

The Enforcement of Occupational Safety and Health Requirements in Public and Private Sectors in the Emirate of Abu Dhabi, the United Arab Emirates

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Abstract

Research Problem: In Abu Dhabi, limited implementation of OSH Regulations contributes to the general unawareness among employees and workers about occupational hazards and safety measures, resulting in slow responsiveness toward enforcement measures and a lack of self-regulatory approaches within companies. **Purpose:** The purpose of this study is to examine the implementation methods practised in Abu Dhabi with those in developed countries with established OSH regulatory bodies. **Methodology:** Qualitative and quantitative research methods were employed to gather primary research data. Workers from various industries in Abu Dhabi were sampled on purpose and asked to respond to questionnaires and interviews on OSH protocol awareness and implementation, and circumstances of workplace incidence. **Results:** The findings of this study showed that the enforcement of OSH requirements in UAE positively correlated to a reduction in the rate of work-related injury and improved business performance. The quantitative research data showed that the energy sector had the highest score (15) while the tourism sector had the lowest score (5.3) in occupational health systems and improvements in business efficiency and productivity. **Implications:** The outcomes of this study shed light on the importance of implementing OSH Guidelines for companies to empower their safety managers to fully enforce OSH requirements in their organisations. In conclusion, effective OSH enforcement requires cooperation between general workers and OSH managers and facilitation from business owners.

Keywords

Occupational Health and Safety, Abu Dhabi, The United Arab Emirates, Implementation

1. Introduction

1.1. Background of the Study

The United Arab Emirates government assumes the role of protecting the health and safety of all employees as enshrined under several laws and programmes following the International Labour Organisation's (ILO) conventions related to workers' rights [1]. Occupational Safety and Health (OSH) requirements in Abu Dhabi Emirate (the capital of UAE) were established after issuing The Executive Council Decree No. 42 of 2009 on the Environment, Health and Safety Management System (EHSMS) of the Emirate of Abu Dhabi [2]. OSH roles and responsibilities have been published and enforced officially in Abu Dhabi Emirate since 2010 by the Abu Dhabi Occupational Safety and Health Centre—OSHAD (2016). The OSHAD enforcing agency directly reports to the Abu Dhabi Executive Council, the Emirate's highest authority.

Figure 1 illustrates the hierarchical structure of the OSHAD-SF administration. The OSHAD-SF consists of a series of mandatory and explanatory requirements that apply to government and public sector activities. The level of implementing health and safety requirements depends mainly on the level of risk and types of activities [3]. The level of risk is determined by many factors defined in the OSHAD-SF Mechanism 3.0—Identification, Assessment & Nomination of Entities. One of the main requirements for high-risk entities is “The Elements”, which explains the requirements of the high-risk entity in terms of procedures to be developed, implemented, and maintained. The elements document includes nine elements stipulating the requirements of OSH roles and responsibilities: risk management, management of contractors, communication and consultation, emergency management, training and competency, and management review.

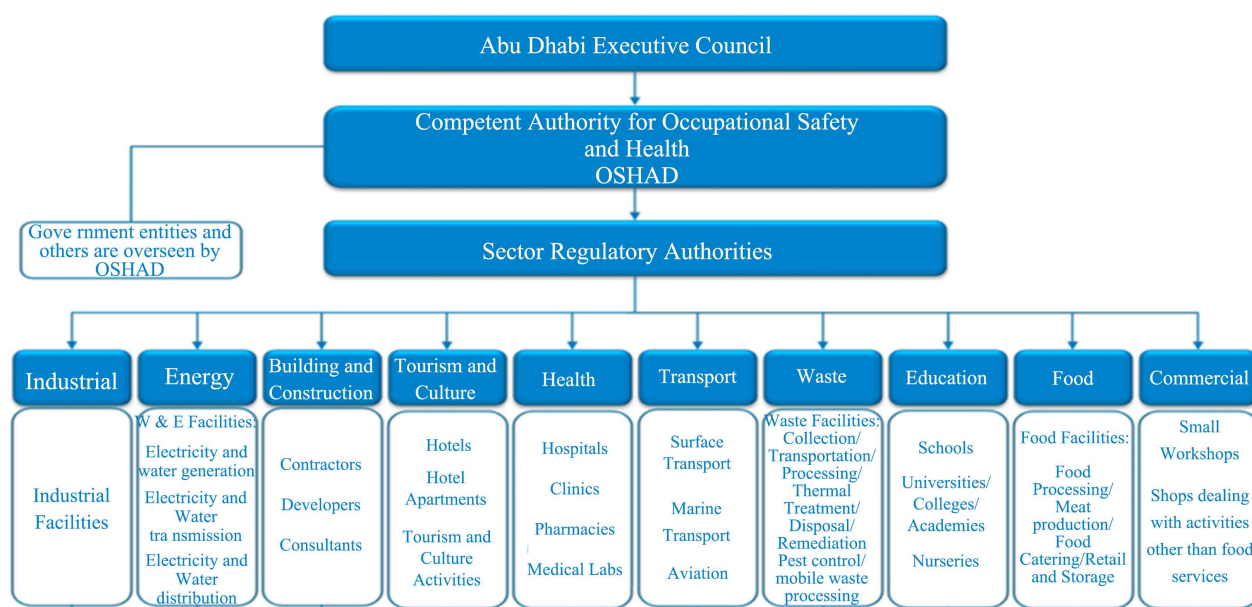


Figure 1. The Abu Dhabi Emirate OSHAD-SF administration hierarchy. Source: Adopted from OSHAD (2018).

1.2. Problem Statement

The limited enforcement of the Occupational Safety and Health Standards (OSH) in the Arab country stems from the need to protect employees and workers in various areas. Injuries are the second leading cause of death in Abu Dhabi, with occupational injuries accounting for 16% of the total injuries in 2020, which increased to 22% [4]. Humans may induce injuries, emanate from animals, or be inflicted by equipment, falling objects, or hazardous items. The significance of the matter is crucial due to the nature of the popular industries in the UAE. The health risks from injuries may be simple in terms of cuts or horrific, such as the loss of limbs [5]. The construction, manufacturing, and retail sectors are amongst the biggest entities in the nation, despite the dangers associated with the firms related to physical injuries.

1.3. Aims and Objectives of the Study

The main aim of this study is to examine the implementation of the Occupational Safety and Health Standards (OSH) Framework in the United Arab Emirates (UAE). Further, the objectives of the study are:

- 1) To determine the occupational benefit and health programs to ensure employee safety and improve business performance.
- 2) To investigate the current occupational areas with substandard health and safety measures.
- 3) To provide a comparative analysis between best practices in public and private sectors in advanced countries and those practised in Abu Dhabi.
- 4) To analyse the positive changes in the health and safety system and business efficiency and productivity improvements.

1.4. Research Questions

To achieve the aim of this study, the following three main questions must be answered by the research:

- 1) Research Question 1: What are the methods of enforcing OSH requirements used in the advanced countries in public and private sectors? The sub-questions are as follows:
 - a) What are the methods of OSH enforcement used in the United Kingdom by the Health and Safety Executive in Great Britain “HSE-UK”?
 - b) What are the methods of OSH enforcement used in the United States of America by the United States Department of Labour Occupational Safety and Health Administration “OSHA”?
 - c) What are the methods of OSH enforcement used in Australia by the Australian Government Safe Work Australia?
 - d) What are the methods of OSH enforcement used by OSHD?
- 2) Research Question 2: What are the best methods for enforcing OSH requirements on public and private sectors in the UAE and the Abu Dhabi Emirates in particular?

3) Research Question 3: To what extent do the selected methods protect employees, reduce incident rates and increase business performance? The subquestions are as follows:

- a) What are the incident rates before and after enforcing OSH requirements?
- b) What is the business performance before and after enforcing OSH requirements?

1.5. Significance of the Study

One of the key contributions of the study is to expand the empirical evidence on the subject by focusing on Abu Dhabi, for which there is insufficient evidence available. The country's workplace culture and regulatory norms differ from that of the majority of Western countries, which have remained the focal point of most of the previous studies on OSH enforcement and compliance. Several Western countries have embedded OSH guidelines in their work culture, realising the monetary and other costs associated with the negligence. By contrast, in Abu Dhabi, OSH enforcement and compliance are yet to be entrenched as a safety measure norm and remain merely a regulation. Thus, addressing the OSH enforcement in Abu Dhabi will help diversify the empirical evidence on the subject. In addition to this, an important part of the research is to present the business or financial aspect of enforcing the OSH standards. There is a need, however, to note that it is still unclear how or to what extent the OSH protocol and measures help a firm gain financial stability or long-term sustainability.

