The Effectiveness of the Occupational Health and Safety Management System in the United Arab Emirates

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Thesis Abstract

The aim of the research is to compare and investigate whether Abu Dhabi's Occupational Health and Safety Management System (OHSMS) based regulatory framework or the traditional/conventional framework as implemented in the other Emirates of the United Arab Emirates is more effective in controlling occupational incidents, within the Construction and Manufacturing sectors. The study was conducted to assess what is more effective and beneficial, a mandatory OHSMS based regulatory framework or traditional/conventional laws and regulations based health and safety regulatory framework, both in terms of preventing injuries and ill health as well as cultivating a positive safety culture within the organisations as well as to determine whether OHSMS has contributed to the bottom line of the business by saving hidden costs or not.

In this research, a questionnaire was developed based on the literature review and pilot interviews with industry leaders from the Construction and Manufacturing sectors. The data collection methods also included the use of focus group discussions as well as conducting face-to-face interactions with key personnel and the use of online communities through professional networks from the selected entities in the Construction and the Manufacturing sectors, where a statistically designed sample size was surveyed. The method of direct interaction was primarily used for qualitative data collection, whereas the questionnaire responses were the approach for quantitative data collection. Both types of data gathered were concurrently yet independently analysed, followed with the merging of the results and finally the interpretation of the combined results.

Based on the detailed analysis of the qualitative and quantitative data, it is concluded that there is a higher level of compliance with occupational health and safety rules and regulations in the Construction and Manufacturing companies in the Emirate of Abu Dhabi compared to the same sectors in the other Emirates due to the enforcement and the systemic monitoring of implementation of the management systems. The OHSMS based system framework is found more beneficial than the conventional occupational health and safety framework, through the evidence of reduced Lost Time Injury Frequency Rates (LTIFR) and reduced costs of occupational health and safety expenses. Improved governance and higher frequencies of training are found to be essential for effective occupational health and safety management in any company, with the aim to prevent or reduce occupational health and safety incidents. As far as the occupational health and safety governance across the United Arab Emirates is concerned, the study has demonstrated that an increase of supervision by Emirati occupational health and safety professionals has reduced the Lost time injury frequency rates. However, the overall OHS management in the United Arab Emirates was found to have a broad opportunity for improvement, starting-off with the establishment of a federal-level competent authority for the management of occupational health and safety.

Keywords

Conventional/Traditional OHS Framework; Regulatory OHS Framework; Construction and Manufacturing sectors; OHS Governance; OHS Training.

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Thank you to all the friends I have made on this journey. In particular, I would like to thank all my family members for their unconditional support throughout this DBA.

Declaration

I declare that this work in this research **"The Effectiveness of Occupational Health and Safety Management System in the United Arab Emirates"** is my own and that this thesis has not been submitted at another university as a degree-level project.

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List of Abbreviations

Abbreviation	Name
ABS	Aston Business School
AD	Abu Dhabi
ADPHC	The Abu Dhabi Public Health Centre
ALARP	As Low as Reasonably Practicable
ANOVA	Analysis of Variance
BS	British Standard
BSc	A Bachelor of Science
CA	Competent Authority
CEO	Chief Executive Officer
DBA	Doctor of Business Administration
df	Degrees of Freedom
DM	Dubai Municipality
DP	Dubai Port
EHS	Environment, Health and Safety
EHSMS	Environment, Health and Safety Management System
ERT	Emergency Response Team
F	Variation between sample means / variation within the samples
FCSA	The Federal Competitiveness and Statistics Authority
GCC	The Gulf Cooperation Council
HS or H&S	Health and Safety
HSE	Health, Safety and Environment
HSMS	Health and Safety Management System

IDB	Industrial Development Bureau
IGC	International General Certificate
IIRSM	International Institute of Risk and Safety Management
ILO	International Labour Organisation
IOSH	Institution of Occupational Safety and Health
ISO	International Organisation for Standardisation
KPIs	Key Performance Indicators
LEV	Local Exhaust Ventilation
LTI	Lost Time Injury
LTIFR	Lost Time Injury Frequency Rate
LTISR	Lost Time Injury Severity Rate
MOHRE	Ministry of Human Resources and Emiratisation
MOL	Ministry of Labour
MSDS	Material Safety Data Sheet
n	Sample Size
NCEMA	The National Emergency Crisis and Disaster Management Authority
NIOSH	National Institute for Occupational Safety and Health
NQA	National Qualification Authority
NSC	The National Safety Council
NVivo	A qualitative data analysis computer software
NVQ	National Vocational Qualification
OH	Occupational Health
OHS	Occupational Health and Safety
OR-OSHA	Oregon Occupational Safety and Health Act.
OSHA	Occupational Safety and Health Act.

