou (2015), modern civilisation reflects the excessive use of advanced technology, and in turn, it creates the environmental issue. As the number of businesses and factories are increasing, these damages the environment by creating pollution. In the past decades, the organisations do not use eco-friendly technologies in the venture, and as a result, it reduces the ecological balance and changes the climate. It is noticed that deforestation, development of greenhouse gases and reduction in natural resources, lead to climate change, which is harmful to the people to lead a healthy life. In addition to this, Singh et al. (2016) stated that healthy living policy could be achieved by enhancing environmental sustainability. In addition to this, the UN Environment Commission explains sustainable development for appropriately fulfilling the sustainability needs. The main three pillars of sustainability are social development, economic development and environmental protection. Therefore, it can be stated that if organisations use eco-friendly products for construction purpose, it can easily protect the environment.

Therefore, in the case of the construction industry, in previous days, the workers did not maintain the environmental sustainability. As a result, due to the reduction of natural resources, it leaves a negative impact on the climate. Sustainable Development Commission of UK tries to follow the plan, and their motto is to reduce 80% of carbon emission so that they can enhance

environmental sustainability. Therefore, it can be stated that the construction industry should maintain environmental sustainability in a time of building construction so that people can lead a healthy life.

Reason for conducting the research/rationale

In the opinion of Khatib (2016), the main issues that ruin the environmental sustainability are deforestation, increasing increase in the level of greenhouse gases and depletion of natural sources. It is common that an increase in the advancement of technologies has developed their use in the modern day enterprise, which can create pollution in the environment. For example, many organisations are there who use chlorofluorocarbons as refrigerant, which is non-toxic and harmful to the environment. In addition to this, in the construction industry, various building purposes and activities are there, which add up to the elements that harm the environment such as lack of using electronic smart glass, solar power and many others. It is harmful to the environment. On the other hand, deforestation is increasing due to heavy construction in urban as well as rural areas. Air pollution has been an age-old matter of concern for mankind. As per the report of parliament, around 16% of current human beings are involved in carbon emission related activities (parliament.uk, 2019). It creates different diseases such as cancer, and as a result, the life span of people is also decreased day by day.

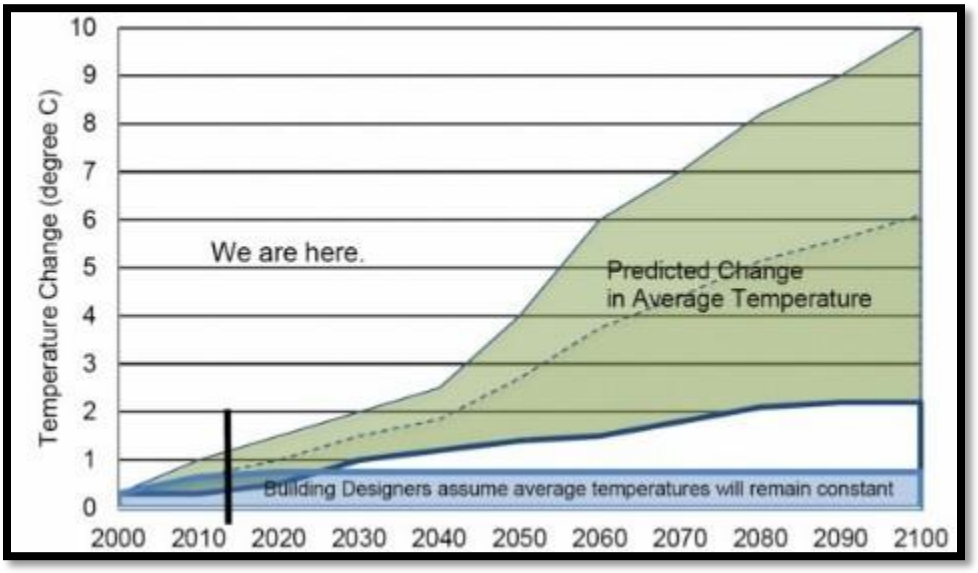

Figure 1: Temperature changes for lack of environmental sustainability

(Source: Influenced by Owusu & Asumadu-Sarkodie, 2016)

In case of the construction industry, as per the report of Guardian, it is found out that due to climate change, house builders face huge challenges for conducting their project. Raw materials for construction cannot be supplied due to bad weather. For example, in the rainy season, the construction project cannot be completed. Therefore, the government of the UK has set a goal of reducing 80% carbon emission within 2050 (theguardian.com, 2011). However, if the construction industry does not use eco-friendly products for enhancing environmental sustainability, it can leave a negative impact on the environment.

Therefore, the reason for conducting the study is to analyse the importance of using sustainable methods in construction. It is also the corporate responsibility of the ventures under construction industry. As people of the UK are consciously related to the environment, it will try to examine the efficiency of employees under the construction industry in a time of creating the building plan and construction process. It will also try to provide an idea related to the usage of sustainable products and technologies in the construction industry so that the UK government can achieve its goal related to environmental sustainability.

Research aim

The study aims to analyse the importance of maintaining environmental sustainability in a time of starting a construction project in the UK.

Research objectives and questions

Research objectives

- To analyse the opinion of UK construction industry related to the environmentally conscious construction project
- To examine the impact of following environmentally sustainable construction method for achieving the goal government related to sustainability
- To give idea related to the pros and cons for maintaining environmental sustainability in a time of building construction
- To analyse the benefits of companies under the construction industry for constructing the building or bridge in an environmentally sustainable manner
- To provide a recommendation, which can ensure in future that environmental sustainability is the main thing that needs to be followed in the time of construction work

Research questions

- Has the concept of environmental sustainability had an impact on building techniques in the UK?
- What are the differences between traditional methods and environmentally conscious methods of construction and do they have an impact on reducing climate change?
- What are the advantages and disadvantages of building in a more environmentally sustainable way?
- What is the government's role on the impact of environmental sustainability in the construction industry in the UK?
- Are there incentives for companies to consider building in an environmentally sustainable way?
- What recommendations can be made in the future to ensure that environmental sustainability becomes one of the main considerations when constructing a building or a road or bridge?

Significance of the study

Importance of maintaining environmental sustainability is found out through the study, and it is the main significance of the paper. In addition to this, the necessity of maintaining environmental sustainability is also elaborated throughout the study. Consciousness among people is needed for leading a healthy life in a contemporary environment. In this context, using this study material, people would be able to enhance their knowledge of environmental sustainability. They also get an idea related to activities of the construction industry for increasing environmental sustainability.

Structure of the dissertation

Chapter 1: Introduction	This chapter is focused on the overview of the topic related to environmental sustainability in regards to the construction industry. In addition to this, it is also focused on the activities of the construction industry that can create a barrier for enhancing environmental sustainability. Reason for conducting this study is also mentioned along with its issue. At the end, the

	significance of this study is also elaborated efficiently.
Chapter 2: Literature review	In this chapter, the basic perception of environmental sustainability is elaborated. After that, the necessity of following sustainable construction method is also discussed. Advantages and disadvantages of following environmental sustainable construction method are also examined in this chapter. Strategies for promoting sustainable environmental methods in a construction project are also negotiated. In the end, the gap of the literature is found out.
Chapter 3: Methodology	In this chapter, the clear outline is given, based on which; the data collection part will be conducted. It is found out that quantitative and qualitative both methods will be used so that the research can be completed efficiently. Using survey monkey, a survey among employees of the construction industry will be conducted, and interview will also be taken. Secondary data from eminent journals and books will be gathered. It will help to understand the importance of following an environmentally sustainable method for construction.
Chapter 4: Data findings and analysis	In this chapter, survey and interview of employees will be conducted, and the result will be found out. In the case of primary data collection, statistical analysis will be done, and in a secondary method, the thematic analysis

	will be followed.
Chapter 5: Conclusion and recommendation	At the last chapter, the conclusion will be drawn. The recommendation will be included so that environmental sustainability in the UK can be increased in future. Objective linking will be conducted, and future scope will be discussed efficiently.

Table 1: Structure of the Dissertation

(Source: Created by the learner)

Summary

To sum up the study, it can be deduced that organisations under the construction industry should follow sustainable construction method for getting the fruitful outcome for the environment. Reason for this research is mentioned. It is noticed that due to climate change, economic downfall in this industry is noticed. Therefore, the impact of environmental sustainability on construction is examined for getting the fruitful outcome. Aim and objectives are set along with the significance of the study are also mentioned in an appropriate manner. Thus, the importance of following sustainable construction method is elaborated throughout the study.

Chapter 2: - Literature review

Introduction

A literature review gives an overview of studies conducted in the past on the chosen research topic. It consists of analytical descriptions of various concepts. This section shall portray the concept of environmental sustainability along with its requirements in the construction industry. These concepts will be reviewed critically to compare the opinions of different authors.

Concept of environmental sustainability

According to Bell & Morse (2012), sustainability is the practice to enhance the excellence of life within boundaries of the globe's capacity. It has three pillars, including social, economic, as well as the environment.

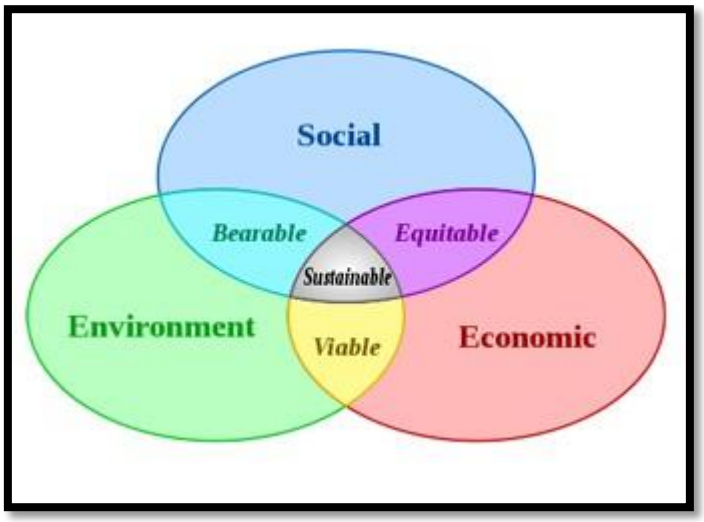

Figure 2: Pillars of sustainability

(Source: Thwink.org, 2019)

Social sustainability refers to an ability to build a social framework to operate at a level to maintain well-being as well as harmony. Economic sustainability is the practice to support an economy at the indefinite level. Moldan, Janoušková, & Hák (2012) stated that environmental sustainability is an ability to support natural resource extraction rate and environmental quality. It is important to have healthy communities, protect natural resources, and ensure a non-toxic environment.

