Journal of Sustainable Construction Materials and Technologies
Web page info: https://jscmt.yildiz.edu.tr
DOI: 10.14744/jscmt.2022.11

JSCMT
Journal of Sustainable Construction Materials and Technologies

Review Article

Sustainability in the civil engineering and construction industry: A review

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ARTICLE INFO

Article history
Received: 07 February 2022
Accepted: 17 March 2022

Key words:
Civil engineering, construction industry, green building, green construction, sustainability

ABSTRACT

The negative consequences of construction may be minimized by using environmentally friendly construction techniques. There are many ways construction work impacts the environment. The purchasing and use of building materials and the chopping down of trees are only some of the various processes involved in construction. However, the bulk of traditional building methods have the most significant harmful impact on the environment. For future generations, sustainable construction techniques and practices must prioritize all principles of sustainability. This study examines the idea and substance of sustainable development, sustainable development's triple bottom line, the significance of the triple bottom line to the construction industry, corporate sustainability and knowledge transfer. Sustainability in construction works, how construction works affect the environment, environmental benefits of construction, barriers to sustainability in the construction industry, and recommends steps to sustainability in construction. The study also points out research gaps to be filled. In the methodology reputable academic sources were found were found on Google Scholar, SCOPUS, the Web of Science, IEEE, Xplore, and Science Direct. As part of their study, the authors trimmed down the papers to those that best answered their research questions. After examining these sources, the authors restricted their attention to 55 sources that had a strong link to their study. Recommendations and conclusions were derived from a review of the available research as presented in this study. The study found that a project's social sustainability success depends on meeting the requirements of a wide range of stakeholders, also that sustainable construction creates a more equitable working environment, reduces costs, boosts productivity, and better health. It also provides economic advantages, more efficient use of resources, promotes the environment's protection, and increases the overall quality of life.

Cite this article as: Utsev T, Tiza M, Sani HA, Sesugh T. Sustainability in the civil engineering and construction industry: A review. J Sustain Const Mater Technol 2022;7:1:30–39.

1. INTRODUCTION

The construction industry has a significant effect on the global GDP. However, construction accounts for 36% of world energy use and 39% of CO_2 emissions whereas manufacturing accounts for just 3% of global CO_2 emissions [1]. Sustainability in the construction industry is a topic interest for policymakers, industry professionals, and academics. When it comes to sustainable building, it is not enough to focus just on ecological or environmental issues; it also has

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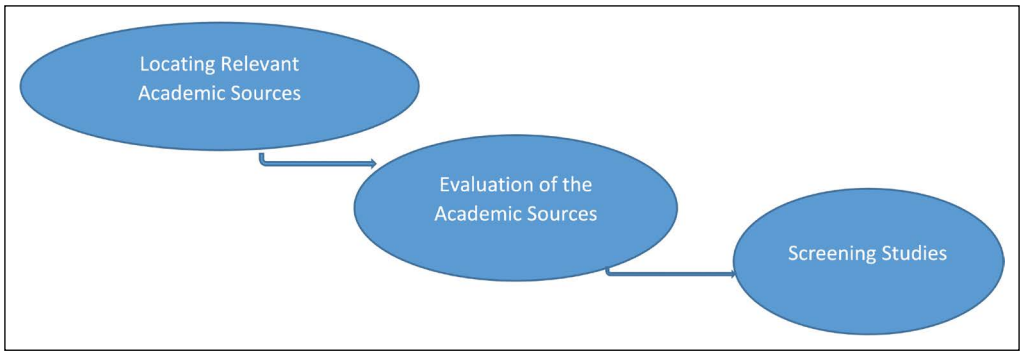

Figure 1. Pictorial representation of the research method for the research (source; authors, 2022).

Table 1. Sources of academic works cited in this article

S/No	Type of academic article	Number used	Percentage
1	Academic journals	38	69%
2	Books	10	18%
3	Government publications	4	7%
4	Webpages	3	6%