2. Literature Review

2.1. Introduction

This chapter focuses on the literature available in this study area, identifies the best OSH practices worldwide, and compares them to those in Abu Dhabi. Specifically, the practices of OSH standards in the USA, UK, Singapore, and Australia are examined. The selected literature review identifies the enforcement practices focusing on the available programmes meant to encourage or incentivise compliance with OSH standards. Additionally, the benefits of OSH compliance are discussed. This provides recommendations that advise on the scope for Abu Dhabi in UAE. Further, this chapter examines how Abu Dhabi lags in policy adoption and enforcement.

2.2. Literature Search

The literature search was conducted through various online databases. The research questions defined the area of focus for the literature review. Consequently, the use of a comprehensive list of sources was justifiable. The search optimisation technique involved appropriate keywords and a focus on specific countries. The search of the sources in the databases involved the use of a combination of keywords including but not limited to occupational work safety standards, enforcement of workplace safety and health standards, best ways of

enforcing workplace safety standards, benefits of enforcing workplace safety standards, and the challenges of enforcing workplace safety and health standards in Abu Dhabi. The keywords later formed pertinent themes for the literature review. Studies related to this research topic were sampled.

2.3. Benefits Incurred from OSHAD-SF Implementation: A Business Perspective

Abu Dhabi Government confirms the government's positive and increasing role in promoting OSH culture in practice. OSHAD-SF can benefit from improved OSH standards in the workplace in both the private and public sectors. Private and public entities must meet and strive to exceed the required level and maintain high compliance with OSH guidelines [6]. The benefit provided by OSHAD-SF can reduce corporate liabilities and risks. This framework can reduce workplace injuries, incidents, and illness [3].

The field of OSH combines or contradicts the topics of human capital and business profitability. Therefore, it is important to look at the underpinning concepts related to the enforcement of OSH requirements. One of the fundamental theories in this regard is the Resource-Based View (RBV) theory [7], which combines aspects of human capital and structural capital. According to Goh and Loosemore [8], organisations compete with their resources, where humans comprise one of the company's central resources, followed by buildings, equipment, tools, and other assets and resources. In case of any occupational safety issue and health-related injury, a company's human capital and structural capital are in jeopardy, thus damaging the firm's resource standing.

Núñez and Villanueva add that companies gain a competitive advantage when their resources are unique and cannot be duplicated [9]. In this context, providing a safe and risk-free work environment can be used as a resource to gain a unique identity in the market. For example, a firm can promote itself as the safest place to work in the relative industry by showing statistical facts regarding the number of injuries in the past years. Another critical dimension is provided by Kheng-Khor and Surienty [10], explaining the relationship between a safer workplace and employee involvement.

2.4. Comparative Description of OSH Methods of Enforcement

The initial step of the comparative analysis was a scoping review study, intending to systematically review all relevant studies and narrow it down to the ones that focus on one or more of the targeted regions: 1) the USA, 2) the UK, 3) Australia, and 4) Singapore. The reason for choosing these countries is because of their leading position in OSH standards and implications. The USA and the UK have considerable representation in the OSH international body, which reveals the role of these countries in designing and implementing the policies. Furthermore, Singapore and Australia have enjoyed significant development in their workplace safety sector over the past decade. Their examples can be used to

compare with the Abu Dhabi workplace health and safety measures to present a contrasting or parallel viewpoint.

2.4.1. The United States of America (USA)

The implementation of OSH measures is governed by the OSH Act of 1970. Importantly, the passage of the OSH Act was to ensure safe and healthy working conditions and environment for any worker in the USA. According to McQuistoan *et al.* [11], OSH enforcement in the USA is based on the deterrence theory, whereby strict and swift actions are taken against firms not meeting safety standards. The actions include hefty fines and ordering work to stop. A survey of 6842 manufacturing plants, which were inspected and cited by OSHA between 1979 and 1985, found that a 22% reduction of injuries was recorded in these plants after the inspection. Legal policies for meeting the safety standards include regular inspections from the OSHA and implementing legal fines and other punishments like suspending business operations.

Different states of the USA have forwarded different OSH enforcement programmes. Oregon and Washington have initiated programmes that raise awareness through electronic access to data [12]. This includes enabling private and public entities personnel to access information pertinent to OSH standards and regulations through voice, videos, and written content on the internet, including portals. Many states have partnerships meant to improve compliance with OSH standards. **Table 1** shows chronological events leading to the full development of the OSH guidelines in the USA. The first industrial safety initiative was implemented in 1912, with a core concept of promoting the prevention of accidents. The original initiative was developed for at least six decades to include safety standards and relevant enforcement programmes.

Table 1. Timeline of notable OSH Initiatives in the U.S.

Year	Initiative	Concept
1912	Establishment of the National Council for Industrial Safety	Promote accident prevention programmes
1970	Occupational Safety and Health Act is passed into law	Institute safety standards and enforcement programmes
1980	Implementation of emergency room-based and population-based injury surveillance system	Institute a database for work safety accidents
1991	Issuance of confined space standards	Prevent injuries from workplaces with confined spaces
2007	Enactment of rulemaking employers liable for employees' Personal Protection Equipment	Enforcement of safety liability of employers
2010	Injury and Illness Prevention Programme Initiative	Enabling employers to identify and fix hazards at workplaces

2.4.2. The United Kingdom (UK)

The research follows the UK framework on OHS that follows twelve statutes founded on different Acts of Parliament over time. Compliance with the OHS Act of 1969 was the first move for the UK government towards OHS. It maintains that businesses should be insured against litigations that emanate from injuries or health conditions related to the workplace. Firms should be ready to compensate workers, which enhances their confidence. The Act advises that employers may have to cater to health-related problems that may be outside the confines of the work premises [13].

The Management of OHS Regulations Act of 1999 improved on the 1974 general OHS enactment. The former introduced specific rules for employers and employees with regard to OHS. Employers had to undertake risk assessments and create a hierarchy of the dangers within their environment. For instance, a cloth-making factory could indicate a rank of dangers, including fire from the textile-generating plant, cuts from the machinery, and breathing issues as a result of long-term exposure to chemicals. Consequently, it could introduce measures to curb the risks [14]. Also, the employer should inform the employees of the dangers in the working environment and relay the safety measures.

The OSH standards in the UK comprise five major principles. These are transparency, accountability, targeted, consistency, and proportionality [15]. Transparency ensures that all workers at a working station understand the OSH principles. Accountability ensures that the flow of responsibility is linear, right from the workers to the HSE, the minister, the parliament, and the public. Targeting elements refers to the direction of any standards towards the reduction and elimination of a certain hazard. Consistency then explains the congruency between any new standards and the existing laws and regulations. Proportionality measures the relation between risks and cost (Table 2).

2.4.3. Australia

According to Schofield *et al.* [16], the OSH enforcement structure changed from the deterrence strategy to the responsive regulatory approach in the early 1990s. Ayres and Braithwaite [17] noted that the failure of a one-dimensional deterrence approach is that enforcement would vary across regions, and companies would always find a loophole in the enforcement strategy. The use of the “responsive regulatory approach” draws upon both coercive and persuasive enforcement measures. First, employers are educated and persuaded to make employee safety their utmost priority and follow all safety standards. Coercive sanctions are imposed when companies prove unresponsive to the softer measures.

Table 2. The principle of proportionality.

Initiative	Solution	Concept
“Think Small First”	Offering guidance on HSE policies and standards Offering electronic toolkits	To consider the impact of HSE policies on small businesses

To implement uniform safety standards across the country, a process of standards development and adoption was initiated by the National Uniformity Taskforce, headed by the National Occupational Health and Safety Commission (NOSHC).

In Australia, the focus for OSH at workplaces is anchored on proactiveness and prevention rather than a reaction to the aftermath of incidents, including individual care [18]. The economic burst in Australia called for the creation and enactment of appropriate legislation meant to prevent accidents at workstations across Australia. There have been improvements across several sectors, with dramatic changes in terms of deaths, injuries, and disease, all originating from lapses in OSH standards. According to the National Occupational Health and Safety Strategy 2002-2012, Australia made significant progress in improving WHS outcomes, including a 41% reduction in the fatality rate and a 26% reduction in the work-related injuries rate during its life [19]. When compared to other nations, the level of safety and health awareness is higher in Australia, and thus, the country has a relatively healthy working population.