IUCN or International Union for Conservation of Nature emphasises on the fact that production and consumption patterns are devastating at high rates. With the increase in population, the use

of natural resources, including coal, petroleum, minerals and others has increased. Environmental sustainability is the process of stabilising the disruptive relationship between complex systems of the earth, including the living world and human culture. Sustainability can have several forms such as identifying living conditions, improving economic sectors, developing new technologies, and making adjustment in lifestyles. The sole objective of environmental sustainability is to protect natural resources and develop alternative sources that can reduce harmful effects on the environment. Organisations are using environmentally sustainable practices to reduce wastage of resources. The first step to sustainability is reducing the use of goods that generate wastes. This is a precautionary method to reduce waste and ensure sustainability.

Figure 3: Sustainable practice

(Source: Thwink.org, 2019)

The second step is to re-use products wherever possible. Recycling waste materials is another sustainable practice that can reduce the volume of harmful components.

Need for environmentally sustainable construction

Environmentally sustainable construction is similar to the development of the green building. It is the application of environmentally responsible and resource-efficient methods in construction to ensure sustainability and efficiency of buildings. As depicted by Khatib (2016), sustainability context of construction demonstrates building operation, maintenance, repair, site design, and destruction with less damage to the environment. This process needs the close association of construction engineers, architects, and clients in the entire project. Such construction methods are durable and cost-effective. They aim to reduce impacts on the construction project on human

wealth and the environment. The central focus of sustainable construction is on the practical use of resources and energy, enhanced occupational health, water preservation, and reducing wastage and pollution.

Construction projects account for a total of 45% of carbon emission in the UK. Domestic and non-domestic buildings result in 27% & 18% of carbon emissions, respectively. Around 32 percentages of landfill waste products arise from construction projects (Designingbuildings.co.uk, 2019). It is found that 13% of products are sent to landfill without applying in construction areas. The construction industry is witnessing resurgence in growth for which it tends to have disadvantageous effects on the environment.

As per the Green Building Council of the United Kingdom, this sector uses materials more than 400 million tons of materials annually. Construction jobs influence the environment negatively due to the application of different raw materials at a higher rate. Tools, techniques and resources used by construction firms and workers can harm the environment and public health. The sector generates non-industrial waste amounted to 160 million tons. It contributes towards climate change, air and drinking water pollution, and others at different percentages (Designingbuildings.co.uk, 2019). It is estimated that emission from the construction of buildings is expected to increase by 1.8% by the end of 2050.

On the other hand, it is found that in the UK, the Government has taken the biggest imitative for the infrastructure of 34 new bridges (ukconstructionmedia.co.uk, 2018). As a result, the environment is getting highly affected by this type of construction project. As commented by Khatib (2016), it can be said that during any construction project, there can be huge chances of CO2 emission that leads to environmental pollution. Moreover, if the construction industry were not using reusable technologies, then the rate of environment pollution would be increased. Due to the burning of fossil fuel such as diesel and gas, the environment can be polluted.

Construction works should be designed in sustainable and efficient ways to reduce threatening effects on occupants and workers. According to Abolore (2012), the emission of dangerous radiance, substances, discharge of wastewater, and toxic gas can be a threat to the environment and hygiene of living beings. Therefore, sustainability is required to reduce air and drinking water pollution and increase the use of energy effectively, and reduce waste generation.

Traditional methods and environmentally conscious method of construction

Traditional methods of construction do not include any sustainable design and measures. There is no scope for preserving natural resources and wetlands. There are no arrangements done by companies to initiate an effective drainage system for wastewater in traditional methods of construction. They do not select construction materials carefully. As opined by Hardin & McCool (2015), environmentally conscious methods use solar power to preserve the sun's radiation for the requirement of electricity and heating provision in construction works. The installation cost of solar power is a bit higher, but it saves energy bills and reduces greenhouse emissions. The application of biodegradable materials is one of the eco-friendly ways to ensure sustainable construction process. As demonstrated by Bal et al. (2013), traditional methods result in accumulation of toxic chemicals and waste products along with these products take many years to degrade. These products contaminate and harm the environment after degradation. Therefore, modern construction methods use organic paints to limit negative, dangerous and harmful effects on the environment, as they can break without removal of toxic materials. The application of biodegradable materials for insulators, walls and building foundation is another element of sustainable construction technology.

Insulation is one of the major concerns among construction projects. Insulators are wall filters, and these do not require to be extracted from highly finished and expensive materials. Green insulation is a proven sustainable technology that reduces high-end products obtained from non-renewable products. It offers solutions by using used and old materials such as newspaper and denim. As depicted by Wong & Zhou (2015), a cool roof is another green design technology, which aims to reflect heat and transferring sunlight away. It keeps buildings and homes at standard room temperature by reducing heat absorption. Cool roofs have the capacity to lower temperature by fifty degree Celsius. Use of construction design materials from recycled and waste products is a part of the conscious method of construction. In most of the construction projects, agricultural by-products or wastes are used to ensure sustainability. According to Zhong & Wu (2015), construction of buildings and homes with wood can reduce energy consumption, as it has a reduced embodied energy as compared to buildings with concrete and steel.

In addition to this, at the time of construction work of the roads and bridges, the contraction companies use latest technologies. As a result, the sustainability of the environment can be affected.

Some construction companies use water efficiency technologies to make efficient use of water supply systems. Examples of such technologies are rainwater harvesting, dual plumbing, water conservation fixtures, greywater re-use and others. These methods are effective in managing water adequately and conserving water for the future generation. For instance, rainwater harvesting enables people to use water for multiple purposes and store for future uses. According to Berardi (2012), dual plumbing enhances the capacity of re-using water and reducing sewer traffic. In general, such methods help in water conservation and reduce water usage cost. As depicted by Zhang et al. (2014), Health and safety of occupants is a primary responsibility of organisations operating in the construction industry. Therefore, modern construction methods ensure green safety standards that include moisture resistance materials, non-toxic materials, and low-volatile emission. Materials from bamboo, wood, cork and other naturally resourced materials do not have irritating, carcinogenic and toxic effects for which they cannot pose any life-threatening effects on health.

Strategies to promote environmentally sustainable construction

The UK Government is carrying out proactive steps to promote sustainable construction and ensure development is going in the right direction. It has initiated some schemes and incentives to encourage sustainable development. Carbon emission performance of buildings has been set to a standard. Construction companies should oversee all health and safety issues that may occur in construction sites. Energy strategy formulated by the Government seeks to secure energy generation, support low-carbon and encourages using innovative technologies. Manufacturing and material programming respond to challenges of resource supply during construction works. Environmental legislation for the UK construction industry covers the primary and relevant types of directives that aim to attain sustainability. Energy performance of buildings or EPBD promotes the enhancement of energy performance in domestic and non-domestic properties. As depicted by Zuo et al. (2012), the Climate Change Act 2008 targets to reduce carbon emissions resulting from construction projects by 80% at the end of 2050. The Government has asked the construction industry to report progress in every five years.

As depicted by Abdellatif & Al-Shamma'a (2015), construction projects in the UK are bound to formulate a site waste management plan to help contractors in reducing construction waste and identifying the by-products, utilising recycled products and disposing of wastes effectively. On completion of a project, performance is examined against targets set in the plan. This encourages

contractors to develop a portfolio for improvements in future projects to be carried out in the future. The Government assesses environmental impacts to determine the negative impacts of intended construction projects.

Advantages of environmentally sustainable construction

Advantages of sustainable and green construction are classified into three categories, including social, economic as well as the environment. It generates its sources of energy and increases biodiversity. It has the highest potential for decreasing greenhouse emission. This emission reducing potential can be 84 gigatonnes by 2050 through certain measures including exploit of renewable energy, switching of fuels, and others. As opined by Coelho & De Brito (2012), green buildings have the potential to save energy by 50% and reduce global temperature. Sustainable buildings seek to minimise environmental impacts throughout the entire construction process. Additionally, they have other advantages concerning economic, energy, health, cost and material efficiency. They have distinctive design and construction features, which make them significantly efficient. They are capable of conserving water, energy and other resources. With features of having solar energy systems, buildings are featured to maximise natural lighting. Sustainable buildings help in reducing water waste with advanced features of rainwater collection systems and water-efficient plumbing systems.

People living or working in sustainable buildings inhale improved air quality that provides the benefits of health and wellness. Some sustainable buildings are free from harmful toxic materials and cancer-causing substances that reduce threats of chronic diseases. Local communities surrounding green construction get the benefits of good air quality. Maintenance expense accounts for around 80% of total lifetime expenses of buildings. Embedding sustainable measures reduce cost and improve efficiency for firms falling under manufacturing sectors. Businesses can spend decreased maintenance cost in other areas such as product development, employee development and higher wages. According to GhaffarianHoseini et al. (2013), sustainable construction processes use eco-friendly materials without compromising quality, excellent, and design integrity of buildings. Green Building Council found from a survey that sustainable construction process was accountable for providing around 1.1 million employment opportunities in 2018. With the continuing adoption of sustainability approaches, more job opportunities will be opened for people. This implies sustainable construction accounts for economic efficiency by enhancing the livelihood of communities. Constructing building through

sustainable measures and green technologies, construction firms can enjoy a higher return on investment by selling at attractive prices.

Time management is a major issue seen during construction projects, and it causes project overrun. A major benefit of green or sustainable construction is that it improves utilisation of energy, building materials and water needed for projects, which shall minimise the time required to finish. Contractors or clients taking responsibility for green construction can save money through minimum usage of resources. As depicted by Yeheyis et al. (2013), green construction can be completed with the planned budget, as it does not require any adjustment during the execution stage of projects. Another advantage of sustainable construction is that it reduces the pressure of using local resources. Many countries are forced to make use of alternative energy sources to consider cleaner options. For instance, some companies use the solar panel on roofs to harvest energy. They do not depend on national grids to run different works. Therefore, sustainable construction works minimise the demand for non-renewable energy.

Disadvantages of environmentally sustainable construction

Air cooling feature is the major disadvantage of sustainable construction. Cooling components used for controlling indoor temperature of buildings do not exist. It influences natural ventilation, and this cannot be controlled. This may lead to air pollution and illness among people. As stated by GhaffarianHoseini et al. (2013), the requirement for workers with specific skill sets to install various components of sustainable construction may prevent companies from opting environmentally construction works. This happens due to the requirement of specialist help that could increase cost and dependency on sustainable materials.

Another limitation of sustainable construction is the unavailability of sustainable materials. As depicted by Coelho & De Brito (2012), contractors and clients worry about transportation cost, as green materials are not easily available. If clients require acquiring materials from outside, it may cost more, resulting in poor value. Sustainability objective cannot be achieved if it requires importing green materials from other countries, as shipping will use more energy. The key disadvantage of the sustainable construction project is the poor data concerning the durability of final work. As many contractors and clients do not know much about how long green buildings will stay protected, they will not take the risk of adopting the green methodology. Sustainable materials, methods and projects will be ignored, leading to the hindrance of innovation.

Summary

The section has portrayed overall concepts of sustainability by reflecting its three pillars. It is observed that environmentally sustainable construction is vital to protect the environment from resource depletion, pollution and other adverse effects. An overview of traditional and environmentally conscious methods used in construction has been discussed and reviewed. Advantages and limitations of such construction projects were critically evaluated to determine components adding value.