OHSAS	Occupational Health and Safety Assessment Series
OHSMS	Occupational Health and Safety Management System
OSH	Occupational Safety and Health
OSHAD	Occupational Safety and Health Abu Dhabi
OSHAD SF	Occupational Safety and Health Abu Dhabi - System Framework
PhD	A Doctor of Philosophy Degree
PTW	Permit to Work
PPE	Personal Protective Equipment
QDA	Qualitative Data Analysis
Qudorat	The Abu Dhabi Occupational Safety and Health Registration Program
R^2 (Squared)	Proportion of the variance for a dependent variable
RIA	Regulatory Impact Assessment
SCAD	Statistics Centre − Abu Dhabi
SD	Standard Deviation
Sig.	Significance level
SLR	Systematic Literature Review
SMART	Specific, Measurable, Attainable, Relevant, and Time-Bound.
SRA	Sector Regulator Authority
TBT	Talk Box Talk
TQM	Total Quality Management
TRI	Total Recordable Injuries
UAE	United Arab Emirates
UK	United Kingdom
US	United State

Chapter 1. Introduction

1.1 Chapter Summary

This chapter will introduce the research undertaken on the effectiveness of the Occupational Health and Safety Management System in the United Arab Emirates (UAE). The chapter begins with an overview of the United Arab Emirates before an outline of the problem is explained. Following this, the chapter examines the value of studying the occupational health and safety in the United Arab Emirates. Next, the aim and objectives of this study are presented along with the scope of the study and its potential contributions. Finally, the content of each chapter is described.

1.2 Overview of the United Arab Emirates

The United Arab Emirates (UAE) is comprised of seven Emirates, and they are in alphabetical order (Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al Khaimah, Sharjah, and Umm Al-Quwain) as presented in Figure 1 *United Arab Emirates Map.*

Source: (Batt et al., 2016). [Redeveloped]

. The United Arab Emirates was formed in 1971, and it is located in the southeast of the Arabian Gulf (see Figure 2).

Figure 1 *United Arab Emirates Map.*
Source: (Batt et al., 2016). [Redeveloped]

Figure 2 *United Arab Emirates on the Arabian Gulf Map.*
Source: (Sherif, 2010)

The United Arab Emirates has experienced great economic and industrial growth in the petroleum, construction, maritime, and industrial sectors, especially since the discovery of oil reserves. Several mega-projects exemplify the industrial progress over the past ten years, including the construction of the world's tallest building (Burj Khalifa), the largest shopping complex (Dubai Mall), Jebel Ali Port and Free Zone, Dubai International Airport, and several artificial islands: Yas Island, Palm Dubai, and a human-made archipelago called The World. The UAE also has an expanding manufacturing base with aluminium, steel, iron, and textiles contributing significantly to exports (Bagaeen, 2007; Loney et al., 2013).

Mass recruitment of low skilled or unskilled labourers from less-developed countries has been utilised to satisfy the workforce demands of these fast-paced industrial developments. Such labour force recruitment has created unusual demographics. The population in 2018 as announced by the Federal Statistical Research Data Centres, was estimated to be 9.366 million (Federal Competitiveness and Statistics Authority, 2018). Out of those, 1,084,764 were Emiratis (The Media Lab, 2019), and the remaining population consisted of a multinational expatriate labour force, as presented in Table 1 and Figure 4. These migrant labourers included different religious beliefs, work experiences, cultural practices, educational qualifications, and native languages.

These unique attributes present a challenge for health and safety professionals tasked with ensuring the multinational labour force adheres to specific occupational health and safety procedures. While looking at the data collected from the Ministry of Human Resources and Emiratisation (MOHRE, 2011-2015), it is observed that most of the blue-collar employees were from the Indian subcontinent, middle management from the Middle East, Philippines and India, and senior management from the UAE, Europe, North America, and Australia. As such, there are numerous sociocultural, religious, and educational differences among the various ethnic groups, and most of them are with low levels of education and/or are illiterate, which present unique challenges and obstacles for occupational health and safety. The total number of the expatriate labour force is much higher at many levels, such as domestic workers, drivers and workers in the free-zones, do not come under the Ministry of Emiratisation and Human Resources previously known as Ministry of Labour (MOL), and there are many others on a visit visa, which are considered to be working illegally (Hanouz & Dusek, 2013).

