

Identifying The Factors That Increase The Cost of hse in Sustainable Projects Compared to Traditional Projects in Egypt

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Abstract: The increased cost of applying health, safety, and environmental standards to sustainable projects, as compared to traditional projects, causes project owners and contractors considerable concern because it reduces profits. The objective of the study is to identify the most significant factors that contribute to the increasing cost of sustainable projects. The study assesses the factors that increase the cost of implementing health, safety, and environmental management standards in sustainable construction projects as compared to traditional projects. Toward this end, a field survey was conducted on a sample of 53 selected projects in a specific geographical area with a high intensity of construction work. Data was collected using structured questionnaires and analyzed using a tabulated presentation that determined the percentages of responses given. The study's findings indicate that selecting HSE managers with more experience, increasing scaffolding security and specialized training and using more personal protection equipment in sustainable projects are some of the most significant variables causing cost increases. The findings show that improved HSE regulations are needed for the Egyptian construction sector, especially in traditional projects. To attain cost effectiveness, HSE issues must be recognized and integrated early in the project cycle. On sustainable Egyptian projects, the client, consultant, and contractor must collaborate to enhance health, safety, and the environment.

Keywords: HSE, Sustainable, traditional, Egypt, and cost.

1. INTRODUCTION

In recent years, the construction industry in Egypt has seen a shift towards sustainable and green construction projects. This shift has resulted in increased cost due to various regulations and standards that need to be adhered to. As the construction industry continues to expand, it is essential to find cost-effective solutions to achieve sustainability while still keeping spending within budget.

The complexity and inefficiency of the construction industry's approaches to worker safety and construction procedures are widely known. Over the years, the industry as a whole has earned a bad reputation for having a high casualty rate. Construction industry injuries and fatalities are more than 50% more common than in all other industries, according to reports from the Construction Industry Institute (CII) [1]. Occupational injuries were linked to long hours, poor safety, short work duration, job

dissatisfaction, young age, and job stress. Conclusion: Extended working hours, inadequate safety culture, and other risk variables contribute to non-fatal occupational injuries in this sample of construction workers. Thus, successful strategies to avoid work-related accidents and promote safer construction building work practices must be developed [2]. Competitive tendering, which does not provide a fair basis for estimating and bidding since contract papers like Bills of Quantities typically do not specify health and safety items, marginalizes the best financial resourcing of health and safety [3].

Building in poor nations will have issues. Industry resource shortages are monitored. This study claims that non-developing country subjects are essential, and some may be vital. Globalization, environment, and culture in rising country building activity, enterprises, and sectors need more research. Construction industry development

should address these issues. In other words, developing countries should develop construction industries that are well-positioned to benefit from globalisation (rather than those that are victims of this inevitable process in construction), enterprises and practitioners that are aware of, and actively seek to limit, their negative environmental impact, and which effectively apply local culture to facilitate their efforts to succeed on their projects [4]. Buildings are the biggest energy consumers and greenhouse gas emitters in industrialized and developing nations. Building energy use accounts for up to 50% of continental European carbon dioxide emissions. Energy savings, emissions management, material production and use, renewable resources, and building material recycling and reuse are urgently needed. Due to environmental concerns, new eco-friendly building materials and methods are crucial [5].

Even though few studies have addressed OHS issues in sustainable building construction projects, no study has developed a management framework to identify, analyze, quantify, and regulate safety risks for green building construction workers (GBCWs). Lack of consideration increases stakeholder costs and reduces the building industry's incentive to implement sustainable innovations [6].

This paper aims to explore the concept of cost optimization for health, safety, and environment (HSE) in sustainable projects compared to traditional projects in Egypt, offering insight and suggestions to identify and minimize unnecessary costs.

2. LITERATURE REVIEW

The practice of creating, operating, maintaining, renovating, and demolishing structures in a way that is resource- and environmentally conscious is known as "green building," according to the definition given [7]. The development of green buildings is gradually being accepted by the public and recognized as a crucial element in developing a green and sustainable society, as the advantages of green buildings have recently gained rapid awareness [8]. Traditional projects are typical and unsustainable projects that do not take sustainable development into account for the social, economic, or environmental needs of future generations. HSE culture governs workplace safety. The government requires us to follow the same law. Every company must have an HSE policy, which creates a safety culture [9].