Literature Gap

The literature could have focused on aspects that enable businesses to carry out sustainable projects. It may consider unnoticed areas including durability, affordable materials and specialised labour force to ensure better output. These aspects are useful to add value in construction projects and bridge performance gap.

Chapter 2: Literature review

The study shall include the advantages and disadvantages of sustainable construction. It shall review articles on the role of Government on the impact of environmental sustainability in the UK. It shall identify if companies are getting incentives because of the emphasis on sustainable construction. Analysing all aspects of the environmentally sustainable construction process will identify a gap.

Chapter 3: Methodology

In this chapter, positivism philosophy, deductive approach, the descriptive design will be used. Current members of the construction industry will be considered as the population of research. Desk and questionnaire both methods will be followed. 79 sample sizes will be chosen, whereas 75 will be contractors and 4 will be clients. Survey Monkey will be used for gathering data. Using the Likert scale, data of close-ended question will be analysed. Open-ended questions will be asked to 4 clients of the construction industry. In the case of desk research, around 3 themes will be developed, and according to the themes, journals will be found out. Data Protection Act 1998 will be followed.

Chapter 4: data findings and analysis

In this chapter, data will be found out by conducting a survey and interview. For gathering data in a secondary purpose, journals will be collected. Statistical and thematic both analysis methods will be followed.

3 themes are-

1. To examine the importance of following environmental sustainability in the UK construction industry
2. The social-organisational effect on the impact of environmental sustainability in the UK construction industry
3. Limitation in the construction industry to follow environmental sustainability in the UK

Chapter 5: Conclusion and Recommendation

This section shall summarise all chapters by highlighting important points. It shall recommend on how to perform the project with the application of alternative methodologies. It shall review the objectives and findings to determine the link between them. Scope of the research in the academic context will be stated here.

Chapter 3: Research methodology

Introduction:

This chapter provides an overview of the entire methodology that has been followed by the researcher to conduct this research. The selected philosophy, along with the research approach, has been mentioned in this chapter. In addition to this, the strategy applied for collecting information regarding the "impact of environmental sustainability on the construction industry of the UK". The plan for data analysis has also been discussed here, along with the sampling technique and population. Applied research design and ethical considerations have also been highlighted here. Furthermore, the time plan of this research work has also presented in this section.

Research onion:

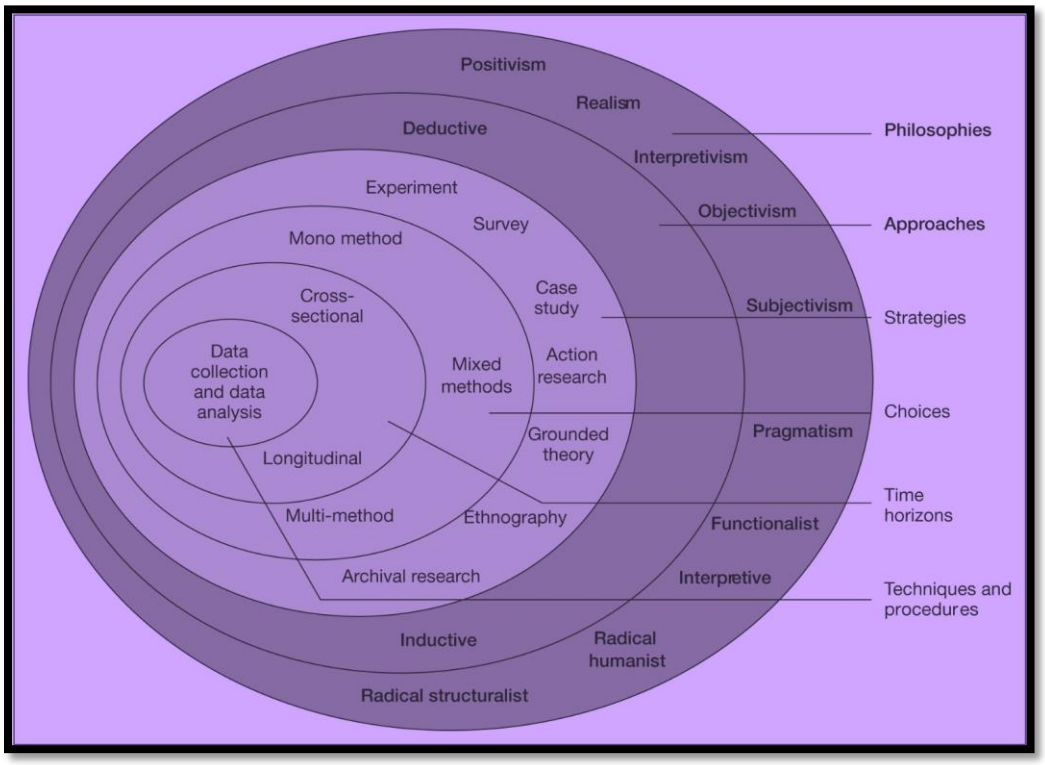

Figure 4: Research onion

(Source: Saunders, Lewis & Thornhill, 2009)

Research philosophy:

According to Mackey & Gass (2015), the philosophy of the research is of three types such as Interpretivism, realism and positivism, which can be used by researchers to implement their research work. Positivism indicates that the researcher has to present meaningful data sets for testing the hypothesis. On the other hand, Silverman (2016) argued that the researchers have to conduct observation to analyse research data if they are going to use Interpretivism. Realism is completely based on scientific enquiry. The experience of the researcher can be shared through this type of philosophy. Moreover, real-world experience can be included with the work by adopting this philosophy.

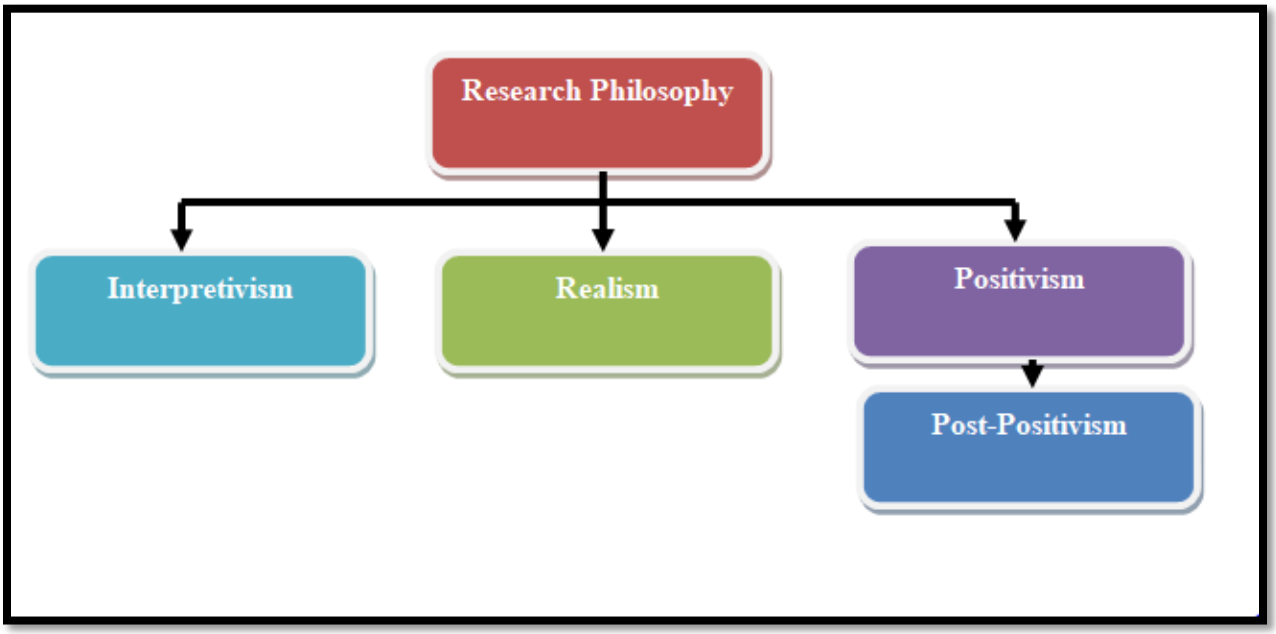

Figure 5: Philosophy

(Source: Mackey & Gass, 2015)

In the case of evaluating the influences of environmental sustainability, the researcher has selected ***positivism*** to make sure that the collected information is logically correct. At the time of this research, the research team that is indicating the authenticity of the result manipulates no resources. As commented by Flick (2015), it can be said that the highly structured feature of positivism enables researchers to analyse the large sample. Moreover, the statistical analysis of the gathered information sets related to the construction industry has been performed here. There is no need to do observation to collect data, and for this reason, realism or Interpretivism has not been considered here. All the research questions have been met by adopting the philosophy.

Scientific interpretation of the data regarding the advantages that that construction organisations are getting after using environmentally sustainable methods have been done here.

Research approach:

Alvesson & Sköldberg (2017) stated that researchers could choose any approach in between deductive and inductive to perform the work. For the inductive approach, it is needed to develop new theory and concepts by the research team instead of applying previous concepts. Theories are developed here to achieve the research objectives instead of developing a hypothesis.

The deductive approach can be helpful for the researchers to gather the necessary information from existing books and journals. At the time of working on this research, deductive approach is considered here to collect data from the available theoretical frameworks. There is no need to develop the concepts regarding the advantage and disadvantages of sustainable environment in case of the construction industry. According to Fletcher (2017), researchers can test the hypothesis by using a deductive approach.

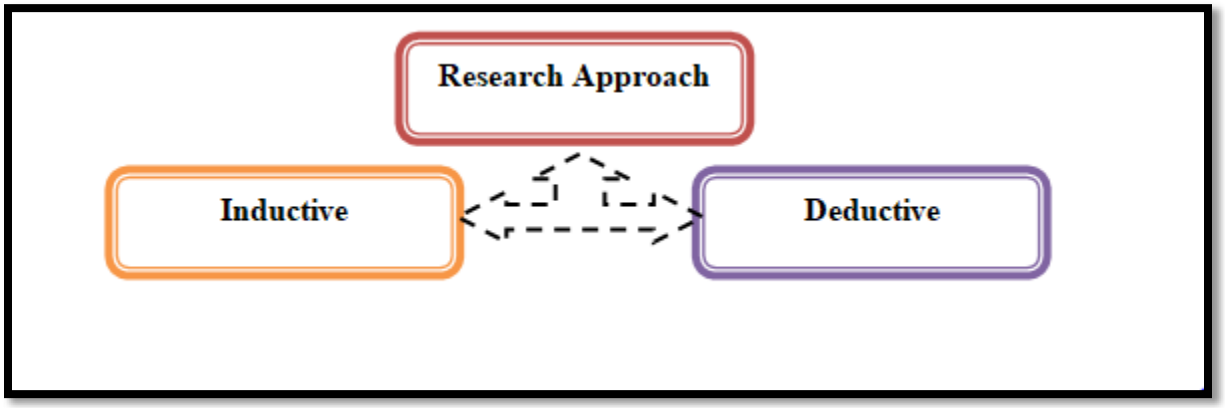

Figure 6: Research Approach

(Source: Alvesson & Sköldberg, 2017)

In the context of this research also, it can be seen that the research team to check whether these are valid has tested the developed hypothesis or not. After getting the result of the test, the hypothesis can be accepted or rejected. On the contrary, hypothesis testing could not be possible by adopting inducting method as this approach does not formulate hypothesis; rather, it only supports to form the research aim, objectives as well as questions.