Figure 3 *United Arab Emirates Demographics in 2016.*
Source: (Abu Dhabi City Guide & Information Website, 2016)

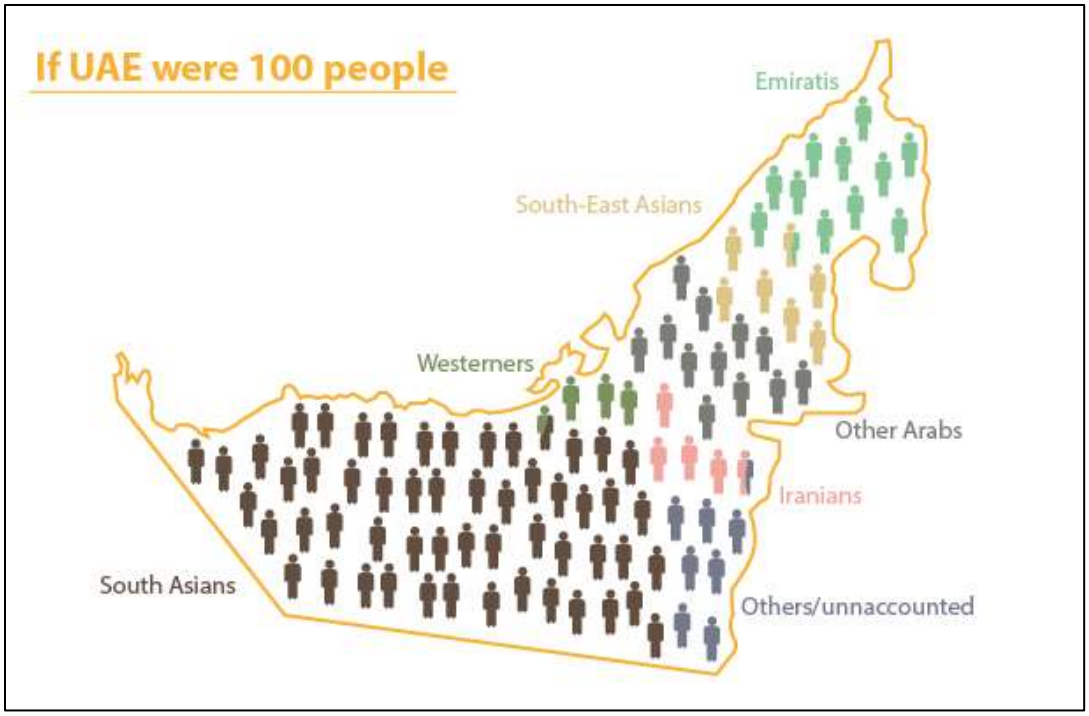

If UAE were 100 people
Emiratis
South-East Asians
Westerners
Other Arabs
Iranians
South Asians
Others/unnaccounted

Figure 4 *Expatriate Population in the UAE 2018.*

Source: (Insight, 2020)

Table 1 *The Population of Employees per Sector and Location in 2017.*
Source: Ministry of Human Resources and Emiratisation (MOHRE 2017, Not cited)

	Manufacturing		Construction	
	Emirati	Expatriate	Emirati	Expatriate
Abu Dhabi	157	95,780	1,445	496,028
Other Emirates	708	377,046	1,342	1,212,946
Total	865	472,826	2,787	1,708,974

As per the information provided by the Ministry of Human Resources and Emiratisation (MOHRE), which is the authority responsible for setting the OHS guidelines and regulations and also in ensuring the working conditions and that the workers comply with all the applicable Occupational Health and Safety requirements. The distribution of Emiratis among the expatriate workforce is illustrated emirate-wise and sector-wise in the above Table 1, by numbers and percentage, respectively.