2.4.4. Singapore

The Singapore government has institutionalised the entire OSH framework in such a way that the stakeholders have now become the leaders of safety standards. This has brought a revolution in the OSH measures in the country. The Workplace Safety and Health Bill (WSHB) was passed in 2006, which directed that employers must maintain safety and health precautions in the workplace [20]. To illustrate this, Singaporean law requires employers to ensure workplaces have proper ventilation systems. The current state of workplace health and safety in Singapore involves practices that move away from mere compliance with the regulations and instead prioritise a performance-based approach under the WSH Act. The performance-based approach under the WSH Act requires employers and other stakeholders to work towards the reduction of risks and hazards at the workplace.

2.4.5. The Case of UAE

The national OSH legislation in UAE is based on the UAE's federal law on labour enacted in 1980. Two years later, additional fundamental federal laws on the protection from hazards were enacted under Order No. 32 (1982) following Ministerial Decision No. 37/2 of 1982. Other hazard-specific regulations were enacted, such as the 2002 Federal Law No. 1 on use, monitoring and protection from radioactive material and other risks, which required the determination of retentive methods and measures for the protection of workers from the risks at work (Ministerial Order no 32-1982) [21].

The OSHAD-SF has designed an internal audit framework, which entails the lagging and leading performance indicators. Firms are required to conduct the audit every 3 - 6 months, depending on the nature of the firm, and identify safety measures based on historical data on incidents and injuries (lagging indi-

cators) and proactive measures to further improve the safety standards in the future (leading indicators). The audit also entails a detailed report on what corrections were made, how they were implemented, what improvements were recorded, and what changes did not work (**Table 3**).

2.5. Barriers and Challenges to OSH Enforcement

Abu Dhabi, and, by extension, the UAE, has many migrant workers employed in its vast industries, including construction, factories, farms, and industrial workshops. Abu Dhabi: The largest Emirate accounts for most of these workers, as well as the fatal injuries that cause death [22]. A large number of migrant workers and the many locals in vulnerable and hazardous occupations outstrip the nation's ability to enforce OSH standards effectively. The UAE still faces barriers and challenges that include the lack of enough data on occupational injuries. The lack of such data makes it difficult to ascertain the most appropriate way of tackling the menace that awaits, such as fatal injuries. Notably, the lack of crucial data relating to occupational safety leads to situations where auditors cannot tell whether any reduced cases of serious injuries and fatalities are due to enhanced work safety measures or a slowdown in the workplace for hazardous occupations.

Following the implementation of OSH guidelines, fatal occupational injury rates have decreased in the UK, USA, Australia and Singapore, as summarised in **Table 4**.

Table 3. Summary of OSH guidelines in Australia, the United States, the United Kingdom and Singapore.

Country	Model of OSH Implementation
United States	The implementation of OSH measures is governed by the OSH Act of 1970 to ensure safe and healthy working conditions and environment for any worker in the USA.
The United Kingdom	The OSH standards in the UK comprise five major principles of transparency, accountability, targeted, consistency, and proportionality.
Australia	The National Uniformity Taskforce, headed by the National Occupational Health and Safety Commission (NOSHC), implements uniform safety standards across the country, a process of standards development and adoption.
Singapore	The Singapore government has institutionalised the entire OSH framework, making stakeholders the leaders of safety standards and subsequently revolutionising the OSH measures. The Workplace Safety and Health Bill (WSHB) was passed in 2006, further ensuring that employers must maintain safety and health precautions in the workplace.

Table 4. Fatality rates.

Country	Fatality Rate
UK	0.61
USA	3.5
Australia	1.4
Singapore	0.9

2.6. Theoretical Framework

The main aim of deploying the resource-based view is to allow firms to take full advantage of the resources at their disposal to attain a specific goal/purpose. The resource-based view, as shown in the figure below, illustrates how firms in the United Arab can take advantage of resources at their disposal to influence the uptake/adoption of OSH guidelines in the country. The resources at the disposal of the firms are human resources (employees) and technology to monitor the progress of the models in action. The core competencies of the firms are their ability to liaise with key government entities. The UAE government has put in place strategies to create a good working environment through licensing and support, providing firms that comply to operate smoothly. The business capabilities of the firms are the ability to lower the rates of death, injury or trauma within their working environments. The combined effect of the three facets, therefore, allows firms to realise their full potential (through the resource-based view) and thus contribute to the adoption of OSH Guidelines in the United Arab Emirates, as shown in **Figure 2** below.

2.7. Research Hypotheses

2.7.1. Enforcement of OSH and Incident Rates

The growing rate of occupational injuries can be associated with the prevalent barriers and challenges to OSH enforcement measures. There is still a substantial lack of awareness when it comes to safety protocols, and this is among the most prevalent barriers to OSH enforcement. As Ayres and Braithwaite [17] noted in a deterrence system, an ineffective inspection mechanism will result in employers exploiting employees and not adhering to safety standards. With the growing number of construction and other projects in the UAE, the periodic interval for inspection has become elongated, resulting in more injury cases going unnoticed and unreported. Other studies have highlighted financial constraints and the lack of resources to dedicate to OSH measures. There is sufficient evidence showing that the implementation of OSH guidelines is, therefore, likely to lead to a reduction in the incident rate of work-related injuries.

Hypothesis 1: The enforcement of OSH requirements in UAE positively correlated to a reduction in the rate of work-related injury.

2.7.2. Business Performance and Enforcement of OSH Requirements

A major obstacle in the enforcement of OSH standards is the lack of adequate

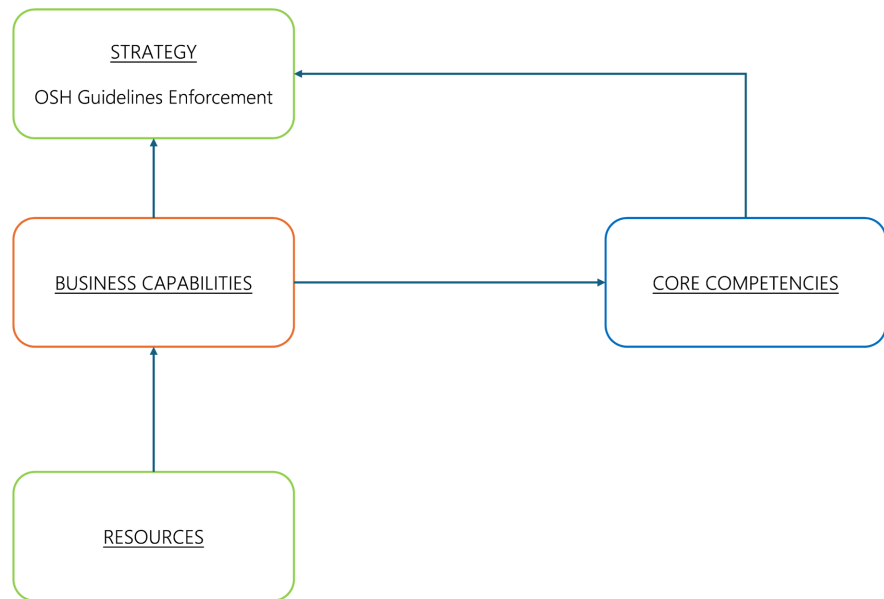


Figure 2. The Resource-based view and its application on the OSH guideline implementation in the UAE.

and comprehensive OSH systems [23]. In some instances, corporate entities lack the financial power to hire qualified occupational safety staff as well as purchase personal protective equipment (PPE). There is an overemphasis on safety compliance from larger entities that make up a smaller proportion of the industry as compared to the many smaller ones that are characterised by financial instability and fragility. Specifically, inadequate funding for small businesses limits the adoption of work safety resources [24].

While larger corporations are aware of the long-term benefits of investing in occupational safety, the smaller ones find such investments less attractive. When narrowing down to the type of industries, the construction industry is significantly affected. Specifically, in the construction industry, most companies are forced to place lower bids on construction project tenders to win. As a result, limited funding is allocated to enable total compliance with occupational health and safety guidelines. There is sufficient evidence showing that the involvement of various stakeholders and improvement in business operations may stimulate the adoption of OSH requirements.

Hypothesis 2: Business performance improvement in UAE firms is positively associated with the enforcement of OSH requirements.