Research design:

Explanatory, descriptive and exploratory are the research designs which can be applied by researchers to achieve their aim (Cuervo-Cazurra et al., 2017). In the case of exploratory design, the research teams can be able to "analyse background information" whereas the connection between cause and effect can be known by using Explanatory design. On the contrary, descriptive design helps to gather systemic information related to the research topic.

For getting the expected outcome from this research, "***descriptive research design***" has been selected. The positive and negative both the influences of the sustainable environment have been evaluated here by using descriptive design. There is more need for describing the happing rather than background information regarding environmental sustainability. Due to this reason, the descriptive design has been selected here rather than choosing the other designs. As suggested by Briggs & Coleman (2019), it can be said that descriptive design can be considered as a theory-based approach where the researchers can take help from previous concepts and discuss the cases. Different case examples of "the impact of the sustainable environment on construction industry" have been gathered and analysed in this study to get the expected outcome. The reasons behind these impacts, along with their results on the growth of the construction industry, have been discussed here with the help of this design.

Research strategy:

The survey, case study, interview as well as observation are the available strategy to conduct the research (King & Mackey, 2016). In the case of identifying the impacts of a sustainable environment, survey, as well as the interview, has been considered by the research team as a suitable research strategy. Contractors of UK are requested to participate in the survey whereas interview of the clients is taken.

Data collection techniques:

From the point of view of Dumay & Cai (2015), the researchers can collect data from primary and secondary sources based on the requirements of the research. In the case of this research, both secondary and primary data have been sued by the researcher. To analyse the point of views of contractors and clients of the construction industry regarding environmental sustainability, the primary data source is considered. In addition to this, theoretical concepts related to this topic

have been found from the secondary sources, including websites, books, and news articles along with journals.

Population and sampling:

According to Dumay & Cai (2015), the population has to be chosen by the research team to collect relevant information and proceed with the research work. As gathering data from a large population is difficult; hence, a sample size of 79 has been selected here by applying probability and non-probability random sampling techniques. 75 contractors, along with 4 clients, have been selected here to know about the sustainable environment from them. In order to collect survey data, the researcher has preferred to collect data by sending the questionnaire to the participants via email. All the participants have the right to skip any question if they do not want to answer it.

On the other hand, 3 themes have been developed by gathering quantitative data from secondary data sources. Books, authentic websites, journals and online articles have been considered here to collect and analyse secondary data.

Below mentioned criteria are the inclusion and exclusion criteria of the research papers:

- As commented by Hickson (2016), the publishing date of the research papers need to be after 2015. For this reason, the researcher has checked the publishing year while downloading the articles.
- None of the collected articles should contain any irrelevant information regarding within it.
- Every selected article are based on sustainable environment and its impact
- The researcher to ensure that the paper is useful for the work reads the introduction and abstract of the research papers.

After testing these criteria successfully, the researcher has approved the articles. Using several search engines such as searches all these papers:

- Yahoo
- Google

- Google scholar

Data analysis plan:

Quantitative and qualitative data analysis techniques can be used by the researchers to analyse the gathered information (Alvesson & Sköldberg, 2017). After collecting data from the survey, the research has prepared graphs and charts to analyse the information more clearly. Various statistical tools such as standard deviation, median as well as mean have been used here. On the contrary, the non-numeric data sets are known as qualitative data. For analysing qualitative data, the interview has been conducted for the clients, and they have been asked about the sustainability impact on the construction industry. These information sets have helped the researcher to evaluate the pros and cons of environmental sustainability while doing construction related work.

Ethical consideration:

Data Protection Act 1998 indicates that the research teams are responsible for protecting research information from any type of breach (legislation.gov.uk, 2019). In case if any of the research data is breached by the third party or shared by team members of the research group, then they will be punished. This research work has been conducted by arranging a survey for the participants and consent has been offered to the participants. All of the survey participants have been informed regarding the survey rules so that no chaotic situation occurred while collecting data.

As per the point of view of Smith (2015), it can be said that the participants should not encounter ant inequality among them while they are participating in the survey. Each and every contractor is given with equal respect by the researcher rather than considering their nationality or background or community. All research participants are given the right to leave the work whenever they want, and no one has the authority to stop them from leaving the research work.

On the other side, no research team should use data of any other research paper while they are conducting the work (McCusker & Gunaydin, 2015). In case if anyone does that they the work will be unethical. At the time of gathering secondary quantitative data, the researcher has acknowledged the previous scholars of the research papers, which are selected to gather information.

Time plan:

Activities	Start date	Duration	End date
Topic selection	13-05-2019	2	15-05-2019
Conducting literature review	15-05-2019	4	19-05-2019
Methodology	19-05-2019	6	25-05-2019
Data collection from Primary data source	25-05-2019	8	02-06-2019
Data collection from a secondary source	02-06-2019	10	12-06-2019
Analysing the data	12-06-2019	6	18-06-2019
Conclusion and Recommendation	18-06-2019	2	20-06-2019

Table 2: Work Breakdown Structure

(Source: Created by the learner)

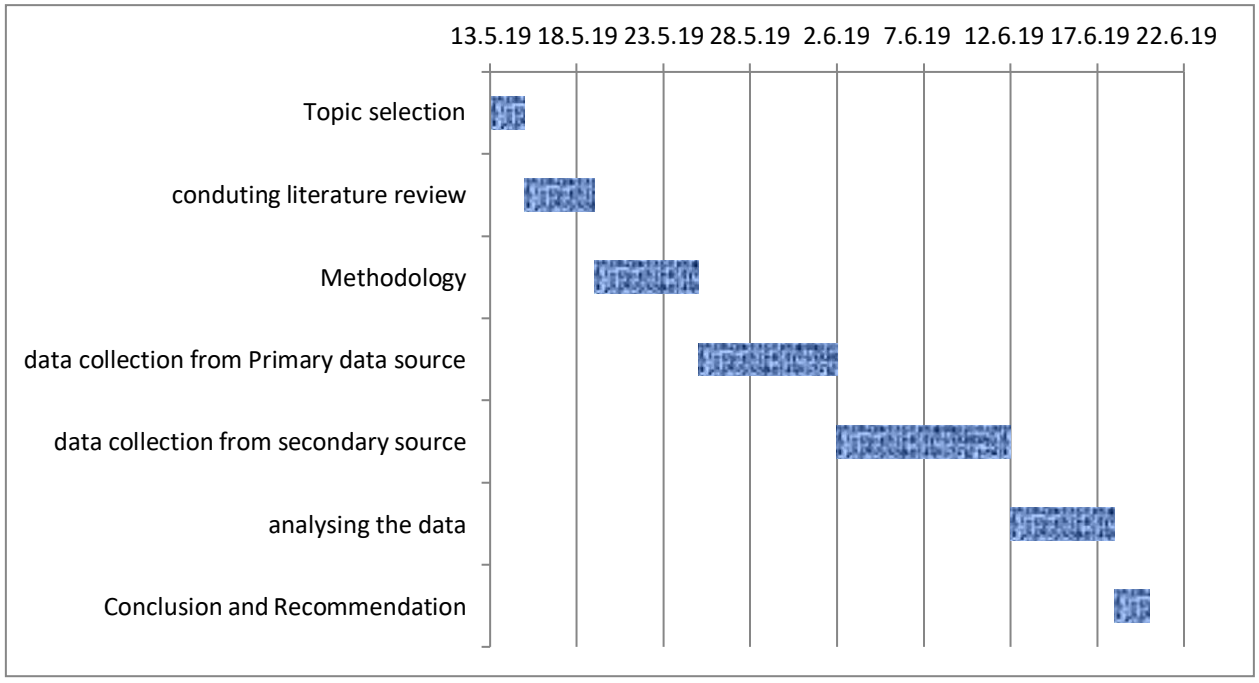

Figure 7: Gantt chart

(Source: Created by the learner)

Summary

It is found here that the use of positivism philosophy is beneficial here to meet all the developed research objectives. Moreover, the deductive approach and descriptive design have been selected

here for doing the research related to the construction industry. From this chapter, the ethical considerations that have been obeyed by the researcher can also be known. Every research participants are offered with the consent form, and they have received equal treatment from the research team. Survey and interview have been conducted along with 3 themes have been developed by the researcher to collect quantitative and qualitative data from both primary and secondary source.

Chapter 4: Data analysis and findings

(Refer to Appendix)

Introduction

In this chapter, the data regarding the construction industry has been collected from both primary and secondary source. The survey has been arranged for the contractors of the UK to know the reasons behind environmental pollution. Moreover, the clients have been asked about the strategies they are using for their construction work and whether these strategies are affecting the environment or not. Three themes have been used here related to the impact of the construction industry on a sustainable environment to gather the required secondary quantitative data. After gathering it, the information has been analysed here to achieve the expected research result.

Data collection

Primary quantitative data analysis

1) What is your age group?

ANSWER CHOICES	RESPONSES
20-25	50.00%
26-34	22.22%
35-40	11.11%
41-50	5.56%
Above 50	11.11%

Figure 8: Age

2) What is your gender?

ANSWER CHOICES	RESPONSES
Female	52.94%
Male	47.06%

Figure 9: Gender of the respondents

3) Since how long you are working in this industry?

ANSWER CHOICES	RESPONSES
0-1 year	47.06%
1-2 year	29.41%
2-3 year	5.88%
3-4 Year	0.00%
> 5 year	17.65%

Figure 10: Duration of working

4) **How far do you agree with the fact that a sustainable environment is impacting on the construction industry?**

ANSWER CHOICES	RESPONSES
Highly Agree	41.18%
Agree	47.06%
Neutral	0.00%
Disagree	5.88%
Highly disagree	5.88%

Figure 11: Impact of the construction industry in a sustainable environment

5) **What is the main reason that is affecting the sustainability of the environment?**

ANSWER CHOICES	RESPONSES
Due to the deforestation	17.65%
Increasing level of green house gases	23.53%
Depletion of natural sources	47.06%
Use of different types of modern technologies within the organisations	11.76%

Figure 12: Reasons behind poor sustainability

6) **What are the benefits of a sustainable environment in the construction industry of the UK?**

ANSWER CHOICES	RESPONSES
Less pollution	17.65%
Environmental safety	23.53%
waste management	35.29%
Energy conservation	11.76%
reducing carbon emissions	11.76%

Figure 13: Advantages of a sustainable environment

7) How far do you agree that waste management can bring sustainability?