LEED (Leadership in Energy and Environmental Design) is the most widely used green building rating system in the world. Available for virtually all building types, LEED provides a framework for healthy, efficient, and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement

and leadership [10]. The enhancement of safety performance in the construction industry can be facilitated by good safety performance at the project level. The elements influencing safety performance at the organizational level require further study [11].

Despite the enormous implications, safety-LEED literature is scarce. As said, Fortunato et al. [12] conducted case studies on LEED projects to identify and describe safety concerns related to design and construction practices used to attain certain LEED credits. The study found 12 credits that raise safety risks compared to traditional techniques. This analysis relies on Fortunato et al. [12], Gambatese et al. [13], and Rajendran et al. [14] to identify key credits, design and construction methodologies, and risks.

Doman [15] description Bottom-up aggregate OSH cost research totals fatal and nonfatal work-related injuries and illnesses, identifies worker, employer, and social costs, and matches costs to incidences. This method has two parts: epidemiological, which counts occupational accidents and diseases, and economic, which counts expenses. They can be done by different researchers if the same IDs are used to categorize health outcomes and allocate expenses. Everett and Frank [16] split the expense of workplace accidents into the first two groups; they regarded insurance as the direct cost, which included worker's compensation, public liability, and property insurance, while indirect expenses were included the same as in [17]. When Everett and Frank [16] compared their approach to that of Levitt et al. [17], they discovered that the cost of accidents had risen to 7.9% of the entire cost of construction. A cost model that included direct, indirect, and an assessment of the quality-of-life expenses associated with the injury, as previously described by [15], was used to synthesize the findings of [18].

2.1 Health and Safety Performance Cost:

Safety cost include complying with legislative accident prevention regulations, preventing accidents during construction, and improving health and safety conditions in all areas of work to ensure a safe working environment. Most individuals thought company health and safety costs were necessary and worthwhile [19]. Haefeli et al. [20] asserts that efficient health and safety management is not driven by reducing accident and work-related disease expenses. Haefeli et al. [20] noted that health and safety errors could affect a company's financial success through higher-level factors such customer and client expectations, employee morale, productivity, efficiency, and service delivery. Guha [21] argues that strict safety regulations in developing nations may be unreasonable and that

stakeholders cannot absorb the safety cost for economic survival if the true cost of accident is too low. Safety investment cannot be absolute, and a logical safety cost judgment is needed. Smallwood [22] estimates that construction companies spend 0.5% to 3% of project costs on health and safety.

2.2 Cost of Accident (CoA) :

The Cost of Accident (CoA), which can be stated as a percentage of organizational business volume or finished construction, is the final metric that all stakeholders can easily relate to. It could also be classified as direct or indirect, which make up the overall cost of an accident. In South Africa, the projected CoA is observed to be roughly 5% of the cost of the finished construction, as stated by [20]. Smallwood [22] demonstrates that the indirect costs of accidents exceed the direct expenses by (14.2). Human and worksite factors cause most workplace accidents and incidents. Thus, these aspects are considered immediate causes since they are easier to identify and investigate than underlying causes. However, external and management factors cause it. Management and external factors are the farthest causes. Management needs to be addressed as one of the underlying causes since it adds another dimension to the external factor, which is more broad [23].

2.3 Reasons for considering health and safety :

This follows from the concept that it is crucial not to minimize the impact of developing countries' construction industry's unique structure and characteristics on health and safety. Among the defining features of the Ghanaian economy are the country's large informal sector, its reliance on labor-intensive methods, the absence of a centralized regulatory body, and the proliferation of small contractors. The prevalence of the conventional procurement system, the use of temporary workers, the legacy of colonialism, and the sector's inherent fragmentation are also highlighted. Understanding H&S management in the construction industry in underdeveloped nations requires an awareness of these features (and their effect on H&S). Managing health and safety in the construction industry relies on addressing the difficulties posed by these features [24].