2.8. Research Gap

The available literature does not adequately address workplace safety standards and practices for different countries globally, including the UAE. However, locating enough literature on the enforcement practices and solutions for Abu Dhabi has remained challenging. The available data from the lean literature does not focus on Abu Dhabi; hence, finding relevant information from across the world, including the benefits of enforcement of workplace safety standards, the

challenges being faced in Abu Dhabi, and the best practices, is limited. The present study intends to evaluate quantitative aspects of the research aims and objectives. From the quantitative perspective, the present study is driven by an overarching hypothesis that the enforcement of OSH requirements is associated with decreased incident rates and enhanced business performance.

3. Methodology

3.1. Introduction

The chapter discusses the methodology used to conduct the study. This research used a positivist research approach to obtain occupational and safety experts' views in the United Arab Emirates' private and public sectors. The approach implies that the findings can be justified mathematically, even if they invoke immeasurable aspects. Research methods are a term used by researchers to refer to collecting and analysing data. This chapter presents the methods used by the researcher to conduct the study. The methodology begins with a discussion of the research paradigm, the research approach, the research design objectives, the types of data used, sampling strategies, data collection and analysis methods, the evaluation of the methods used, and ethical considerations.

3.2. Research Philosophy/Paradigm

In this study, a positivist approach was used because it stressed the significance of occupational safety and health requirements that are key in society. It was critical to get society's views on the need to enforce OSH requirements in the UAE. The philosophy of positivism argues that human beings gain knowledge and facts through observation. In this paradigm, the researcher's role is limited to the collection and interpretation of data objectively. Positivists argue that society relies on scientific evidence, especially from statistics and experiment [25], which reveals how nature helps society operate.

3.3. Research Methods

This study relied on a quantitative approach because it combined because of its array of appeals. It helped the researcher tackle a broader and more complete range of research questions because they were not confined within any specific research method's parameters. As it was an exploratory study, some 80 - 100 close-ended responses were deemed sufficient to serve the data's purpose. The final questionnaire items comprised 25 close-ended questions. These research tools were deemed adequate for collecting data from the public and private firms in Abu Dhabi. The reason for narrowing it down to the public and private firms was the high safety risks associated with the firms and the firms' association with OSH officials and specialists.

3.4. Participant Recruitment and Sampling

The present study targeted the workforce population in OSH-enforcing firms

and government entities in the UAE. To ensure data validity, it was important to narrow down the study population to those enforcing or directly affected by OSH rules, including 1) HSE/OSH Assistant/Promoter, 2) HSE/OSH Supervisor, 3) HSE/OSH Officer, 4) HSE/OSH manager, and other personnel working directly in the field of health and safety maintenance in the workplace. This population was suitable because it works in a highly risky environment that needs a high-level emphasis on OSH rules and guidelines and, therefore, can provide suitable data needed to meet the research objectives.

The present study targeted employees from both public and private sectors, which enforce Abu Dhabi OSH safety standards. The target industries or sectors included construction, energy, government facilities, health and tourism. The target employee groups or categories included general workers, site supervisors, top management of organisations/companies considered, and OSH specialist officers. The details of the sample population, sample size, sample frame, sampling procedure and sources of sampling errors enrolled herein are summarised in **Table 5**.

Convenience sampling was used to select the participants for the interview because it is the most common form of non-probabilistic sampling strategy for collecting data for applications in the social sciences and business research (Galloway 2005). After narrowing down the respondents' categories to take part in the interview, the researcher sought to find the most convenient time for the

Table 5. Sample population, sample frame, sample size, sampling procedure and sources of sampling errors for general workers given questionnaire forms.

Target population	Employees working in a public or private organisation or firms enforcing Abu Dhabi OSH safety standards: OSH specialists, workers with and without a history of workplace accidents.
Study sample frame	The study invited general workers (with or without a history of safety incidents) and OSH specialists, including HSE/OSH Assistant/Promoter, HSE/OSH Supervisor, HSE/OSH Officer, and HSE/OSH Manager.
Sample size	The sample size varied between employee categories: general workers $n = 32$ (with a history of safety incidents, $n = 13$; and with no history of safety incidents, $n = 19$); with HSE/OSH positions $n = 95$.
Sampling procedure	A convenient sampling strategy was used to recruit OSH specialists available via their HR department. The sampling procedure was random for general workers.
Possible sources of sampling errors	The identified possible sources of sampling errors that may affect the representativeness of the sample population are selection errors due to self-selection of surveys and non-response errors due to low interest in participating in the survey.

interviews. If they were not available within the time frame provided for the study, another interviewee was contacted. The random sampling technique was used for the participants who took part in the questionnaires. The participants were first put in homogenous groups based on their specialisations in OSH.

3.5. Research Design

The present study was an exploratory study to investigate the best OSH-enforcing measures in the private and government sectors in Abu Dhabi. To do this, a comparative analysis was carried out between Abu Dhabi OSH enforcement standards and those in the USA, the UK, Australia, and Singapore. Concerning this research aim, both close-ended and open-ended data have been collected in the study. The close-ended data aimed to give an idea of the current enforcement practices and whether appropriate protocols and implementation strategies have been designed [26]. On the other hand, the open-ended data served as an instrument for knowledge expansion and exploring the current best practices worldwide and what improvements need to be made in Abu Dhabi.

3.6. Data Collection

Primary data was collected because it was specific to the researcher's needs at the time of data collection. The researcher was able to control the kind of data collected through follow-up questions on the respondents and seeking clarifications. The purpose of collecting the study's primary data is to get first-hand information about the OSH standards and enforcement measures practised in different sectors in Abu Dhabi. It is important to note that there is a scarcity of empirical evidence pertinent to the Abu Dhabi corporate and public sector's regulations and implementation of the OSH standards. Therefore, the primary data to be collected will try to fill this void.

3.7. Data Analysis

Quantitative data analysis of quantitative (survey questionnaire responses) will be performed using descriptive statistics and thematic analysis, respectively. Quantitative data is best analysed statistically using descriptive statistics (means, standard deviation, range) and effect size measures (probability value), which can be achieved using Statistical Package for the Social Sciences—SPSS statistical software. The SPSS allows comparing quantitative variables to determine if they are significantly different. For instance, data on participants' experience and role in OSH enforcement can be collected and used to carry out cross-tabulations between different participant groups. Using a chi-square test with cross-tabulations, it is possible to determine if there were significant group differences using variables of experience, position, and years of experience [27].

The collected quantitative data from the questionnaire instruments were processed using a Microsoft Excel spreadsheet (Microsoft Excel for Windows) ready for statistical analysis. The Excel spreadsheet was imported into the Inter-

national Business Machines (IBM's) Statistical Package for the Social Sciences (SPSS) for Windows, version 28.0 [28], Armonk, NY, USA). The characteristics of the sample were evaluated using descriptive statistics, where numerical data on basic demographics (age, gender, industry/sector, current position in HSE/OSH field, HSE/OSH education level, years of job experience, OSH professional credentials earned) of the study populations were presented using means and standard deviation; where appropriate, range. Using SPSS, the between-group differences in independent quantitative variables (individual survey responses measured using a 5-point Likert scale) were evaluated using a One-Way Analysis of Variance (One-Way ANOVA). In all statistical tests, a p-value < 0.05 was considered significant. Where appropriate, the analysis results were presented in tables and charts.

The validity, accuracy and credibility of the survey results were evaluated based on the sources of sampling error encountered during the actual distribution of survey instruments to respondents and the collection of responses. First, the sampling error was estimated mathematically using the following formula.

$$\text{Sampling error} = Z = \frac{\sigma}{\sqrt{n}}$$

where:

Z = Z score value based on the confidence interval (approx. = 1.96)

σ = Population standard deviation

n = size of the sample

3.8. Ethical Considerations

As guided by the British Educational Research Association—BERA (2018), the Ethical Guidelines for Educational Research (EGER) were used to confirm the ethical implications of the current study. First, all participants were informed about the voluntary nature of their participation and the study's objective, and their permission was sought to quote their interview responses [29]. Second, to ensure privacy and anonymity, no personal information such as real full names, email addresses, and phone numbers were collected during the surveys. In addition to this, the use of an audio or video recorder for interviews could have raised confidentiality, anonymity breaches, and problems of secure data storage. For this reason, the use of these items was completely avoided in the study.

The researcher avoided any form of discriminatory, offensive, and other unacceptable language in research while formulating the interview and questionnaire questions. The researcher also acknowledged any material borrowed from outside by providing in-text citations and a reference list using acceptable reference styles [30]. While conducting the interviews and analysing the collected data, the researcher maintained the highest level of objectivity. The researcher also adhered to acceptable Data Protection Acts. Additionally, all the respondents were respected by ensuring no psychological or physical harm was inflicted on them. The researcher also ensured that only the relevant components

were assessed during the study. The researcher did not ask any irrelevant questions that were not critical in answering the research questions.