ANSWER CHOICES	RESPONSES
Highly Agree	58.82%
Agree	35.29%
Neutral	5.88%
Disagree	0.00%
Highly disagree	0.00%

Figure 14: Opinion about the role of waste management

8) Do you have any suggestions on how the organisations can maintain environment sustainability?

ANSWER CHOICES	RESPONSES
Reduce wastage of resources	35.29%
Re-use products	35.29%
Water preservation	0.00%
Enhanced occupational health	5.88%
Energy preservation	23.53%

Figure 15: Recommendations for the construction industry to maintain sustainability

9) What are the strategies to promote the sustainability of the environment?

ANSWER CHOICES	RESPONSES
Schemes & incentives	11.76%
Setting standard of carbon emission	17.65%
Enhancement of energy performance in domestic	11.76%
Reduce carbon emissions	29.41%
Site waste management plan	29.41%

Figure 16: Promoting sustainability

10) How far do you agree with the fact that the application of biodegradable materials is essential for sustainability?

ANSWER CHOICES	RESPONSES
Highly Agree	47.06%
Agree	41.18%
Neutral	0.00%
Disagree	11.76%
Highly disagree	0.00%

Figure 17: Application of biodegradable materials

Primary qualitative data collection

Questions	Client 1	Client 2	Client 3
Q1. Do you find any Government initiatives to promote environmental sustainability in construction projects?	" BERR or Department for Business enterprise and Regulatory reform works collaboratively with the construction industry to achieve environmental targets."	" Imposition of environmental tax encourages to consider sustainability."	" Government schemes and incentives are helpful to promote sustainability."
Q2. What are the benefits and limitations of	"Construction projects are efficient concerning water and energy	" Such projects do not need frequent maintenance, but they	" Projects can be delivered with high price leading to

environmentally sustainable construction projects?	supply, but these are not cost-friendly".	do not ensure durability."	increased ROI, but materials are not easily available."
Q3. Recommend new approaches to ensure complete environmental sustainability in the construction industry	"Material selection should be considered to ensure sustainability."	" Managing construction site to improve the environment is a sustainable approach."	" Construction waste management is crucial for clients and contractors to achieve complete sustainability."

Table 3: Data collection

(Source: Created by the learner)

Collecting data from a secondary source

Themes	**Articles/Books**	**Authors**	**Year of publication**
Application of sustainable practices in Construction Projects	Green Building Toward Construction Sustainability: Energy Efficiency With Material And Design Aspects	Abualrejal Udin & Mohtar	2017
	Sustainable Building Material For Green Building Construction, Conservation And Refurbishing	Umar, Khamidi, & Tukur	2012
Advantages and disadvantages of environmentally sustainable construction	Green building project management: obstacles and solutions for sustainable	Hwang & Tan	2012

projects	development		
	The way forward in sustainable construction: issues and challenges	Hussin, Rahman, & Memon	2013

Table 4: Secondary data

(Source: Created by the learner)

Analysis

Quantitative Data Analysis

1) What is your age group?

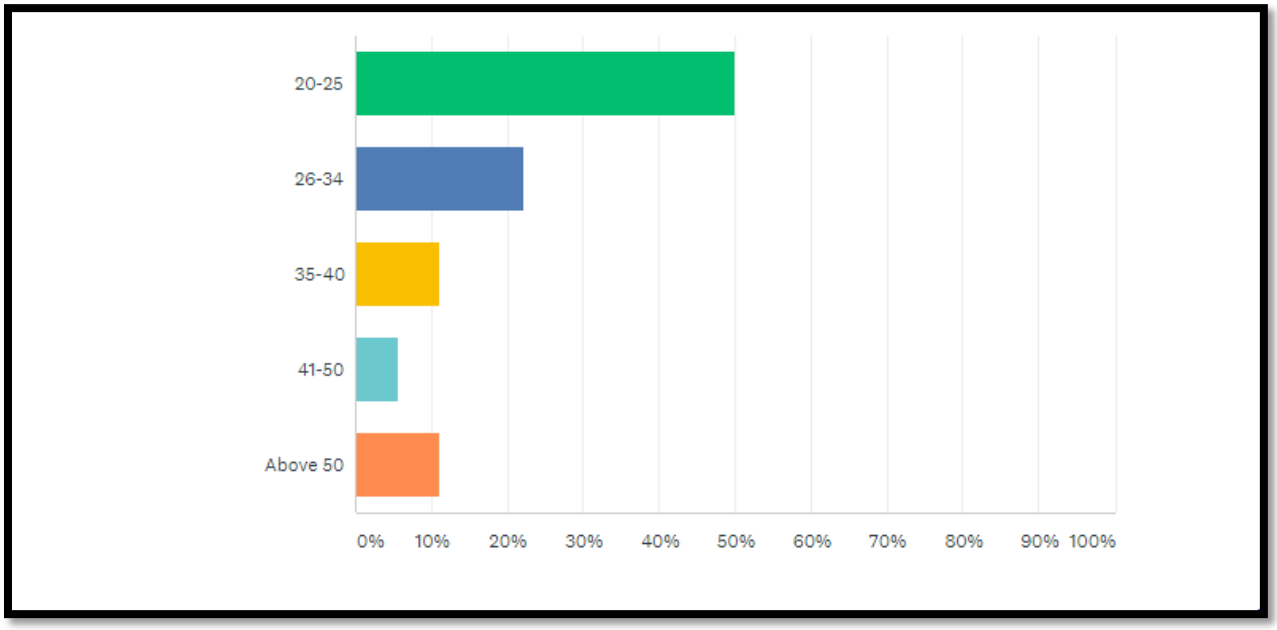

Figure 9: Age group

From the above graph, it is seen that 50% of the participants belong to the age group of 20-25 years. 20% of them belong to 26-34 years of age group. Hence it can be said that young people are working mostly in the construction industry. As a result, this industry is able to apply the latest technologies for their construction work.

2) What is your gender?

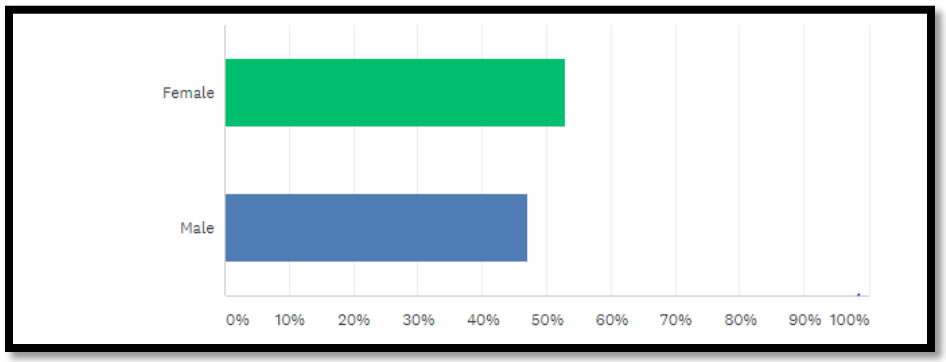

Figure 10: Gender

After getting the survey result, it can be seen that most of the respondents are female. Hence, it is clear that nowadays the female employees of the UK are also showing their interest to work in the construction industry.

3) Since how long you are working in this industry?

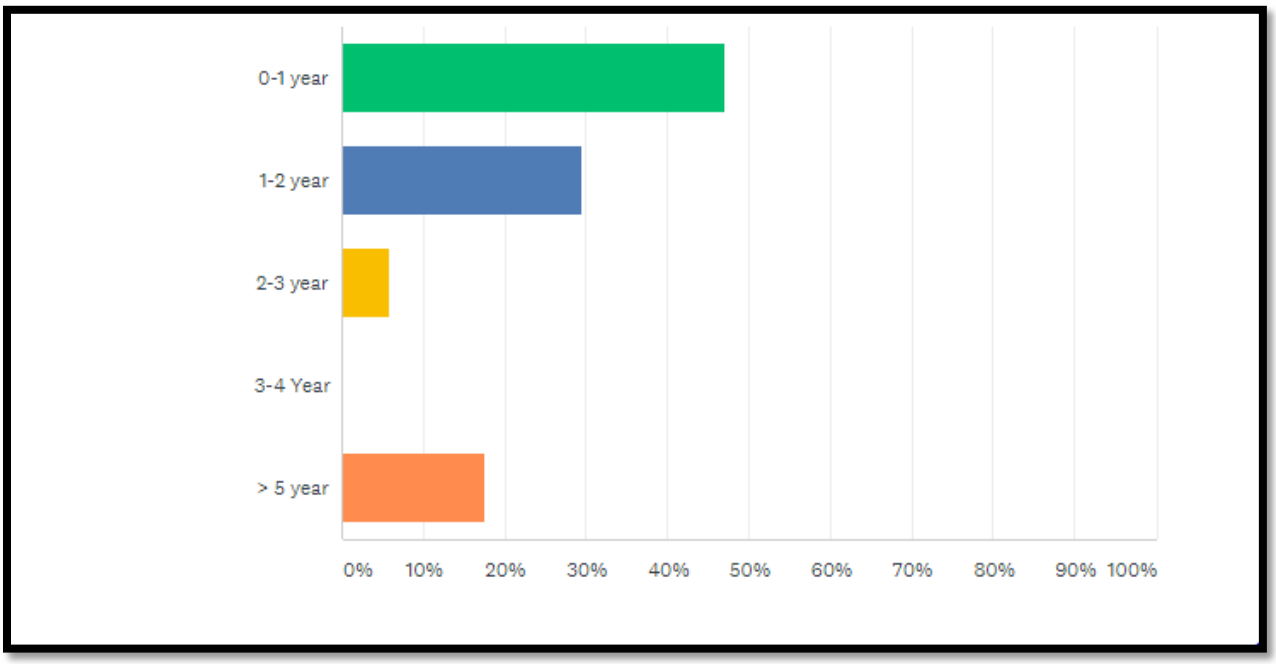

Figure 11: Experience of the respondents

All most 50% of the respondents are working in the construction industry since 0-1 year. However, 30% of them are here since 1-2 years. Due to this reason, the researcher can face difficult to analyse the result from their viewpoints. Among them, all most, 20% of them are working for 5 years. For this reason, their opinion can be valuable to understand the impacts of this industry on the suitability of the environment.

4) How far do you agree with the fact that a sustainable environment is impacting on the construction industry?