2.4 Reasons for considering the environment.

Employee engagement, productivity, and morale are all impacted by the office environment—both favorably and unfavorably. The majority of industries have hazardous and unhealthy working conditions [25]. Save people from themselves. The speed at which enterprises must adapt to ecologically friendly production methods that utilize less energy, resources, and pollutants has been debated. This call

is urgent since 40% of global carbon dioxide emissions come from the building sector, contributing to global warming. Emerging nations like Iran are the greatest offenders in this regard, since they continue to prioritize economic growth over environmental protection. Researchers have examined the reasons, obstacles, and impediments to the construction industry's continuous reluctance to the transition to sustainability that everyone agree is important in hopes of finding a solution. Thus, there is a lot of written material on the topic, including lists of barriers to change (particularly in regulation) [26].

2.5 Green Job Hazards :

Risks that are frequently present in traditional (non-green) construction, such as falls, electrical shock, stresses, tight spaces, and movable equipment, are faced by employees working on green buildings. Unfortunately, many workers entering the quickly expanding green building business may be unfamiliar with these construction-related risks. For instance, the construction and upkeep of "living roofs," sometimes known as "green roofs," has produced a possible fall danger for landscapers who are not used to working on elevated buildings like roofs. When workers advance from job to job, they frequently find themselves moving into and out of green employment, which could present extra risks. A roofer must be aware of the risks associated with each type of roof because they may install standard roofs one week and green roofs the next [27].

2.6 Role of HSE Department :

Health, safety, and the environment (HSE) at work include the physical, mental, and social well-being of workers, their dependents, and society as a whole. Collaboration and assistance from the government, the workforce, labor unions, and other organizations are necessary to achieve this. Concerns about workplace health, safety, and the environment have received less attention, but if ignored, they would be extremely costly. The most important thing is to know how to protect ourselves, our loved ones, our community, and the environment that we so heavily depend on for survival. Work-related illnesses and accidents could have a major impact on the lives of workers, their families, the community, employers, and the state [28]. Table 1 illustrates effects of work-related accidents on individuals, community and government.

TABLE 1: Work-related Effects of Accidents Source: [28] .

Affectees	Effects
Workers and his family	The grief and suffering of the injury or sickness, The loss of salary, The conceivable loss of a job, Treatment costs
Community	Seeing adored and praised-worthy individual suffering from an injury or ailment, anxiety and tension, Time and effort to look after for the person, financial damages and hardship, Loss of life
Employer	Payment for task not done, treatment and compensation expenditures, Repair or replacement of damaged machinery and equipment, Decrease or a provisional halt in production, High training expenditures and administration costs, Potential decline in the quality of work, Negative impact on morale of other worker
Government	Decrease in Gross National Product (G.N.P)

2.7 HSE in Sustainable and Traditional Project :

The development of more than one million LEED certified buildings, according to the U.S. Green Building Council, will enhance the value of green building by \$60 billion over the following ten years. The LEED program's popularity has risen quickly due to perceived reductions in harmful environmental effects and financial advantages from lower utility cost [29,30,31]. Despite the program's obvious advantages, general contractors assert that LEED projects are typically more complex and take longer to finish [32]. Additionally, Rajendran et al. and Fortunato et al. [12,14] discovered that the design and construction of sustainable buildings has major effects on safety as well. In their investigation into 74 initiatives, Rajendran et al. [14] revealed that compared to non-LEED projects, LEED certified projects had a mean recordable injury rate (RIR) of 6.12 injuries per 200,000 worker-hours. The entire project is affected by the 9% increase in RIR, not just the building of the sustainable components. Fortunato et al. [12] improved on this research by carrying out case studies to pinpoint the fresh safety issues brought on by the design and building techniques used to obtain LEED certification.