4. Results

4.1. Quantitative Results

4.1.1. Descriptive Results

This study included a total of 57 interview participants. For ease of reference to individual participants without identifying them by name, the participants were coded from P1 to P57 in conjunction with their attributes, as shown in **Table 6** below.

As shown in **Table 7** below, 43.9% of the participants were OSH specialists 22.8% were general workers with incidents, and 33.3% were general workers without incidents. The participants were from different sectors, with the highest number being from the Construction sector (27.1%), followed by the participants from the Government sector (25%), the health sector (20.8%), the Tourism sector (12.5%), Worker Village Admin sector (10.4%) and the Energy sector (4.2%). A high number of participants were males (78.9%). As shown in **Table 7**, the mean age of the participants was 36.3 (SD = 7.683) years, and the mean years of experience were 9.5 (SD = 5.037). The participants were selected from organisations with 1197.8 (SD = 1742.073) mean number of employees and 9.6 (SD = 20.715) mean the number of OSH officers.

Surveys were also carried out with 95 OSH specialists. The majority of the participants (35.79%) had years of experience of 6 - 9, while 17.89% of them had 10 - 13 years of experience 27.37% had an OSH experience of more than 13 years 16.84% had 2 - 5 years of experience, and 2.11% had less than two years. Concerning the level of education 29.79% of the participants had a certificate, and 29.79% had a diploma. The participants with an undergraduate degree made up 10.64%, while those with a postgraduate degree made up 23.40% (**Table 7**).

Objective 1: To examine occupational benefits and health programmes to ensure employee safety and improve business performance

Table 8 shows findings from General Workers and General Workers with incidents. Concerning OSH awareness/understanding of employees and supervisors, participants (General Workers and General Workers with incidents) from the Construction sector had a mean score of 4 (SD = 0.408), the Government sector had a mean score of 4 (SD = 0.900), Health 4 (SD = 0.707), and Worker Village Admin 4 (SD = 1.414). Overall, the findings presented in **Table 8** indicate that participants (General Workers and General Workers with incidents) considered OSH awareness/understanding of employees and supervisors to be good (Mean = 4, SD = 1.414). **Table 8** also shows that the participants considered time and effort spent on worksite supervision and enforcement of safety protocols to be good (Mean = 4, SD = 0.663). The findings also indicate that the participants considered the frequency of site inspections to ensure site and equipment safety to be excellent (Mean = 5, SD = 0.510) (**Table 9**).

Table 6. Participants' codes and their attributes.

Code	Gender	Sector	Description		
			Specialist OHS	Gen. worker with incidents	Gen. worker without incidents
P1	M	Construction			
P2	M	Health			
P3	M	Health			
P4	M	Health			
P5	F	Health			
P6	M	Energy			
P7	F	Health			
P8	M	Government			
P9	M	Construction			
P10	M	Government			
P11	M	Tourism			
P12	M	Worker Village Admin			
P13	M	Worker Village Admin			
P14	F	Government			
P15	M	Health			
P16	M	Health			
P17	M	Government			
P18	F	Health			
P19	F	Government			
P20	F	Health			
P21	M	Construction			
P22	M	Construction			
P23	M	Tourism			
P24	M	Government			
P25	M	Construction			
P26	M	Construction			
P27	M	Construction			
P28	M	Tourism			
P29	F	Transport			

Continued

P30	M	Transport
P31	M	Transport
P32	M	Government
P33	M	Waste
P34	M	Transport
P35	M	Government
P36	M	Transport
P37	M	Government
P38	F	Government
P39	M	Worker Village Admin
P40	M	Health
P41	M	Construction
P42	M	Transport
P43	M	ADPHC
P44	M	Construction
P45	M	Tourism
P46	F	Government
P47	F	Health
P48	M	Transport
P49	M	Energy
P50	M	Tourism
P51	F	Tourism
P52	M	Worker Village Admin
P53	M	ADPHC
P54	M	Construction
P55	M	Construction
P56	M	Construction
P57	M	Worker Village Admin

Table 7. Summary of the study interview demographics.

Demographic Factor	Frequency	Percent
Identity	GC	33.3%
	IGC	22.8%
	OSH Specialists	43.9%

Continued

Sector	Construction	13	27.1%
	Energy	2	4.2%
	Government	12	25.0%
	Health	10	20.8%
	Tourism	6	12.5%
	Worker Village Admin	5	10.4%
Gender	Male	45	78.9%
	Female	12	21.1%
Age	Range	34	
	Minimum	24	
	Maximum	58	
	Mean	36.3	
	Std. Deviation	7.683	
Experience (years)	Range	19	
	Minimum	1	
	Maximum	20	
	Mean	9.5	
	Std. Deviation	5.037	
Number of employees	Range	5996	
	Minimum	4	
	Maximum	6000	
	Mean	1197.8	
	Std. Deviation	1742.073	
Number of OSH officers	Range	69	
	Minimum	1	
	Maximum	70	
	Mean	9.6	
	Std. Deviation	20.715	

Table 8. Description of the survey participants (n = 95 OSH specialists).

Experience/Education	Level	Percent (%)
Experience (years)	Less than two years	2.11
	2 - 5 years	16.84
	6 - 9	35.79
	10 - 13	17.89
	More than 13 years	27.37

Continued

	Certificate	29.79
	Diploma	29.79
Education	Undergraduate Degree	10.64
	Postgraduate Degree	23.49

Table 9. General workers and general workers with incidents responses on the occupational benefit and health programmes to ensure employee safety and improve business performance.

Sector		Protocol 1	Protocol 2	Protocol 3
Construction	Mean	4	4	5
	N	6	6	6
	Std. Deviation	0.408	0.408	0.548
Government	Mean	4	4	4
	N	7	7	7
	Std. Deviation	0.900	0.690	0.535
Health	Mean	4	5	5
	N	8	8	8
	Std. Deviation	0.707	0.756	0.518
Tourism	Mean	5	5	5
	N	2	2	2
	Std. Deviation	0.707	0.707	0.707
Worker Village Admin	Mean	4	5	5
	N	2	2	2
	Std. Deviation	1.414	0.707	0.707
Total	Mean	4	4	5
	N	25	25	25
	Std. Deviation	0.726	0.663	0.510

For the OSH specialists (n = 95), the findings shown in **Table 10** indicate that regarding the level of OSH awareness/understanding of employees and supervisors in the organisation, the participants had a mean score of 3.89, which indicates that the participants perceived the level of OSH awareness/understanding of employees and supervisor to be good. **Table 10** also indicates that the OSH specialists (n = 93) perceived the top management commitment to enforcing OSH within their organisations, including the worksites, to be good, as indicated by a mean of 4.08. OSH specialists perceived the frequency of internal inspections done in your organisation to ensure compliance with OSH requirements (self-regulation) to be good, as indicated by a mean of 4.05.

Table 10. OSH specialists' responses on the occupational benefit and health programmes to ensure employee safety and improve business performance.

OSH specialists' responses	N	Mean
Level of OSH awareness/understanding of employees and supervisors in your organisation	95	3.89
Top management commitment to enforcing OSH within your organisation, including the worksites	93	4.08
Frequency of internal inspections done in your organisation to ensure compliance with OSH requirements (self-regulation)	95	4.05

One-way ANOVA was carried out to determine whether there was a difference in the benefit and health programmes focused on employee safety and improving business performance across the different sectors. The assessment involved the summation of the scores for the three questions (Protocol 1, Protocol 2, and Protocol 3), with the maximum expected score being 15 and a minimum of 3. As shown in **Table 11**, participants from the Energy sector had the highest score of 15. The mean total score for the other sectors was Construction (M = 9.4, SD = 5.902), Government (M = 12.4, SD = 1.988), Health (M = 11.5, SD = 4.928), Tourism (M = 4, SD = 6.928), and Worker Village Admin (M = 13.0, SD = 2.828).

However, as shown in **Table 11**, the observed differences in scores were not significantly different ($F = 1.728$, $P = 0.168$). Therefore, the benefit and health programmes focused on employee safety and improving business performance do not differ across the different sectors (**Table 12**).

Objective 2: To investigate the current occupational areas with substandard health and safety measures.