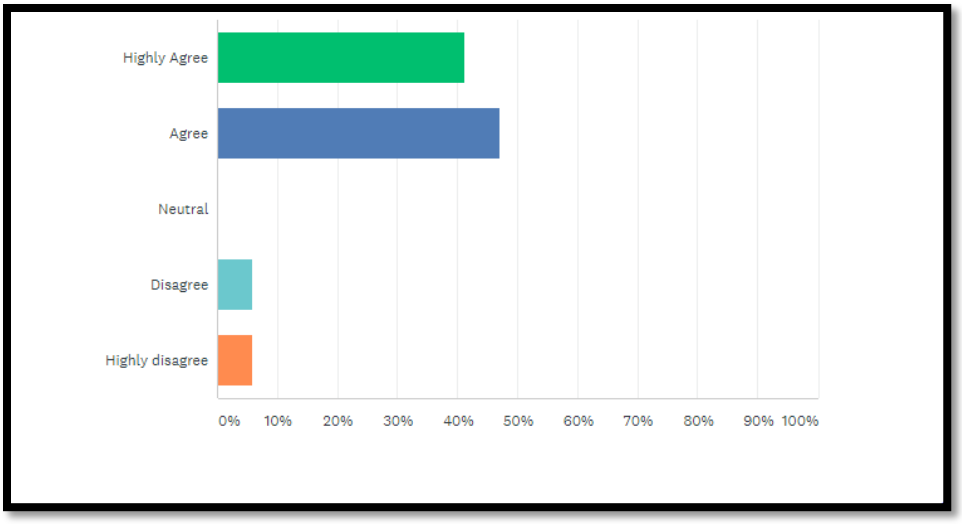

Figure 12: Impact on the sustainability of the environment

40% of the respondents have highly agreed that sustainable environment and the construction industry have a relation between them. In case if environmental friendly procedures are adopted by the organisations, then they can be able to manage environmental sustainability. In addition to this, more than 40% of the respondents have agreed with this fact. Climate change sometimes creates a barrier for the construction work, as the companies are unable to get the supply of raw materials to start or continue the work.

5) What is the main reason that is affecting the sustainability of the environment?

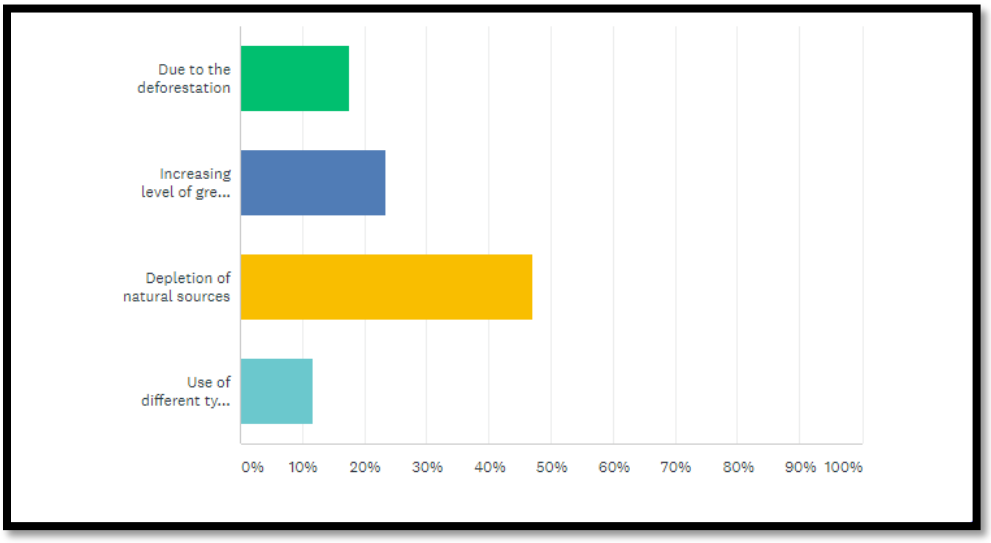

Figure 13: Risk factors of sustainability

After conducting the survey, it can be seen that all most 50% of the participants have supported that "depletion of the natural resource" is the major factor that is affecting the sustainability of

the Environment. On the other hand, deforestation can be another reason that is affecting sustainability, as the constructors need to cut the forests while implementing their projects. Due to the construction project, "the level of greenhouse gas" is increasing that is not suitable for environmental sustainability. If the companies will not control the greenhouse gas, then it will not be possible to maintain sustainability while doing their business. The higher authority of the companies is nowadays preferred to use the latest technologies to do their work in a faster way.

6) What are the benefits of a sustainable environment in the construction industry of the UK?

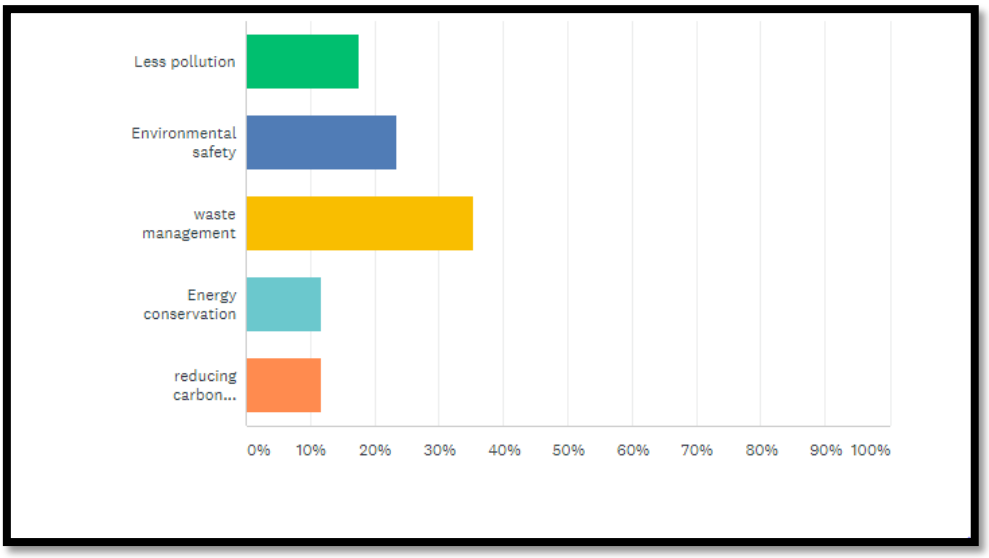

Figure 14: Benefits

Most of the participants have told that waste management can be ensured by the organisations if they are using sustainable methods. The organisations need to make sure that their internal employees know how to use a sufficient amount of resources while performing construction work. Environmental sustainability would lead to energy conservation by enabling the use of solar energy. Moreover, they have to reduce the rate of carbon emission for managing the safety of the environment. In case if the organisations belong to the construction industry will maintain a sustainable environment, then they can be able to decrease the pollution percentage. As a result, the safety of environment can be ensured by this industry.

7) How far do you agree that waste management can bring sustainability?

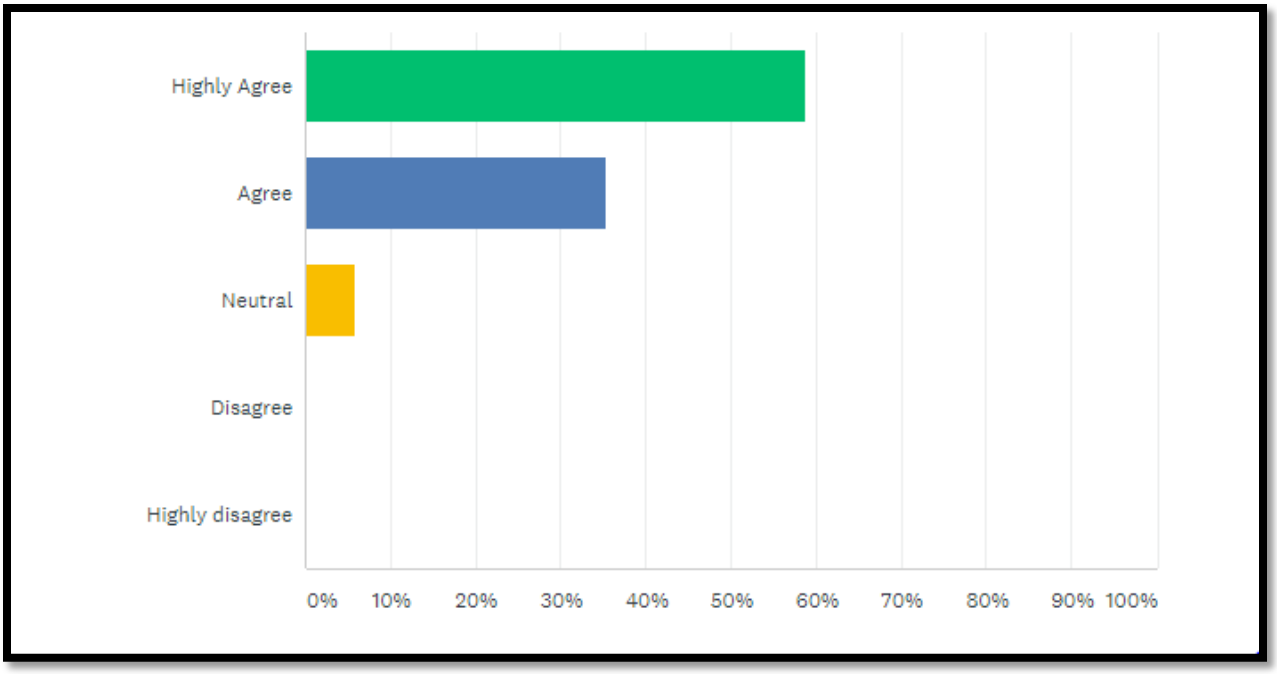

Figure 15: Viewpoints on waste management

After doing the survey, it can be found that the more than 30% of the participants have agreed that waste management can be essential for the organisations for maintaining sustainability. In case if the companies do not take any action for waste management, then the management will face difficulties to perform the construction work successfully. Moreover, their project work will maximise the pollution rate.

8) Do you have any suggestions on how the organisations can maintain environment sustainability?