2.8 Impact of Sustainable Building on Health and Safety :

Despite sustainable buildings' low H&S performance, Rajendran et al. [14] found little empirical evidence of SB concerns. LEED-certified SB projects had 48% higher recordable injury rates (RIR) than non-LEED SB constructions. Few studies have examined these topics [12,33] Green roofs enhance fall risks during installation and maintenance. Chen [34] showed how servicing solar

panels directly involved servicing the power source, increasing electrical shock and trip risks. Skylights, atria, and windows in SB boosted interior lighting but increased construction and maintenance falls [12,34,35]. Gambatese et al. [35] found that recycling building waste increases musculoskeletal injuries due to physical handling and material separation. Greg [36] states that the white, reflective roofing used on some Sustainable Building (SB) projects provides a visual hazard for employees, especially in the summer, and that these risks are greater than those on non-SB projects due to increased exposure [37].

2.9 Impact of LEED Certifications on Health and Safety :

Sustainable building is growing with numerous sustainability rating systems (SRSs) worldwide. SRSs' environmental advantages have been researched more than construction workers' H&S consequences. Lean and Hong Kong Building Environmental Assessment Method SRSs caused 30 incidents and eight dangers. SRSs may pose H&S risks without creating new ones. "Falling from height" and "manual handling injuries" from solar installation and recycling garbage are the most sustainability risks. The data is largely connected to Leed, but additional research is needed to evaluate if other SRSs, such as the Building Research Establishment Environmental Assessment Method in the UK or Green Star in Australia, can solve H&S risks associated to sustainable building projects [41].

Fortunato et al. [12] observed that LEED workers spend more time near unstable soils, electrical currents, heights, and heavy gear than non-LEED workers. Fortunato et al. [12] found that LEED certifications were connected to increased H&S risks. Onsite renewable energy credits boosted the falls by 10.2%. Construction waste management credits increased laceration, strain, and sprain injuries by 26.2%, and advanced wastewater technologies credits increased overexertion by 12.5%. H&S is built into SB design since it prioritizes occupant welfare.

3. RESEARCH METHODOLOGY

A literature study illustrating the monetary benefits of meeting HSE standards in conventional and green buildings.

The cost of applying HSE standards in sustainable buildings and traditional structures in the Egyptian construction sector was compared using an actual survey (on-site and off-site interviews).

Data collection is the process of gathering specific information to support a certain issue. The key cost variables for adopting HSE requirements in sustainable projects as opposed to traditional projects in Egypt were determined using a literature analysis and expert interviews. In a number of Egyptian businesses, a survey questionnaire

was distributed, and the responses were analyzed statistically.

In order to create interview questions that would help determine the reasons why applying HSE standards in sustainable projects in Egypt would be more expensive than doing so in regular projects, interview procedures were organized. Do you believe that the cost of adopting HSE standards in sustainable projects is higher than their cost in traditional projects? This was one of the two primary questions that the components gathered from the literature research were subjected to. What factors, in your professional opinion, have contributed to the rise in sustainable construction projects? Are there any more justifications you would like to add? Several explanations of the reasons were partially modified, removed, and combined during the interviews.

Three sections were intended to be included in the survey. The general questions, the projects the respondents have undertaken, their duration, their cost, and the number of years they have worked in the field are all included in the first section. The second part of the questioning concentrated on HSE guidelines and data for building projects. In order to determine the most significant project risks, the process for choosing the project owner for contractors, the process for choosing HSE managers and personnel, and the process for logging accidents and reports, a number of questions were developed.

The cost of applying HSE standards to construction projects was the subject of the questionnaire's third section. In order to lessen the duty on the respondents to reveal project secrets, a series of questions were established concerning the most significant elements that influence the cost of adopting HSE standards in projects, with estimated numbers for the cost for each factor.

analyzing and figuring out why it costs more to implement HSE standards to sustainable structures than it does to conventional projects.

3.1 Sample Size & data collection :

The sample size (N) was 66 as the focus was only on sustainable and traditional construction projects in different companies in Egypt. Seventy online questionnaire forms and personal interviews were distributed among various entrepreneurs, consultants, project managers and HSE managers in different projects. Only 53 of 66 answered the questionnaire. The data collected from 53 sustainable and traditional projects in Egypt were analyzed using the statistical methods mentioned in the Statistical Package for Social Sciences (SPSS).