To address objective 2, participants responded to three questions that were scored on a 5-point Likert scale. Overall, the findings presented in **Table 13** indicate that participants considered the level of support received in the workplace to be good (Mean = 4, SD = 1.000). The participants also considered the documentation of OSH standards for the firm in all processes to be good (Mean = 4, SD = 0.779). **Table 13** also indicates that participants considered the level of top management support and commitment provided to be good (Mean = 4, SD = 0.757).

For the OSH specialists ($n = 94$), the findings shown in **Table 13** indicate that regarding the level of management support provided to ensure OSH compliance, the participants had a mean score of 4.05, which indicates that the participants perceived the level of management support provided to ensure OSH compliance to be good. **Table 14** also indicates that the OSH specialists ($n = 95$) perceived the level of internal cooperation and support received to ensure OSH compliance to be good, as indicated by a mean of 3.95. Concerning the effectiveness of OSH self-regulation within the organisation, participants perceived it to be good, as indicated by a mean of 3.81 (**Table 14**).

Table 11. Assessment of the difference in the benefit and health programmes focused on employee safety and improving business performance across the different sectors.

	Mean	Std. Deviation	Minimum	Maximum
Construction	9.4	5.902	0	15
Energy	15.0		15	15
Gov	12.4	1.988	10	15
Health	11.5	4.928	0	15
Tourism	4.0	6.928	0	12
Worker Village Admin	13.0	2.828	11	15
Total	10.6	5.158	0	15

Table 12. One-way ANOVA analysis of the difference in the benefit and health programmes focused on employee safety and improving business performance across the different sectors.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	203.445	5	40.689	1.728	0.168
Within Groups	541.589	23	23.547		
Total	745.034	28			

Table 13. General workers and general workers with incidents responses on the current occupational areas with substandard health and safety measures.

Industry/Sector		Protocol-4	Protocol-5	Protocol-7
Construction	Mean	4	4	5
	N	6	6	6
	Std. Deviation	0.983	0.816	0.408
Government	Mean	4	4	4
	N	7	7	7
	Std. Deviation	1.528	1.155	0.900
Health	Mean	5	4	4
	N	8	8	8
	Std. Deviation	0.535	0.463	0.707
Tourism	Mean	4	5	5
	N	2	2	2
	Std. Deviation	0.000	0.707	0.707
Worker Village Admin	Mean	4	5	4
	N	2	2	2
	Std. Deviation	1.414	0.707	1.414
Total	Mean	4	4	4
	N	25	25	25
	Std. Deviation	1.000	0.779	0.757

Table 14. OSH specialist's responses on the current occupational areas with substandard health and safety measures.

OSH Specialists' Responses	N	Mean
Level of management support provided to ensure OSH compliance	94	4.05
Level of the internal corporation and support received to ensure OSH compliance	95	3.95
Level of supervision provided (number of OSH supervisors per worker) to ensure OSH compliance in your organisation	95	3.72
OSH standards for the organisation are well documented and frequently referred to during all the stages of projects and processes	94	4.06
The overall level of OSH regulatory enforcement and policies in Abu Dhabi	94	4.13
High level/of top management support and commitment provided	94	4.11
Awards/rewards/recognition based on OSH performance	93	3.56
How is the internal negative reinforcement of OSH Performance (Any internal penalty for OSH violations)	92	3.28
How effective is the OSH Self-regulation within your organisation	93	3.81

One-way ANOVA was carried out to determine whether there were differences in how participants from the various sectors viewed the current occupational areas with substandard health and safety. The assessment involved the summation of the scores for the three questions (Protocol-4, Protocol-5, and Protocol-7), with the maximum expected score being 15 and a minimum of 3. As shown in **Table 15**, participants from the Energy sector had the highest score of 15. The mean total score for the other sectors was Construction ($M = 10.3$, $SD = 6.585$), Government ($M = 12.1$, $SD = 3.388$), Health ($M = 11.4$, $SD = 4.749$), Tourism ($M = 4$, $SD = 6.928$), and Worker Village Admin ($M = 12.5$, $SD = 3.536$) (**Table 15**).

However, the observed differences in scores were not significantly different ($F = 1.293$, $P = 0.301$). Therefore, there was no statistically significant difference in how participants from the various sectors viewed the current occupational areas with substandard health and safety (**Table 16**).

Objective 3: To provide a comparative analysis between the advanced countries' best practices in public and private sectors and those practised in Abu Dhabi

To address objective 3, participants responded to four questions that were scored on a 5-point Likert scale. Overall, the findings presented in **Table 17** indicate that participants considered the OSH regulatory requirements and enforcement in Abu Dhabi to be good (Mean = 4, $SD = 0.651$). The participants also considered the frequency of training and seminars provided to all employees to educate them about OSH standards and requirements to be good (Mean = 4, $SD = 0.645$). **Table 17** also shows that participants also considered the safety

Table 15. Assessment of the difference in how participants from the various sectors viewed the current occupational areas with substandard health and safety.

	Mean	Std. Deviation	Minimum	Maximum
Construction	10.3	6.585	0	15
Energy	15.0		15	15
Government	12.1	3.388	6	15
Health	11.4	4.749	0	15
Tourism	4.0	6.928	0	12
Worker Village Admin	12.5	3.536	10	15
Total	10.7	5.406	0	15

Table 16. ANOVA analysis of how participants from the various sectors viewed the current occupational areas with substandard health and safety.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	179.475	5	35.895	1.293	0.301
Within Groups	638.732	23	27.771		
Total	818.207	28			

Table 17. General workers and general workers with incidents responses on best practices in public and private sectors and that practised in Abu Dhabi.

Industry/ Sector		Protocol-6	Implement-1	Implement-2	Implement-3
Construction	Mean	5	4	4	4
	N	6	6	6	6
	Std. Deviation	0.516	0.516	0.983	0.516
Government	Mean	4	4	4	4
	N	7	7	7	7
	Std. Deviation	0.787	0.756	1.069	0.900
Health	Mean	4	4	4	4
	N	8	8	8	8
	Std. Deviation	0.518	0.756	0.991	0.535
Tourism	Mean	5	5	5	4
	N	2	2	2	2
	Std. Deviation	0.000	0.707	0.707	0.000
Worker Village Admin	Mean	4	4	4	5
	N	2	2	2	2
	Std. Deviation	0.707	0.000	0.707	0.707
Total	Mean	4	4	4	4
	N	25	25	25	25
	Std. Deviation	0.651	0.645	0.927	0.624

of the working environment to be good (Mean = 4, SD = 0.927). The participants from the surveys also considered the correctness of signage displayed in high-risk areas to be good (Mean = 4, SD = 0.624) (Table 18).

One-way ANOVA was carried out to determine whether there were differences in the best practices across various sectors. The assessment involved the summation of the scores for the four questions (Protocol-6, Implement-1, Implement-2 and Implement-3), with the maximum expected score being 20 and a minimum of 4. As shown in Table 19, participants from the Energy sector had the highest score of 19. The mean total score for the other sectors was Construction (M = 13, SD = 8.142), Government (M = 16.7, SD = 3.251), Health (M = 14.1, SD = 6.010), Tourism (M = 5.7, SD = 9.815), and Worker Village Admin (M = 15.5, SD = 2.121).

However, the observed differences in scores were not significant ($F = 1.396$, $P = 0.263$). Therefore, there was no statistically significant difference in how participants from the various sectors viewed Abu Dhabi's health and safety best practices (Table 19).

Objective 4: To analyse the positive changes in the healthcare system and improvements in business efficiency and productivity.

Table 18. OSH specialists' responses on the best practices in public and private sectors and that practised in Abu Dhabi.

OSH specialists' responses	N	Mean
Overall level of OSH regulatory requirements and enforcement considered best practice	94	4.11
A safe working environment, including proper flooring, ventilation, fire exits, etc.	94	4.10
Frequent training seminars to educate employees about OSH standards and the safe handling of tools.	93	3.94
Proper and visible labels are put on sites with higher risks of injuries.	93	3.72

Table 19. Assessment of the difference in the best practices across various sectors.

	Mean	Std. Deviation	Minimum	Maximum
Construction	13.0	8.142	0	20
Energy	19.0		19	19
Government	16.7	3.251	12	20
Health	14.1	6.010	0	18
Tourism	5.7	9.815	0	17
Worker Village Admin	15.5	2.121	14	17
Total	13.8	6.746	0	20

To address objective 4, participants responded to four questions that were scored on a 5-point Likert scale. Overall, the findings presented in **Table 20** indicate that participants considered the use of smart sensors and IT technology to identify and prevent injuries more efficiently to be satisfactory. Findings also indicate that the participants considered the decline in the rate of injuries over the last 3 - 5 years to be good. Participants from the Government, Health, Construction, and Tourism sectors considered the organisation's effectiveness of hazard reporting and response to be good. The participants also considered the effectiveness of consultation with employees on OSH matters to be good.