to include economic (e.g., construction prices, construction time) and social and technical aspects [2]. The pillar, "technical sustainability," concerns issues such as a building's capacity to function, quality, and lifespan [3]. Mechanisms for assessing the sustainability of building projects are also needed [4]. Construction firms are increasingly turning to sustainable construction methods as a means of mitigating the industry's harmful effects on the environment, such as global warming, environmental degradation, and the depletion of natural resources. A responsible built environment may be achieved using sustainable construction principles and methods to generate high-performance green buildings, or simply, "green buildings" [5]. The study of sustainability in the construction sector has yielded a wide range of new research topics and hypotheses. Even while some research has concentrated solely or partially on a single component of sustainability, others have attempted to cover all three areas. Projects or programs are implicit in the conversation about sustainability in the construction sector. Many studies have been conducted on the topic of building sustainability, from value management in construction to evaluating construction projects' performance on sustainability fronts including work on social sustainability in construction project development phases and policy implications for infrastructure projects [6].When evaluating social sustainability in the construction industry, ideas of social network analysis, sustainability, and equality are often used [7]. Information and communications technology (ICT) may also help achieve sustainability in building projects through process optimization, media substitution, and external control [8]. There are dangers in focusing just

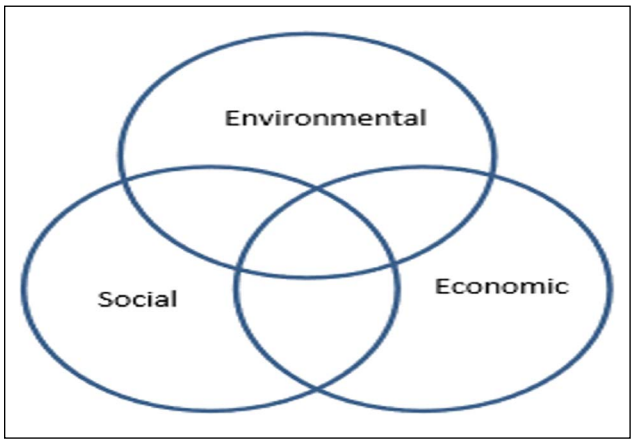

Figure 2. Triple bottom line concept of sustainability [24].

on one aspect of sustainability while overlooking others [9]. In attempts to address other elements of sustainability, we risk creating suboptimal or even harmful "solutions" if we sacrifice certain aspects of sustainability. Is it possible that the widespread usage of natural material has led to the displacement of indigenous communities, resulting in a loss of cultural resources. As a result, students, academics, and industry experts in the engineering and construction professions should be acquiring the capacity to address the social component [10]. In the case of construction projects, the government plays a more prominent role as a facilitator of sustainability, and society plays a more active role as impacted stakeholders. Therefore, all these stakeholders in the construction industry should be made to take this seriously.

2. METHODOLOGY FOR CONDUCTING THE LITERATURE REVIEW

As a result of the study's goals, the authors devised two research questions: "What are the future research avenues for sustainable building projects?" and " What have been the most significant research areas in construction project sustainability? Academic sources were obtained from various sites, including Google Scholar, SCOPUS, the Web of Science, IEEE Xplore, and Science Direct. As part of this

research, the authors narrowed down the publications to those that best answered their research questions. After evaluating these sources, the authors narrowed their attention to 55 sources that had a significant connection to their research. The diagram Figure 1 illustrates the steps of this research method while Table 1 indicates the sources of academic materials used in the work.

3. STATISTICS OF ACADEMIC SOURCES FOR THE REVIEW

3.1. The Idea and Substance of Sustainable Development

As a concept, sustainable development has never been more widely discussed and interpreted throughout the globe, with a wide variety of different definitions and meanings. Sustainable development theory and practice have their roots in human knowledge that has evolved through time in a specific set of social, economic, cultural, and ecological contexts [11]. Initially used for forests and fisheries, the term "sustainably developed" comes from the field of ecology and refers to a resource management plan that focuses on extracting just a good portion of total resources while ensuring that existing resources are not depleted [11]. In the later part of this article, three significant dimensions of sustainability: economic, social, and environmental will be well considered in context of construction. Any assessment methodology for project sustainability should therefore contain these three critical characteristics [12].

3.2. Sustainable Development's Triple Bottom Line

An overarching objective of a sustainable business plan is to profit shareholders while simultaneously positively influencing the environment or society [13]. Sustainable business models are becoming much more critical to corporate leaders as they seek to tackle the most pressing global concerns while assuring long-term profitability [14, 15]. Understanding what it means to be sustainable and devising a strategy for achieving it are essential to success [15]. The concept is known as the "triple bottom line" and may be used to analyze a company's sustainability initiatives [15].