Sample size is a statistical concept that involves determining the number of observations or replicates (the

repetition of an experimental condition used to estimate the variability of a phenomenon) that should be included in a statistical sample. It is an important aspect of any empirical study requiring that inferences be made about a population based on a sample. Essentially, sample sizes are used to represent parts of a population chosen for any given survey or experiment. To carry out this calculation, set the margin of error, ϵ , or the maximum distance desired for the sample estimate to deviate from the true value. To do this, use the confidence interval equation above, but set the term to the right of the \pm sign equal to the margin of error, and solve for the resulting equation for sample size, n . The equation for calculating sample size is shown below [39].

$$\text{Unlimited population: } n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2}$$

$$\text{Finite population: } n' = \frac{n}{1 + \frac{z^2 \times \hat{p}(1-\hat{p})}{\epsilon^2 N}}$$

where

z is the z score

ϵ is the margin of error

N is the population size

\hat{p} is the population proportion

Result

Sample size: 66

This means 66 or more measurements/surveys are needed to have a confidence level of 90% that the real value is within $\pm 10\%$ of the measured/surveyed value.

Confidence Level: 95%

Margin of Error: 5

Population Proportion:

Use 50% if not sure

Population Size: 2500

Leave blank if unlimited population size.

3.2 FORMULATING THE QUESTIONNAIRE

The questionnaire was prepared while being mindful of its advantages so as disadvantages.

The questionnaire was constructed while being cognizant of its types.

The questionnaire was delineated while considering its construction.

The questionnaire was outlined while following its basic rules.

The questionnaire was arranged while knowing its administration-modes.

The questionnaire was formulated while encompassing all its concerns.

TABLE 2: Participants numbers (Cluster 1)

No.	Cluster 1: Personal and Project Information							
	Inquiry	Alternatives						
1-3	Position	Owner (3/3)	Contractor (5/2)	Project manager (11/6)	Safety manager (12/11)	TOTAL (31/22)		
1-4	Years of experience	<10 (20/4)		10-20 (10/8)		>20 (1/10)		
1-5	Type of project	Sustainable projects (22)		Traditional projects (31)		Both		
1-10	Project budget (x 10 ⁶)	<1 (0/0)	1-10 (0/0)	10-50 (1/0)	50-100 (2/0)	100-500 (12/5)	500-1000 (6/6)	More than 1000 (10/11)

TABLE 3: Participants numbers (Cluster 2)

Cluster 8: Safety cost									
No.	Inquiry	Selection							
8-1	Amount spent on HSE	1 (0/0)	2 (0/0)	3 (0/0)	4 (3/0)	5 (8/0)	6 (20/22)	7 (0/0)	8 (0/0)
8-2	cost of HSE official salaries (i.e. related to their experience years)	1 (0/0)	2 (0/0)	3 (7/2)	4 (22/7)	5 (2/13)	6 (0/0)	7 (0/0)	8 (0/0)
8-3	Cost of PPE (personal protective equipment)	1 (0/0)	2 (0/0)	3 (7/1)	4 (15/9)	5 (9/12)	6 (0/0)	7 (0/0)	8 (0/0)
8-4	Cost of equipping toilets	1 (0/0)	2 (18/3)	3 (8/10)	4 (5/9)	5 (0/0)	6 (0/0)	7 (0/0)	8 (0/0)
8-5	Cost of securing scaffolding	1 (0/0)	2 (11/0)	3 (9/6)	4 (7/4)	5 (2/9)	6 (2/3)	7 (0/0)	8 (0/0)
8-6	Cost of additional tools	1 (17/0)	2 (4/6)	3 (10/12)	4 (0/4)	5 (0/0)	6 (0/0)	7 (0/0)	8 (0/0)

* * Where question number 8-1 to 8-6, each has 8 selections that are numbered, as follows:

1. < 1x10³ LE
2. 1– 50x10³ LE
3. 50–100 x10³ LE
4. 100– 500 x10³ LE
5. 500x10³– 1x10⁶LE
6. 1– 10x10⁶ LE
7. > 10x10⁶ LE specify
8. Don't know

4. Results and Discussion.

In the answers and responses, there were 53 examples of both traditional and sustainable projects in Egypt. Figure

(1) shows that where traditional projects are more common, they made up 58% of the answers (31 answers) and 42% of the answers (22 answers) were about sustainable projects.