Table 21 indicates that the OSH specialists (n = 94) perceived the use of information technology to implement the OSH, monitor compliance and detect

Table 20. ANOVA Analysis of differences in the best practices across various sectors.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	296.668	5	59.334	1.396	0.263
Within Groups	977.470	23	42.499		
Total	1274.138	28			

Table 21. General Workers and General Workers with incidents responses on positive changes in the healthcare system and improvements in business efficiency and productivity.

Industry/ sector		Implement- 4	Implement- 5	Implement- 6	Implement- 7
Construction	Mean	3	5	4	4
	N	6	6	6	6
	Std. Deviation	0.632	0.548	0.516	0.408
Government	Mean	4	4	4	4
	N	7	7	7	7
	Std. Deviation	1.272	0.787	0.756	0.900
Health	Mean	4	4	4	4
	N	8	8	8	8
	Std. Deviation	0.926	0.707	0.463	0.641
Tourism	Mean	4	4	4	5
	N	2	2	2	2
	Std. Deviation	0.000	0.000	0.000	0.707
Worker Village Admin	Mean	3	5	5	4.0
	N	2	2	2	2
	Std. Deviation	0.707	0.707	0.707	0.000
Total	Mean	3	4	4	4
	N	25	25	25	25
	Std. Deviation	0.917	0.638	0.542	0.640

OSH violations to be good, as indicated by a mean of 3.72. OSH specialists (n = 93) also perceived the decline in the rate of injuries over the last 3 - 5 years to be good, as indicated by a mean of 3.97. **Table 21** also indicates that the OSH specialists (n = 94) perceived the effectiveness of hazard reporting and response in your organisation to be good, as indicated by a mean of 3.83. The findings in **Table 21** also indicate that the OSH specialists perceived the consultation with employees on OSH matters to be good, as indicated by a mean of 3.79.

One-way ANOVA was carried out to determine whether the positive changes in the healthcare system and improvements in business efficiency and productivity vary across the various sectors. The assessment involved the summation of the scores for the four questions (Implement 4, Implement 5, Implement 6 and Implement 7), with the maximum expected score being 20 and a minimum of 4. As shown in **Table 22**, participants from the Energy sector had the highest score of 18. The mean total score for the other sectors was Construction (M = 12.4, SD = 7.909), Government (M = 16.4, SD = 3.457), Health (M = 14.1, SD = 6.151), Tourism (M = 5.3, SD = 9.638), and Worker Village Admin (M = 16.5, SD = 0.707).

However, the observed differences in scores were not significant (F = 1.515, P = 0.224). Therefore, there was no statistically significant difference in how participants from the various sectors viewed the positive changes in the healthcare system and improvements in business efficiency and productivity (**Table 23**).

Table 22. OSH participant's responses on positive changes in the healthcare system and improvements in business efficiency and productivity.

	N	Mean
The use of information technology to implement the OSH, monitor compliance and detect OSH violations	94	3.72
A decline in the rate of injuries over the last 3 - 5 years	93	3.97
Effectiveness of hazard reporting and response in your organisation	94	3.83
Effective consultation with employees on OSH matters	95	3.79

Table 23. Assessment of the positive changes in the healthcare system and improvements in business efficiency and productivity.

	Mean	Std. Deviation	Minimum	Maximum
Construction	12.4	7.909	0	20
Energy	18.0		18	18
Government	16.4	3.457	10	20
Health	14.1	6.151	0	20
Tourism	5.3	9.238	0	16
Worker Village Admin	16.5	0.707	16	17
Total	13.6	6.700	0	20

4.1.2. Inferential Results

A summary of key survey findings is summarised in **Table 24**. The assessment of the benefit and health programmes focused on employee safety and improving business performance across the different sectors was carried out through the summation of the scores for the three questions (Protocol 1, Protocol 2, and Protocol 3) (**Table 25**).

5. Discussion

5.1. Introduction

The purpose of this mixed-method research was to examine and explore the enforcement of occupational safety and health requirements in public and private sectors in Abu Dhabi Emirate, United Arab Emirates. Survey questionnaires and interview questions were used to collect relevant data from Occupational Safety and Health (OSH) specialists in different sectors, including construction, energy, government, health, and tourism. The rationale for undertaking this study was informed by the rising cases of occupational health hazards across Abu Dhabi [31]. Recent reports show that a large number of immigrant workers and many locals in the construction sector, factories, farms, and industrial workshops remain vulnerable to occupational hazards in their workplaces. While much remains to be known about occupational health and safety issues in Abu Dhabi, more is yet to be known regarding the enforcement of OSH requirements in public and private sectors in Abu Dhabi, thereby the need for this research.

Table 24. ANOVA analysis of the positive changes in the healthcare system and improvements in business efficiency and productivity.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	311.404	5	62.281	1.515	0.224
Within Groups	945.631	23	41.114		
Total	1257.034	28			

Table 25. Summary of key survey findings.

Variable	Highest (score)	Lowest (score)	F	Sig.
Benefit and health programmes	Energy sector (15)	Construction sector (4.0)	1.728	0.168
Sectors with substandard OSH	Energy sector (15.0)	Tourism sector (4.0)	1.293	0.301
Perceived best OSH practices	Energy sector (19.0)	Tourism sector (5.3)	1.396	0.263
Business efficiency and productivity	Energy sector (18)	Tourism sector (5.3)	1.515	0.224

To investigate this identified OSH enforcement knowledge gap in private and public workplaces in Abu Dhabi, three research questions were developed. Research Question 1 was intended to discover the following: What are the methods of enforcing OSH requirements used in the advanced countries in the public and private sectors? Research Question 2 was created to identify the following: What are the best methods to enforce OSH requirements on public and private sectors in the UAE and Abu Dhabi? Research Question 3 was created to examine the following: To what extent do the selected methods protect employees, reduce incident rates, and increase business performance? The current chapter contributes to the understanding of these research questions and the research problem. Survey results and interview findings are discussed chronologically in light of the research questions, past literature on the topic, and the resource-based view (RBV) theoretical frameworks. Points of contention and convergence concerning the past studies are presented while giving potential explanations for the observed findings.

5.2. Analysis of Key Findings

Regarding the methods for enforcing OSH requirements, it was established that countries like the UK have the best OSH enforcement measures. Some of the major factors that make countries like the UK have the best OSH enforcement methods include the comprehensive nature of their OSH frameworks, enforcing regulations embedded in legal frameworks, and regulatory punishments. These findings echo past literature regarding the potential impact of legal obligations, contractual requirements, and implementation guidelines on the successful enforcement of OSH requirements [32]. Similar observations have been made in the procurement sector where companies are likely to enforce OSH guidelines when they have adequate guidelines and legal obligations to ensure safety at the workplace [33]. In light of these considerations, it may be stated that having in place reinforcement mechanisms, legal obligations, and contractual punishments for companies flouting OSH enforcement substantially contributes to the effective enforcement of occupational safety and health guidelines.

In Abu Dhabi, having in place legal frameworks, comprehensive guidelines, and regulatory punishments might not be enough in enforcing OSH guidelines. A major concern is that since there are a high number of work-related safety and health issues in different industries, the implementation process on the ground might be lacking. According to the survey findings, the laxity to implement or enforce OSH guidelines might be overcome through regular inspections and audit processes. Rather, the regulatory body in Abu Dhabi (*i.e.*, the OSHAD) has limited functions that include inspecting and preparing audit reports. These reports are then sent to various legal bodies for assessment and imposition of penalties in case of any infringements [34]. Lack of legal obligation for OSHAD to audit OSH enforcement in private and public sectors and discipline culprits has been noted to be counterproductive.