"Beyond greening lies an enormous challenge—and an enormous opportunity," Stuart Hart observed in 1997, when industrialized nations began to concentrate on sustainability. Developing a global economy that the earth can support eternally is a problematic issue [16]. After that, Hart highlighted that removing pollution is not the only answer to the issue of sustainability and that the world needs to look at it from a broader perspective. Even if all emissions were eliminated by the year 2000, the globe would still face resource shortages, making it impossible to satisfy the demands of future generations [17]. We are dealing with a complex problem that touches on economics, the environment, politics and society [18]. To achieve sustainability, all of these components must be seen through the same lens. It was decided to include economic and social bottom lines when determining sustainability [18]. The Figure 2 shows a pictorial representation of the triple bottom line concept.

3.3. Construction Industry Significance of Triple Bottom Line

For a net-zero carbon construction industry to be achieved by 2050, direct building. Environmental costs must have been cut in half by 2030 from their current levels. In the opinion of the World Bank, reduced facilities should be given top priority in economic stimulus packages, and updated climate commitments must be made [19]. People spend a great hours of 24 hours of their waking hours surrounded by structures, and as a result, the built environment has a significant impact on their well-being and productivity at work. The construction industry contributes significantly to the global economy and is continually expanding around the globe [19, 20]. The relevance of triple bottom line (TBL) can only be recognized if all of these factors are dealt with sustainably. It is becoming more and more common for designers and contractors to include sustainable approaches into their designs to remain competitive in the global building sector. All the major construction firms use TBL to assess the environmental implications associated with their work [21]. TBL has used social and economic factors to broaden building industry methods. Organizations have been able to measure their performance quantitatively and qualitatively, producing excellent outcomes in terms of long-term sustainability. According to TBL principles, there has been a greater emphasis on the management of the building industry, which uses a significant amount of natural resources [22]. There has been a growing emphasis on environmental and social factors and customer and stakeholder service [22]. TBL has helped raise awareness of the need to return part of the natural resources that we have stolen from the earth, which is a result of their efforts. However, when we consider social and environmental factors and look at the sustainability outcomes, our financial performance may seem less optimistic [23, 24]. To summarize, TBL has altered the building industry's practice, and applying it to a sector that uses a large share of natural resources will help us progress toward more environmentally friendly development.

Environment Consideration: The TBL building strategy emphasizes resource efficiency, which means less wastage and more effective use of water, energy, and materials. Passive design strategies reduce energy consumption, emphasize reusing materials, and water consumption and waste are avoided during construction. To determine a building's environmental friendliness, various green rating systems are used, such as the Green Star rating system in Australia and the LEED rating system in the United States [25, 26].

Social Consideration: The focus is on the people who will be using the buildings, and considerations such as ac-

cessibility, safety, and security are taken into account. Designing a sustainable building considers the community's requirements and ensures that the building interacts with and contributes to the community as a whole, rather than functioning in isolation [27]. It is therefore ensured that the most cost-effective building techniques are used at all times. There are methods to reduce the amount of time it takes to build a structure. The materials used are selected for their affordability and long-term usefulness. In order to reduce costs, local materials, labor, and suppliers are prioritized, which also helps reduce transit time and logistics expenses. Designers are instructed to employ less expensive materials to save costs. Summarily, this approach to sustainable building considers both the environment and the social and economic aspects of a project.

Economic Considerations- also known as "profit," the company's or society's economic worth, which is also known as "economic benefit, "Profit, cost reductions, economic progress, and research are all addressed here [28].

3.4. Corporate Sustainability and Knowledge Transfer

The management of a single firm or organization must change its governance and policy thinking in order to implement the notion of sustainability. Financial, human, environmental, and social capital challenges must be addressed together [29]. As a business-related interpretation of sustainability, it means looking at sustainability from the standpoint of the company's stakeholders rather than only the viewpoint of the company's shareholders.

Myers [30] discovered that only the most significant construction businesses had a positive attitude toward corporate sustainability, and even then, they had only just started to understand the importance of sustainability. The vast majority of construction enterprises have fewer than ten workers, and even fewer have a track record of long-term viability. According to Myers [30], a similar pattern may be seen at the European Union level.

There is little indication of greater participation or efficiency in construction than in other industries, although more and more enterprises accept the sustainability goal. The absence of proof suggests the opposite. The construction industry, particularly in Europe, is highly fragmented and complicated, making a swift shift to participation difficult, if not impossible [30].