Fig 1: Classification of projects.

4.1 Comparing the cost of applying HSE standards in sustainable construction projects compared to traditional projects in Egypt:

According to the field survey and personal interviews, 27% of sustainable projects cost more than 100 million pounds, while only 3% of traditional projects cost more than 100 million pounds (Figure 2). Figure 3 demonstrates that the application of health, safety, and environmental standards to all 100 percent sustainable projects cost more than one million pounds, in contrast to the estimated cost of more than one million pounds for traditional projects (65%). Conversations with HSE managers have revealed that it costs between 1% and 3% of the overall project cost and between 2% and 5% of the total cost for sustainable initiatives.

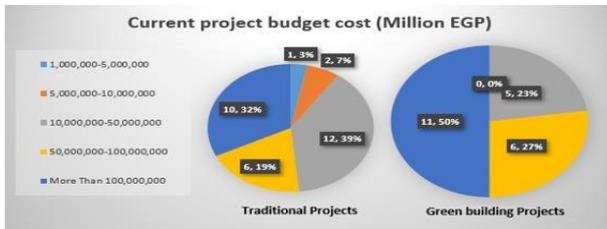


Fig 2: project budget cost (million EGP).

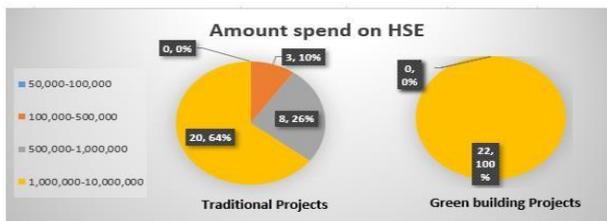


Fig 2: Amount spent on HSE.

4.2 Factors affecting the increase in the cost of HSE practices in sustainable projects compared to traditional projects:

4.2.1 Personal years of experience and Cost of HSE staff salaries:

As the results showed that there are 22 sustainable initiatives, HSE managers in green projects need greater experience, which raises the cost of HSE practices. Eight projects needed HSE managers with more than 20 years of experience (36.36%); four needed between 10 and 20 years (18.18%); and 10 needed less than 10 years (45.4%). Compared to 31 traditional projects, 1 required HSE officials with more than 20 years of experience, at 3.23%; 10 required between 10 and 20 years of experience, at 32.25%; and 20 required less than 10 years of experience, at 64.52%, as shown in Figure (4) and Figure (5). As a result, sustainable projects had higher HSE manager salary costs than traditional projects.

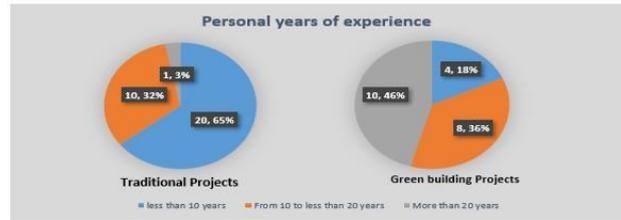


Fig 4: Personal years of experience.



Fig 5: Cost of HSE staff salaries.

4.2.2 Securing scaffolding:

The study showed that securing scaffolding for sustainable projects is more expensive than the cost of traditional projects. One of the reasons is that work on the roofs of the project takes longer due to the installation of renewable energy on the site (such as solar panels) and the use of green roofs, where of the 22 respondents, the rate of about 55% exceeded 100 thousand pounds, compared to the traditional projects of the 31 respondents, the rate was 12% more. From 100 thousand pounds. Figure 6 shows that scaffolding insurance for sustainable projects with a value of less than 1000 EGP was also zero, compared to 36% for conventional projects.