Regarding the question of the most effective approaches to enforcing OSH, the researchers noted that private and public sectors lack positive reinforcement when implementing OSH guidelines. These observations may be explained by the RBV model where lack of commitment to allocate resources to OSH guidelines may be a primary factor for laxity among private and public entities to implement health and safety guidelines at their workplaces in Abu Dhabi. Effective communication mechanisms are highly critical to ascertain the level of safety measures to achieve cooperation and support and cooperation in maintaining an injury-free workplace. Therefore, communicative language mechanisms are needed when enforcing OSH frameworks to complement the technical and practical safety of all the workers, especially in Abu Dhabi. A growing body of literature is in consensus that an unambiguous safety communication mechanism will ensure improvement in knowledge and understanding of preventative measures that would enhance workplace safety practices [35]. These observations align with the current study findings where developing the communicative plan is key to the long-term achievement of OSH implementation goals in Abu Dhabi.

Research question 3 intended on establishing the relationship between employee wellbeing and business performance. Findings revealed that the OSH framework promotes a raft of strategies that are central to protecting employees and reducing accident rates. As a result of the health and safety measures in place through OSH frameworks, there is increased employee productivity that largely contributes to better business performance. Four major OSH implementation approaches were identified to be central in enhancing employee safety and ensuring accident reduction. These approaches included the following: 1) promoting safe working environments such as proper flooring, ventilation, and fire exits; 2) frequent training and seminars to educate employees about OSH standards and safe handling of tools; 3) ensuring proper and visible labels are put on sites with higher risks of injuries; and 4) using smart sensors and IT technology to identify and prevent injuries more efficiently.

Availing a safe working environment ensured employee protection and safety. Key among the safe working settings included ensuring proper flooring, ventilation, and fire exits. Insights from the surveys showed that participants from the Government sector, Worker Village Admin, and Health sector considered a safe working environment to be excellent, while participants from tourism considered it to be excellent. The findings align with past studies which emphasise the need for a safe work environment in terms of protection from biological, chemical, and physical hazards [36]. Ensuring a safe physical environment potentially protects workers against hazards like poor air quality, extreme temperatures, radiation, and excessive noise. These physical hazards potentially expose workers to health risks such as respiratory problems, hearing loss, and chronic ailments like lung cancer. In Abu Dhabi private and public sectors, proper ventilation and flooring among other safe working conditions ensure that employees are protected from potential harm.

6. Conclusion

The purpose of this mixed-method research was to examine and explore the enforcement of occupational safety and health requirements in public and private sectors in Abu Dhabi Emirate, United Arab Emirates. Findings of this thesis revealed numerous methods of enforcing OSH requirements used in advanced countries in the public and private sectors. Survey results and interview findings revealed that various methods are used to enforce OSH requirements. The outcomes of this study also revealed that various methods are used to enforce OSH requirements, including undertaking frequent inspections, conducting impromptu checks of workplaces, and ensuring constant presence and authority of a higher regulatory body like OSHAD working collaboratively with Abu Dhabi companies. Creating a standard framework is another potential recipe for ensuring OSH enforcement in organisations. Findings also showed that enforcing OSH contributes to employee safety and injury reduction and increases business performance. Creating a working environment through proper flooring, ventilation, and fire exits, in addition to conducting frequent employee training services to ensure worker safety.

6.1. Research Implications

Current findings have potential implications for top management, employees, and regulatory bodies. First, in the case of the top management, there is a need to show more commitment to enforcing OSH requirements in their organisations. Findings from surveys and interviews revealed potential conflicts of interest, negative reinforcements, and low commitment to enforcing OSH in the public and private sectors. In terms of theoretical contributions, the study confirms the central role that resource allocation, top management support, time spent on inspections and employee readiness have on successful OSH implementation. There is a need, however, to formulate a comprehensive conceptual framework on external and internal organisational factors that are likely to motivate public and private entities to embrace and enforce OSH guidelines in Abu Dhabi besides resource allocation as proposed under the RBV model. Early detection of potential hazards serves to inform measures to mitigate and reduce harm and injury to employees.

6.2. Recommendations for Practice and/or Policy

The results of this study provide potential recommendations for industry practice and policy development. Increased global competition necessitates organisations to enhance the best work ethics, business practices, and enhance workplace safety for employees. Under Vision 2030, the UAE aspires to be a leader in global business operations and align with the best international labour practices. Achieving this goal would require regulators to reform current OSH practices in private and public sectors to address identified hurdles and barriers to workplace health and safety. Failure to embrace and implement OSH requirements in Abu

Dhabi could create a negative reputation and slow its Vision 2030 economic agenda of robust and globally competitive workplaces. Potential recommendations for industry practice need to be taken into consideration through policy changes. For example, public and private entities in Abu Dhabi show negative reinforcement and laxity in enforcing OSH. There should be regular audits, impromptu inspections, and close collaboration between organisations and regulatory bodies to ensure compliance with OSH requirements. Close collaboration and coordination among stakeholders could improve compliance rates when enforcing OSH in workplace sites.

6.3. Research Limitations

The current research was largely successful in addressing the formulated research problem regarding OSH enforcement in Abu Dhabi's private and public sectors. However, there are potential limitations that might affect the findings. The study heavily relies on self-reported data for quantitative analysis. There is a likelihood of bias or misreporting, which is often associated with this method of data collection and analysis.

6.4. Future Research Recommendations

First, future surveys should consider recruiting a representative sample size to reflect OSH experts in private and public sectors in Abu Dhabi. For example, G*Power (a tool used to compute the statistical power of a required sample) analysis may be performed to determine a suitable representative sample from private and public sectors who may participate in future surveys. Second, the number of interviewees should also be increased in future studies to between 10 and 15 to achieve data saturation.

Third, future research should consider the need to triangulate data collection methods and sources of information. For example, focus group discussions, field observations, archive data, and minutes of board meetings from organisations may shed more light on how private and public sector entities in Abu Dhabi enforce OSH guidelines. Moreover, this study collected data from OSH experts, and there is a need for future studies to triangulate sources of information by including other stakeholders such as top management, leadership, insurers, and employees. Diversifying sources of information could help corroborate the current findings and enhance the generalisation of the findings to other sectors across the United Arab Emirates.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix. Survey Questionnaire

General Worker Survey Questions

Name (optional):	Gender:
Age:	Education:
Mobile No:	Email:
Overall years of Experience:	Current company name (optional):
Current company nature of work:	Number of employees:
Years of Experience in the same company:	Job Title & Nature of Work:
Is there an OSH officer at work? How many	What OSH training did you receive? When? How frequent is refresher training?
Were you consulted on any OSH topic? What was it?	Did you participate in the incident investigation? explain

Rate your organisation and its OSH enforcement for the following statements.

Statements	5	4	3	2	1
OSH Protocol					
1) OSH awareness/understanding of employees and supervisors. (Obj-1)	√				
2) Time and effort spent on worksite supervision and enforcement of safety protocols. (Obj-1)	√				
3) Frequency of site inspections to ensure site and equipment safety. (Obj-1)	√				
4) Level of support you receive in the workplace. (Obj-2)	√				
5) OSH standards for the firm are well documented in all processes. (Obj-2)	√				
6) OSH regulatory requirements and enforcement in Abu Dhabi is considered best practice (Obj-3)	√				
7) High level of top management support and commitment provided (Obj-2)	√				
OSH Implementation					
8) A safe working environment (Obj-3)	√				
9) Frequent training and seminars are provided to all employees to educate them about OSH standards and requirements (Obj-3)		√			
10) Correct signage is displayed in high-risk areas. (Obj-3)	√				

Continued

11) The use of smart sensors and IT technology to identify and prevent injuries more efficiently. (Obj-4)	√
12) A decline in the rate of injuries over the last 3 - 5 years. (Obj-4)	√
13) Effectiveness of hazard reporting and response in your organisation (Obj-4)	√
14) Effective consultation with employees on OSH matters (Obj-4)	√

5 = Excellent, 4 = Good, 3 = Satisfactory, 2 = Below Satisfactory, 1 = Poor.

If you have a history of workplace incidents, proceed to answer the following questions.

-
- 1) Have you been involved in a workplace incident previously? In this workplace or previously?
 - 2) Describe the incident (what were the consequences)
 - 3) Describe the incident location
 - 4) What was your role
 - 5) What went wrong in your opinion
 - 6) Do you think the work conditions contributed to the incident? How?
 - 7) Did you suffer from work stress prior to the incident (overloaded, busy schedule, no breaks, and long working hours), which contributed to the incident?
 - 8) Did you suffer from home stress prior to the incident (not enough sleep, family/friends problems), which contributed to the incident?
 - 9) What was your health condition prior to the incident
 - 10) Did you take medication prior to the incident
 - 11) What do you think the employer should've done to prevent this incident
 - 12) Refer to the above table; which of the rating questions the employer needs to improve
-