It is argued by Robinson et al. [29] that organizational, consumer, and human aspects are all considered when determining the economic worth of intellectual capital. After workers have gone home for the day, the company's hardware, software, and supply lines become structural capital. Finally, the term "customer capital" refers to the goods, as well as the knowledge of customers, society, and other stakeholders, that a company has amassed. For the future standard ISO 26000, ISO is developing a framework for corporate sustainability that includes social responsibility components of corporations.

Figure 3. Concerns about the long-term sustainability of construction companies (adapted from Robinson et al, 2006) [29].

3.5. The Construction Industry in View

According to Du Plessis [10], the most often used definition, "construction," is best described as a "narrowly defined" process. It restricts its usage to a single phase of the construction life cycle by defining construction as solely site-level activities that lead to the building of construction facilities [31], similarly holds this position, referring to the "construction industry" as a collective term for all businesses directly engaged in the planning and construction of buildings and other structures. It is difficult to see how this notion of "construction" works [32]. This eliminates other essential players, such as those that produce and supply materials and those that operate the facilities. The term "sustainable construction," which is the focus of this article, takes a far more extensive view of the construction sector, necessitating the inclusion of the factors listed above. Consequently, it can be said that the construction sector is concerned with the development of the built environment as well as its planning, design, manufacturing, change, maintenance, and destruction.

3.6. Sustainability in Construction Works

After focusing on environmental concerns alone for the previous decade, the construction industry's research community has begun considering sustainability holistically, including the triple bottom line. Furthermore, the building industry has been heavily focused on environmental factors exclusively, according to Lützkendorf and Lorenz [33]. According to [34] buildings are intertwined with regional culture and sustainability since the current building stock

is a crucial aspect of the region's cultural and geographic variety. The charming character of the value-laden world of sustainability causes people to interpret the term differently based on their image of society and how others accept this view. Among the terminology often heard in construction while discussing sustainability are "green" and "sustainable" building. The stakeholders in a construction project often perceive this in various ways based on their education, age, cultural background, etc. [35]. However, international building sustainability research cannot link effectively with local situations because of additional barriers.

3.7. How Construction Works Affects the Environment

"Everyone acts like nothing will change, yet everything changes" is a common phrase. When it comes to building, this could not be more accurate. While some deny that the climate is changing and that their operations influence the environment, others attempt to behave as if this is not a problem [36].

3.7.1. Natural Resources

Non-renewable materials are a significant source of waste in the building industry. According to the World Watch Institute, the industry absorbs 40 percent of raw stone, gravel, and sand consumption worldwide and 25 percent of the world's virgin wood usage annually [37]. When it comes to natural resources, we may be able to pretend that they do not exist, but we will run out sooner or later. Some firms are gradually using new technology, such as 3D printers and biodegradable fabrics, to minimize the amount of resources they need. On the other hand, construction is one of the least digitalized businesses; therefore, the shift may be too late.

3.7.2. Biodiversity

Biodiversity is the second most crucial factor. Consider the effect that buildings have on animals. Images of nighttime building sites or noisy equipment likely flashed through your head right off the bat. When it comes to animals, the disruption of the normal circadian rhythm that bats, badgers, and birds are used to is particularly devastating. As a result, it is merely a tiny component of a much larger issue. In the long run, wildlife is also impacted by construction and development [38]. To name a few, here are a few examples: pollution of the air and water, hydrologic effects, -isolation, and when people become more dispersed, as a result of these changes, animals are forced to adapt to a new way of life and reduce their numbers [39]. Consequences such as these are sometimes overlooked by decision-makers since the difficulties may only become apparent over a lengthy period (usually long after the project has finished) [40].

3.7.3. Atmospheric Conditions

Everyone's actions directly impact air pollution since the creation of carbon dioxide emissions is a significant contributor to global warming. Up to 39% of all energy and process-related CO_2 emissions come from the building industry [41]. Construction-related activities, transportation, and the production of building materials all contribute significantly to this high figure. Dust from building sites is also a significant contributor to air pollution. PM10 is made of concrete, wood, or stone, and may be spotted with a simple magnifying glass. This dust may create significant health issues for both people and animals if it is carried for lengthy periods of time [42].