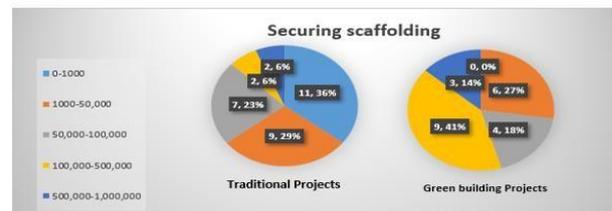


Fig 6: Cost of securing scaffolding.

4.2.3 Additional tools and additional materials:

Due to the various tasks involved in sustainable projects, such as recycling building materials and applying reflective roof films, the study found that personal protective equipment and more materials are used in sustainable projects than in traditional projects. Survey results show that people are more likely to be exposed to harmful substances when new wastewater technologies are developed. This is because the estimated percentage of the value increases with the increase in the number of the 22 participants, whose choices in sustainable projects ranged from 1,000 to 500,000 pounds, while the percentage was distributed. The opinions of the participants in the 31 respondent traditional projects ranged from 46% to 1,000

EGP to 100,000 EGP, and 54% less than 1,000 EGP, as shown in Figure (7).



Fig 7: Cost of additional tools and additional material.

4 DISCUSSION

As the salaries of the managers of health, safety, and the environment came first from the researcher's perspective, the study demonstrated that these factors were the most significant ones that contributed to the increase. Where more than 500,000 respondents (59% of them) participated in sustainable projects. This is because managers for health, safety, and the environment were chosen for sustainable projects who had more experience; 82% of respondents had more than ten years' experience, compared to 35% in standard projects. The expense of securing the scaffolding comes in second place since, in sustainable projects, green roofs are used and installation of renewable energy on the site takes longer than it does in traditional projects, which have a dearth of such work. The usage of personal safety equipment and further training is then required to do some specialized tasks in sustainable projects, such as installing reflecting surfaces and recycling waste, which weren't as prioritized in typical projects. In contrast, some research' findings suggested that the usage of personal protective equipment came first, followed by the previously mentioned toilet amenities and medical services [38]. Not only do those variables point to rising prices, but some traditional projects also fail to apply health, safety, and environmental regulations because their proponents think that doing so results in unnecessary delays and expense increases.

6 Conclusions and Recommendations

This paper examines the cost of health, safety and environment practices in the Egyptian construction industry, which is one of the things that make sustainable projects more expensive than traditional ones as it represents approximately 2-5% in sustainable projects compared to 1-3% in traditional projects, compared to 5% results in a research paper [40]. The results of the survey showed that the most important factors that led to this increase were the salaries of health, safety and environment managers because projects require highly experienced managers, and 82% of the respondents had more than 10 years of experience compared to 35% in traditional

projects, as well as the cost of securing scaffolding and the cost of protective tools Extra personality compared to traditional projects.

The research led to the following suggestions for construction companies and gave ideas for more research to be done in the future.

1. Increasing awareness among design and construction firms of the importance of sustainable buildings in preserving basic resources and energy for future generations.
2. Building an organizational culture in the construction companies to adopt and apply the principles of HSE practices and to be a single control body for all types of projects with the same standards and inspection controls.
3. Improving the idea of using HSE practices and the role they play in saving lives and lowering the costs companies must pay out in compensation for accidents, worker injuries, and equipment accidents that happen while projects are being done.
4. Emphasizes the importance of incorporating HSE practices into all engineering contracts due to their importance and effectiveness in the preservation of human life and ensures that they are implemented by competent authorities in Egyptian construction projects.
5. Encouraging the adoption of green technologies and materials by offering incentives to stakeholders, such as tax exemptions and subsidies.
6. Improving labor laws and regulations related to HSE to ensure compliance with international standards.
7. Developing a comprehensive plan for waste management and disposal to minimize environmental impacts.

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