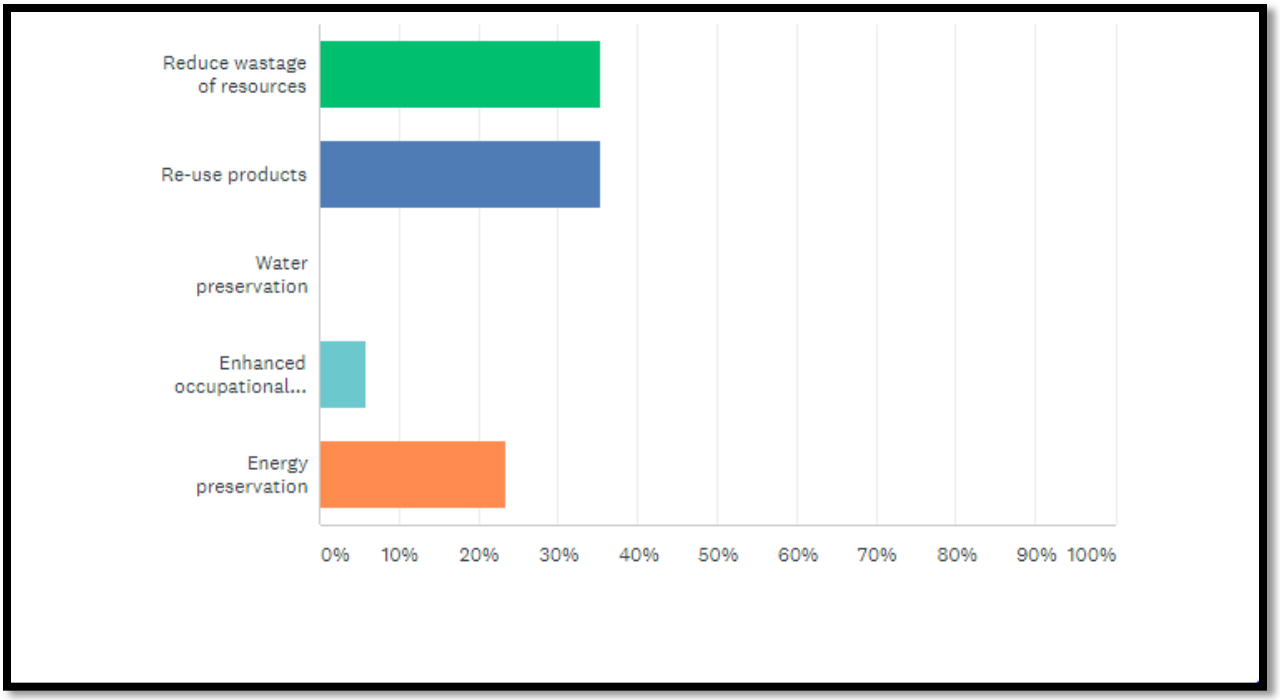

Figure 16: Suggestions for the betterment

More than 30% of the respondents have stated that the construction organisations need to make sure that they are not wasting the resource. In case if the staffs are not limiting the use of resources, then wastage will be increased while performing the business activities. Besides that, 30% of them have also supported the fact that re-use of the products can be beneficial to maintain sustainability. Although none of the participants has selected water prevention, it has to be done by the organisations; otherwise, sustainability cannot be maintained. The organisations also need to concentrate on the conservation of energy. For this reason, they can use solar energy for construction work purpose. Due to the use of solar energy, the organisations will have to invest more financial resources so that the installation can be done successfully. However, this action of the companies can help them to conserve energy.

9) **What are the strategies to promote the sustainability of the environment?**

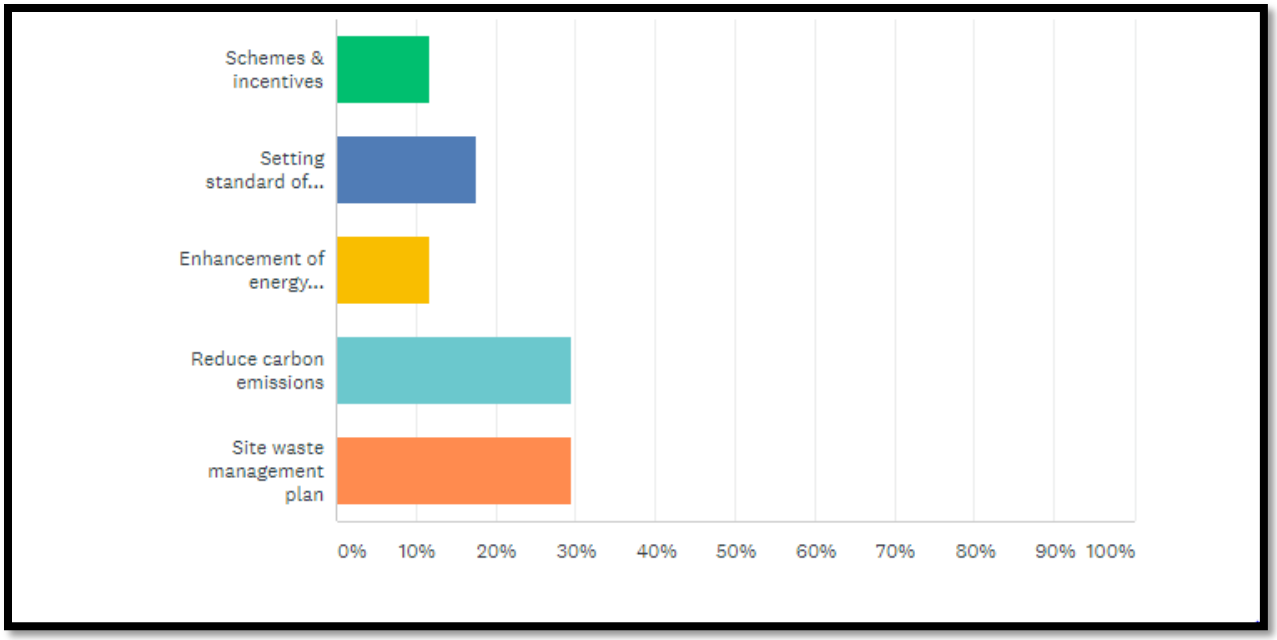

Figure 17: Promotion of sustainability by the organisations

30% of the participants have stated that organisations can promote sustainability by introducing a plan for managing their site waste. Moreover, they have stated that the companies need to promote the reduction of carbon emission. The organisations have to decrease the use of fuel to ensure that their projects are not harmful to the environment. Few of the participants have stated that the construction industry can set the standard of their work. After that, all the organisations under this industry need to obey these standards. They can focus on the enhancement of the use of solar energy. After that, sustainability can be achieved by the organisations.

10) How far do you agree with the fact that the application of biodegradable materials is essential for sustainability?

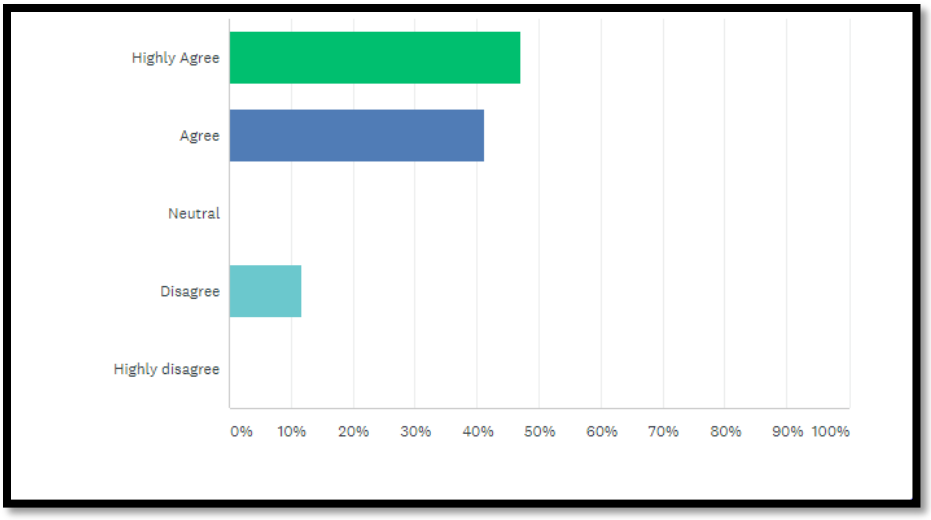

Figure 18: Use of biodegradable materials

50% and 40% of the respondents have highly agreed and agreed with the use of biodegradable materials. However, 10% of them have not shown their interest to use any biodegradable materials. The organisations need to look for this type of materials to avoid environmental pollution and maintain the sustainability of the environment.

Primary qualitative data analysis

Q1. Do you find any Government initiatives to promote environmental sustainability in construction projects?

BERR has outset key targets that shall bring radical changes in the construction industry. It empowers construction companies to earn profitability through efficient application of resources. It encourages securing opportunities referring to sustainable practices of working and products. If construction companies address issues relating to social and environmental responsibilities, they can get an enhanced profile and image. The initiative provides clarity on the current framework on sustainability and future directions to accomplish construction targets. Committing to a higher standard of sustainability is the core aspect of construction agenda set by BERR.

Environmental tax encourages companies to operate in an environmental-friendly way. Taxes are different for construction companies based on their size and scope. Companies may be subjected to higher tax or penalties because of a lot of energy in construction work. If they use energy-efficient technology, energy utilisation can be reduced, and they may get exemption or reliefs

from environmental tax. The Government allows companies to pay less tax in case they are producing less damaging waste and operating efficiently.

The Government provides project owners with financial rewards and incentives, referring to lower repair and additional operating expenses. It lowers churn rate that is needed to renovate constructions or reconfigure space. The sustainable design may require large investment, but post-construction cost relaxation encourage contractors to promote sustainability.

Q2. What are the benefits and limitations of environmentally sustainable construction projects?

Such projects ensure efficiency in terms of water, materials and energy. They recycle grey and rainwater to use them in construction works. They are dependent on all types of renewable energy sources, including wind, hydro, and solar power for electricity and heat purpose and enhance indoor air quality. However, sustainable bridges and buildings require non-toxic and natural materials that are expensive to acquire. If companies require getting these materials from outside, transportation costs and fees increase.

Green and sustainable constructions do not require regular repair or maintenance. Time and cost related to such activities reduce. Indoor air quality improves, as natural and healthy materials are used during construction. However, there is no guarantee for durability or longevity of construction works due to the application of soft or delicate materials. Contractors and clients own less information regarding the survival of buildings or bridges.

Sustainable constructions works are supported with solar panel, windmills and other equipment to get easy access to energy. Companies yield higher resale values and ROI when they sell buildings at a higher price. However, construction activities require the use of compressed earth block, recycled metal, non-toxic and natural materials that are difficult to avail.

Q3. Recommend new approaches to ensure complete environmental sustainability in the construction industry

Material selection is crucial to sustainable and green construction, as they improve the sustainability and durability of buildings and bridges. Materials must be derived from local sources and proper recycling process. Good quality wood, bamboo and other natural products

shall ensure permanent sustainability with low maintenance requirements. Contractors must use low-flow faucets, dual flush toilets and other improved features to save non-renewable energy.

Maintenance of construction sites shall help in achieving sustainability, as this emphasis on areas of waste management, the fulfilment of safety needs, proper resources utilisation and others. Contractors should carry out solid waste management practices including reuse and recycle of materials used in construction points. They need to manage the safety aspects of workers to save them from hazards. Construction companies may ban smoking at sites to reduce pollution up to a limited extent. Thus, proper maintenance at construction sites shall ensure sustainability and efficiency.

Construction companies should carry out a site waste management plan to manage and control waste at all stages of construction works. This shall allow less waste for landfilling, leading to less damage to the environment. Managing waste will cut costs leading to better handling and storage. Clients shall see such projects helping the environment and ensuring cost savings. This shall enable companies to get more projects to handle in future and thereby they will earn higher profit.