3.7.4. Waste

Waste may be found just about everywhere. Consider that the construction industry accounts for 59% of the total wastes. Because of this, it is hard to overlook the enormity of the problem. Much waste is generated in the construction industry since it depends on short-term, low-cost solutions that must be changed often. Many good resources go to waste because building sites do not require recycling. Mahayuddin et al. [43] studied unlawful disposal sites in Malaysia. It was found that aggregate and concrete make up the vast majority of the waste in construction (see Fig. 3). Concrete waste and other potentially helpful demolition materials were found to be dumped straight into landfills, indicating that waste generation is outpacing resource use. Recycled aggregate may be used to solve the issue of waste disposal while also substituting for natural aggregates due to the abundance of waste available for recycling.

3.7.5. Environmental Benefits of Construction (How Construction Can Benefit the Environment?)

At the beginning of every building project, the [44] standards state that environmental considerations should take precedence over other considerations. As a result, one must ensure that all subcontractors doing construction work are aware of these requirements and that the company takes environmental protection seriously. Any or all of the above guidelines might be used to help new contractors get up to speed. Take a look at the Code of Regulations, which has a plethora of information that may ultimately beneficial when included in everyday conversations, meetings, and training sessions.

3.7.6. Measures to Prevent Pollution

Many of the chemicals used in construction might be hazardous to the contractors' health and the environment if they are not appropriately handled [45]. In order to guarantee that pollutants are released appropriately and safely with minimal impact on the environment, the EPA recommends creating "effective pollution prevention measures" throughout a project. On the other hand, the EPA standards state that this need is not essential if there is no danger of pollutants contaminating nearby waterways or the atmosphere around a building site [46]. Figure 4 illustrates the common composition of illegally dumped wastes.

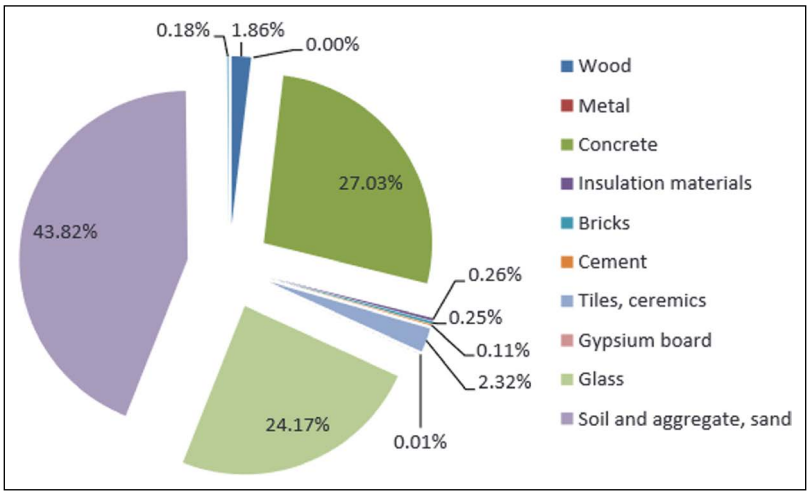

Figure 4. Analyses of the composition of illegally dumped construction waste [43].

3.7.7. Restrictions on Discharges

One must adhere to EPA regulations, which ban specific releases to safeguard employees and the environment. The following are some of their guidelines. When concrete is washed away, much water needs to be "managed." Painting, oil release, curing chemicals, and "other construction materials"-related wastewater discharges "Other pollutants" are released during vehicle and equipment operation or maintenance. Many of these guidelines can help reduce the environmental footprint. However, in recent years, a growing number of construction companies have been incorporating green buildings into their design and construction processes.

4. SUSTAINABILITY BARRIERS IN THE CONSTRUCTION INDUSTRY

According to available literature, the following are considered barriers to sustainability in the construction industry.

4.1. Inattention from Clients and Stakeholders

According to the reviewed literature, clients often lacked the knowledge they required to decide whether development alternatives would be more or less sustainable [47]. Contractors, end-users, and funding organizations all have poor levels of sustainability knowledge and comprehension, according to [48]. They also cited employees in public-client organizations as having low sustainability awareness and understanding levels. Many institutions and professional organizations lack training in sustainability concerns, and the nature of related norms of conduct is advisory rather than mandated, which may be a contributing factor. Inadequate sustainability knowledge and skills:Uncertainty over how and when to utilize evaluation tools and indicators and who should use them is causing practitioners to become overwhelmed and unable to focus on their day jobs. Developing simple but versatile instruments and methodologies for evaluating sustainability is required. A considerable and ongoing investment in education and training, together with enhanced publicity, will be required to address these issues [49].

Resistance to change: The phrase "sustainability" necessitates new ways of thinking, doing things, and shifting perspectives. As a result, it needs revision. Because of this reluctance, new initiatives might be challenging for long-standing businesses to adopt. Problems emerge in client organizations due to a lack of leadership, budget restrictions, and advice [50].

4.2. Fragmentation

Because of the industry's scale and fragmentation, it is challenging to encourage sustainable building. On the bright side, it has given us the ability to handle a wide range of workloads. Stated that partnership and framework agreements might be utilized as instruments to set goals and promote sustainable building to combat fragmentation and increase performance [50]. Sustainability in construction is more than just a matter of continuing to expand as a company; to achieve sustainable development, it may be necessary to curtail or alter corporate expansion in certain circumstances [51]. To put it another way, in the context of the construction industry, sustainability refers to attaining a win-win situation in which construction firms profit economically while also improving the environment [52].

4.3. Finances

Cost is a significant concern for implementing sustainable building practices in the construction industry. One of the biggest deterrents to owners of sustainable buildings is the higher initial investment costs [52]. A sustainable building costs 2 to 7% more than a conventional building, and only a small percentage of such projects can recoup their net expenditures over time.Although the cost of environmentally friendly construction and development is higher

Table 2. Advantages of sustainable construction

[1]	Sustainable construction offers a more fair working environment.
[2]	Sustainable construction helps to save costs.
[3]	Sustainable construction increases productivity.
[4]	Sustainable construction is better for your health.
[5]	The use of sustainable building provides economic advantages.
[6]	Waste reduction is improved by sustainable building.
[7]	Sustainable building provides a more efficient use of resources.
[8]	Sustainable construction promotes protection of the environment.
[9]	Noise pollution is reduced as a result of sustainable building.
[10]	Sustainable constructions enhance the reputation of the organization.
[11]	The use of sustainable building increases the overall quality of life.
[12]	Emerging markets benefit from Sustainable constructions.
[13]	Organizations' environmental sustainability is improved as a result of sustainable building.
[14]	Sustainable construction is a business strategy.

than ordinary projects, most customers are unsure whether there is a market for such structures [53]. As a result of the current financial crisis and the worldwide recession, building prices have fallen somewhat. Financial and working capital issues for contractors are significant problems. Contractors often find it challenging to keep up with their cash flow and expand their working capital resources. Changing stakeholders' perspectives from one of cost to one of value and from the short term to the long term may help overcome these roadblocks.

4.4. Lack of Government Regulation

The policies, laws, incentives, and dedication of leadership may not be sufficient to advance sustainable development. A value-added tax (VAT) was implemented in the United Kingdom for building renovations but not for new construction, according to Sourani and Sohail [48]. By underlining that renovation was a more environmentally friendly choice. Although the government has implemented several laws and policies to address sustainability concerns, it was suggested that these measures might be inadequate. Consequently, an essential role is therefore required to deal with sustainability effectively.

4.5. Sustainable Building: Cost-Benefit Analysis

Sustainable construction has perceived higher costs, which, when combined with the low perceived value of social quality, have kept most people from taking action thus far [54]. As a result, green construction and sustainable design are becoming more popular with customers, who realize that they may save money by constructing environmentally friendly structures [55]. Research shows that greener buildings may attract tenants and investors and fetch higher rents or sell prices from across the globe [56]. Contrary to popular belief, designing to ecologically friendly standards do not inevitably increase capital costs.

According to the findings of this research, several of the writers provided various benefits of sustainable building, some of which are shown in the Table 2.

5. RECOMMENDED STEPS TO SUSTAINABILITY IN CONSTRUCTION

It is not enough to design sustainable structures. The following must also be taken into account by construction companies.

Ensuring the long-term viability of a Project. One of the utmost thought-provoking components of this profession is sustainability. Natural resources are used in the construction of buildings. When such materials have served their purpose, they are usually discarded. To make room for the needed alterations, renovating a structure may necessitate removing installed elements initially. This technique can quickly deplete natural resources, resulting in a significant environmental effect. Using sustainable building materials does not have to be an all-or-nothing proposition. The construction itself may have a substantial environmental effect. It takes a lot of energy to construct construction sites, equipment, and machines. The total energy used includes energy utilized to heat the building or crew quarters. Emissions may be significantly affected by how this energy is utilized and where it originates from. The use of fossil fuel-powered heavy gear in construction further adds to the project's environmental impact. Another option to minimize the adverse effects on the environment is to use lean production methods in carefully monitored facilities. Indoor factories, where waste may be minimized and resources recycled instead of being thrown away, can manufacture products under controlled conditions. Afterwards, the building's components are transported to the site and erected, resulting in a lower environmental impact.