Secondary Data Analysis

Theme 1: Application of sustainable practices in Construction Projects

According to Abualrejal, Udin, & Mohtar (2017), sustainable constructions have adopted new approaches to fuel green building practices. It is termed as the development of buildings and bridges that use untouched energy and materials. The authors articulated that green building is the fundamental aspect of sustainable constructions. This building methodology meets performance standards diminishing disruption to natural environment and ecosystems. To rate buildings based on sustainability, Green Building Index has been designed, and it raises awareness among contractors, developers, designers and planners to focus on environmental issues and ensure sustainable construction. Sustainability consists of certain practices including seeking to save resources and energy, recycling materials, and adapting buildings to culture, environment and climate of a region. Selection of green building materials is important to sustainable construction. Some aspects, including waste reduction, social welfare, resource efficacy, and environmental impacts, are considered while taking decisions on material selection and evaluation. Building owners and construction companies may use renewable energy in forms

of biomass, biogas, and solar and hydro energy to reduce greenhouse gas emissions from the industry. Thus, current practices seeking to enhance energy and material efficiency in construction works are vital to sustainability.

As opined by Umar, Khamidi, & Tukur (2012), physical, mechanical and chemical properties of materials are liable for mechanical strengths of green building. Design of such buildings begins with the application of eco-friendly materials fulfilling financial, technical and functional requirements. Authors have identified some principles of sustainable building design, including energy efficiency, environmental forms, healthy interior environment, good design and others. Possible measures are to be carried out to ensure buildings do not emit hazardous gases and substances to the atmosphere. Planting and filtration may support interior air in terms of revitalisation and cleanliness. Some construction companies are using heating, cooling and lightening systems, having features to conserve and eliminate energy consumption. Thus, the application of sustainable materials helps to reduce carbon emission, transportation cost, and offer skill enhancement opportunity for communities.

Theme 2: Advantages and disadvantages of environmentally sustainable construction projects

As depicted by Hwang & Tan (2012), green building construction is an improved solution to increased concern of climate change and other environmental issues. Additionally, industry experts revealed that some aspects are posing barriers for green constriction. Such projects include unique construction features, which make use of energy and resources efficiently. This saves one-third of total utility bills resulting in reduced overhead costs. Even though green construction projects are more expensive than non-green ones, but the building maintenance cost is cheaper for a longer period. Indoor environment quality improves through sustainable construction practices. It depends on conditions such as thermal, air quality, ergonomics, lighting and others. Buildings' occupants enjoy quality life, referring to reduced stress and improved health. However, the initial cost of green buildings is more, and natural building materials are difficult to get in many regions. This causes a higher price than normal building materials. Apart from the initial cost, finding a supplier for sustainable materials is difficult for construction works. Sometimes, location plays a great role in preventing sustainable building design. Locations with more moist or humid preclude certain green building styles.

According to Hussin, Rahman, & Memon (2013), waste reduction is a major advantage of construction projects. Waste influences material loss, productivity and completion time, are leading to loss of revenue. Sustainability construction works reduce the use of poor materials, frequent design changes and errors leading to the generation of less waste. It is committed to economic sustainability by making proper use of water, energy, labour and other resources. It also ensures social responsibility by increasing customer satisfaction and improving the relationship with local communities, suppliers and clients. Some other advantages of sustainable construction include improved recyclability, less impact on the quality and health of people, and less cost. However, green building projects require more time for completion, as some materials are brought from overseas. Some contractors and builders are not familiar with the mechanism of green building for which it is difficult for them to achieve ultimate sustainable objectives. Eco-friendly products required for construction work are not available everywhere. This may trouble construction companies to bring materials from outside and ensure their quality before application. Thus, sustainable construction projects have advantages and limitations that may improve or degrade the quality and sustainability of buildings and bridges.

Summary

It can be summarised here that the use of recycling methods can be beneficial for the construction industry to make sure that they are not polluting the environment to achieve their own goal and objectives. In addition to this, organisations can promote sustainability by introducing new schemes and procedures. In this case, biodegradable materials can play an essential role to enhance sustainability. It is necessary to set rules and regulations for this industry so that they can work more carefully and restrict the use of fuels. Solar energy can help construction organisations to perform the conservation of energy. Furthermore, it is also seen here that if the organisations would reduce carbon emission rate, then it can be effective to manage the pollution. A plan can be offered by the management to the employees for site waste management to ensure that the resources are used in an appropriate manner.

Chapter 5: Conclusion and Recommendations

Conclusion

From this study, it is seen that environmental sustainability is getting affected due to the construction work. Due to the increasing level of greenhouse gas, the environment is getting polluted. The construction companies are adopting modern technologies for constructing the rods, buildings and bridges. The construction procedure of the buildings, as well as the bridge, is creating huge environmental pollution. It is found from this study that the companies that are containing non-toxic elements that are creating also affecting sustainability use chlorofluorocarbons. In addition to this, the rate of deforestation is also increasing by each passing day due to the construction work.

The deforestation is maximised in both rural as well as urban areas that is another reason for the decreasing sustainability. Moreover, the carbon emission related activities conducted by the human being are contributing to environmental pollution. Due to this pollution, the life span of the individuals of the UK is also decreasing. On the contrary, it is also seen that climate change is creating major challenges for the construction industry to build the houses as due to bad weather it becomes difficult for the organisations to get a supply of the raw materials. The management has to focus on effectively planning their project work and make sure that they have all the required resources; otherwise, their project cannot be completed successfully.

It is necessary for the construction industry to apply environmental friendly products so that the sustainability of the environment can be protected. Applying strict rules and standards can be effective for the construction companies to perform their projects without affecting the environment. It is also necessary to make an efficient plan to guide the internal workers for "managing site waste". Besides that, the organisations can make schemes as well as take innovative initiatives to protect the environment.

Recommendations

- **Use of fuel limitedly**

It is suggested to the construction industry of UK that they can maintain a limit of their fuel usage while doing their project work. At the time of burning the fuels, the emission of CO2 and

Methane occurred that is harmful to the environment. For this reason, organisations can use greener along with hybrid equipment to ensure that the rate of pollution can be minimised.

- **Waste management and use of environmental friendly technologies**

The construction industry of the UK can be recommended to focus on waste management. They have to ensure that the staffs are using business resources efficiently. Besides, that disposal of wastage materials should not be done at landfills. Recycling technique can be adopted by the organisations for this purpose. Moreover, they can implement the technologies, which are environment-friendly in order to reduce the percentage of pollution.

- **Preservation of natural resources**

Construction organisations can be advised to involve themselves in preserving natural resources. It is necessary for organisations to preserve water as well as energy. They can use solar energy to do construction projects. Installation cost, in this case, will be high; however; the companies would be able to energy conservation can be done successfully by the authorities of these organisations.

Linking with objectives

Objective 1: To analyse the opinion of UK construction industry related to environmental conscious construction project

From the data analysis and findings chapter, the point of views of the construction industry regarding their construction projects can be known. It is seen that the organisations are going to take decisions on adopting environmental friendly procedures to avoid environmental pollution. They are becoming more conscious about environmental sustainability, and for this reason, the organisations are trying to avoid deforestation. At the time of site design, building operation as well as maintenance the management of the construction industry is using environmentally responsible methods.

Objective 2: To examine the impact of following environmentally sustainable construction method for achieving the goal government related to sustainability

From chapter 2-literature review, the usage of "environmentally sustainable construction method" has been understood. It is seen from here that the construction industry is looking for sustainable methods to make sure that due to their working process, no pollution has occurred.

The companies can maintain ecological balance if they are using eco-friendly technologies for doing construction work.

Objective 3: To give idea related to the pros and cons of maintaining environmental sustainability in a time of building construction

In the fourth chapter, data analysis and findings along with the second chapter literature review, the advantage and disadvantages associated with building construction to maintain environmental sustainability can be found. To maintain the sustainability, solar power is used by the organisations while taking help of the new techniques. On the other hand, if sustainability would not be maintained, then the number of toxic chemicals can be increased.

After the degradation, the waste products, as well as toxic chemicals, create pollution in the environment. Hence it can be said that this objective has been met.

Objective 4: To analyse the benefits of companies under the construction industry for constructing the building or bridge in an environmentally sustainable manner

From the literature review section, the benefits of the organisations can be known which they are getting by using the environmentally sustainable methods can be identified. The pollution rate can be decreased if the organisations are adopting sustainable methods. Moreover, the well being of the people can also be maintained if the organisations are using environment-friendly ways of completing their construction work.

Objective 5: To provide a recommendation, this can ensure in future that environmental sustainability is the main thing that needs to be followed in the time of construction work

From the data analysis chapter, the suggestions can be known which the organisational management of the construction industry to maintain sustainability can be known can accept. The organisations can adopt strategies to preserve water and energy so that sustainability can be managed. Besides that, the organisation has to ensure that the disposal of waste is done accurately. Adopting re-usable technologies can also be essential in this case management sustainability.

Future scope and limitations

At the time of conducting this study, it is found that the researcher has a limited amount of time, and for this reason, the survey has been conducted for only 75 constructors. It has not been possible for the researcher to gather information from a large sample size. On the other hand,

budget is also insufficient for the research work and due to this reason; the researcher was unable to access the paid version of the articles related to environmental sustainability. In future, by investing more financial resources, the research team would be able to conduct an in-depth analysis regarding the risk factors associated with the construction industry for managing the "environment sustainability". Moreover, the research team would also know the advantages of maintaining the sustainability of the environment after conducting further research work.

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Appendix

Survey questionnaire:

1) What is your age group?

- 20-25
- 26-34
- 35-40
- 41-50
- Above 50

2) What is your gender?

- Female
- Male

3) Since how long you are working in this industry?

- 0-1 year
- 1-2 year
- 2-3 year
- 3-4 Year
- > 5 year

4) How far do you agree with the fact that a sustainable environment is impacting on the construction industry?

- Highly Agree
- Agree
- Neutral
- Disagree
- Highly disagree

5) What is the main reason that is affecting the sustainability of the environment?

- Due to the deforestation
- Increasing the level of greenhouse gases
- Depletion of natural sources
- Use of different types of modern technologies within the organisations

6) What are the benefits of a sustainable environment on the construction industry of the UK?

- Less pollution
- Environmental safety
- waste management
- Energy conservation
- reducing carbon emissions

7) How far do you agree that waste management can bring sustainability?

- Highly Agree
- Agree
- Neutral
- Disagree
- Highly disagree

8) Do you have any suggestions on how the organisations can maintain environment sustainability?

- Reduce wastage of resources
- Re-use products
- Water preservation
- Enhanced occupational health
- Energy preservation

9) What are the strategies to promote the sustainability of the environment?

- Schemes & incentives
- Setting the standard of carbon emission
- Enhancement of energy performance in domestic
- Reduce carbon emissions
- Site waste management plan

10) How far do you agree with the fact that the application of biodegradable materials is essential for sustainability?

- Highly Agree
- Agree

- Neutral
- Disagree
- Highly disagree

Primary qualitative data analysis

Q1. Do you find any Government initiatives to promote environmental sustainability in construction projects?

Q2. What are the benefits and limitations of environmentally sustainable construction projects?

Q3. Recommend new approaches to ensure complete environmental sustainability in the construction industry