5.1. Designing Structures for Reuse

Today's engineer is faced with the difficulty of constructing a structure that can be modified to fit changing demands rather than a single purpose. Reusing rather than demolishing buildings allows us to minimize the quantity of garbage we send to landfills and the amount of raw resources we utilize. Sustainable building solutions are being produced all the time, which is a good thing. In a circular design approach, "design, build, use, and dispose of" is replaced with a more ecologically responsible pattern. A more sustainable approach to building is to design waste, keep goods and resources in use, and regenerate natural systems to keep up with demand while minimizing environmental effects. In order to create new structures, builders devised construction systems that could be dismantled and rebuilt. Ninety per cent of the materials must be re-usable without deterioration in quality.

5.2. Taking into Account the Materials

When it comes to recycling and reuse, there is a lack of efficiency in the design of construction materials. Furthermore, these buildings are made from raw materials, making this much more of a concern. It is damaging to the environment both locally and globally because of the mining and processing of these raw materials. Reusing and recycling materials is a significant consideration when building new structures or remodeling existing ones. The circular economy relies heavily on recycling, and it is time for building to follow suit. Buildings designed with the circular economy in mind also need a high level of durability and endurance from the materials utilized. Investing in long-lasting, multipurpose construction materials saves money in the long run by reducing the frequency and expense of future renovations.

5.3. Researchgap and Recommendations

There are, a number of areas in which more study might make a substantial contribution to the understanding of the concept of sustainability in the construction industry: It is thus recommended that; further research is also needed on the topic of sustainable building project management due to the fact that academics and practitioners have divergent views on the subject. The interrelationships between the many components that contribute to project success have to be looked into. The establishment of a single method for evaluating sustainability in projects is thus necessary, as this study shows there is currently none, by this, it is meant that there are varying methods of determining sustainability in the construction industry, the varying stakeholders in the construction industry should adopt a single or standard way by which each variable in the construction industry can be measured. Investigating the relationship between construction industry sustainability and factors necessary for construction success, and lastly, the need for a comparative study on sustainable construction and processes in both developed and developing countries still expresses significant paucity.

6. CONCLUSIONS AND RECOMMENDATIONS

In order to present a sustainable framework for managing construction projects, the assessment was able to identify the sustainable characteristics of projects. Many questions have been raised as a result of this investigation. There should be more research done on the following; Project success is evaluated by looking at how various sustainability elements interact. Finding a variety of strategies and methods that have a high success rate in increasing the long-term viability of a project, a single or dominant method for evaluating the sustainability of projects is being developed. What can be done to make sustainability assessments as prevalent as risk assessment and mitigation in projects? Investigating the relationship between construction industry sustainability and benefits management. Sustainability in building projects in industrialized and developing nations is compared and contrasted. Clients are increasingly demanding sustainability in both their businesses' construction and day-to-day operations. Sustainable construction projects currently lack standard regulations and strategies. As a result, many additional studies are needed to help the project delivery team better understand how to apply sustainable principles to the building process. It is important to remember that every building activity affects the environment. All of our actions, from the resources we consume to the technology we use to develop building sites, contribute to global warming. We cannot halt our enterprises or the economy as a whole, but we can minimize our negative influence on the environment by taking reasonable measures. The growing importance of sustainable construction project managers may be analyzed in various ways. To keep the economy going, building projects may be small or large in scale, depending on the final product or resources used in the construction process. These initiatives typically lead to smaller-scale government-supported construction projects. The project manager is at the heart of sustainability decisions in government and commercial construction projects. This imposes an additional constraint on time, money, quality, and scope. These problems are not sufficiently addressed by the project management frameworks presently in use. It was discovered in this research that the complex linkages in sustainable construction project management might also be complicated interactions or both challenging and tough at the same time.

DATA AVAILABILITY STATEMENT

The author confirm that the data that supports the findings of this study are available within the article. Raw data that support the finding of this study are available from the corresponding author, upon reasonable request.

CONFLICT OF INTEREST

The author declare that they have no conflict of interest.

FINANCIAL DISCLOSURE

The author declared that this study has received no financial support.

PEER-REVIEW

Externally peer-reviewed.

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