As shown in Table 1, out of the 95,937 employees working in the manufacturing sector in 2017 in the Emirate of Abu Dhabi, 157 were Emiratis (0.16%), and the remaining 95,780 (99.84%) were expatriates. This is similar to the other Emirates, where there were 377,754 employees in total, having 708 Emiratis (0.19%) and the remaining major portion of 377,046 (99.81%) were expatriates. Table 1 also shows that the construction sector in 2017 in the Emirate of Abu Dhabi employed a total of 497,473 staff, out of which 1445 (0.29%) were Emiratis while the remaining 496,028 (99.71%) were expatriate employees. The construction companies in the other Emirates had an even smaller proportion of Emiratis, that is 1342 (0.11%) compared to 1,212,946 expatriate employees, representing 99.89%.

Figure 5 *The Percentage of Sector-wise Distribution Emirati Employees in the UAE in 2017. Source: Ministry of Human Resources and Emiratisation (MOHRE 2017, Not cited)*

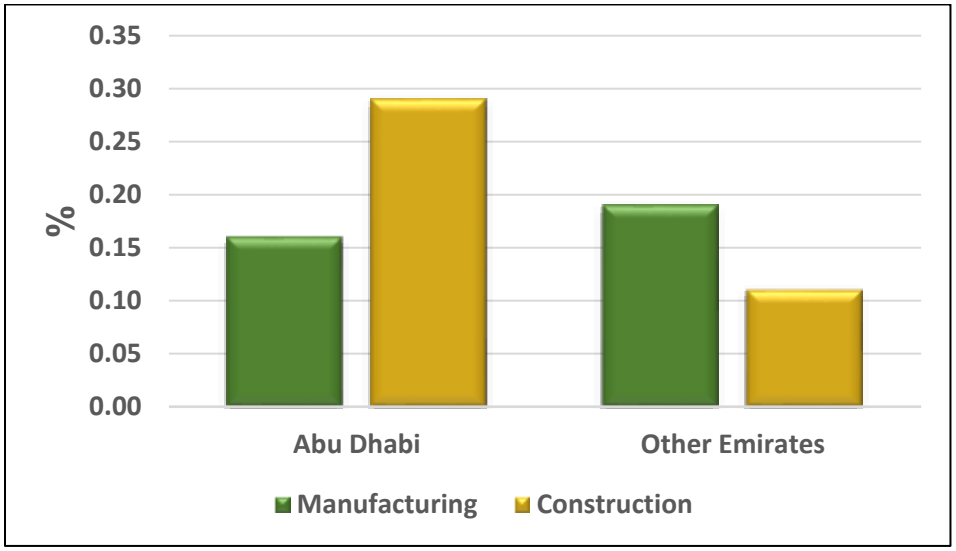


Figure 5 above focusses on comparing the proportions of Emirati employees across the sectors located in the different emirates. The prominent observations are as follows:

- In the manufacturing sector, other Emirates have relatively more employment for the Emiratis (0.19%) against that of the Emirate of Abu Dhabi (0.16%).
- As far as the construction sector is concerned, the employment of Emirati nationals in the Emirate of Abu Dhabi was 0.29%, whereas the same was 0.11% in the other Emirates.

Along with the expanding workforce of the United Arab Emirates, comes an increase in occupational health and safety (OHS) risks in the workplace environment. Sound OHS management controls are required to prevent the causes and reduce the costs of these risks and their corresponding OHS incidents. Research into incidents, as derived from the Statistics Centre-Abu Dhabi (SCAD) occupational health and safety yearly environment survey report 2013 (The Statistics Centre - Abu Dhabi, 2014), shows that the two sectors which contribute to the most occupational fatalities were the Construction and the Manufacturing sectors (47% and 40% respectively).

Most regulatory authorities for highly hazardous industries have developed safety management system requirements specific to their own industries. For example, oil and gas companies typically have a mature OHS system (Grote, 2012).

The United Arab Emirates has progressed significantly to prevent OHS risks in the Emirates. The Abu Dhabi Public Health Centre (ADPHC), formerly named the Abu Dhabi Occupational Safety and Health Centre (OSHAD), and Dubai Municipality are two examples of strong OHS oversight programs (Jackson, 2019). However, the level of OHS system development varies tremendously across organisations and industries within the United Arab Emirates. Therefore, there is a need for a standardised approach to OHS that can be used by all organisations and industries in the UAE.

1.3 Overview of the Research Project

Occupational health and safety initiatives are concerned with protecting the safety, health and welfare of people engaged in work or employment. Regardless of the nature of their work, workers should be able to carry out their responsibilities in a safe and secure working environment free from hazards. Almost all developed countries and some developing countries have set out these rights in their legislation to ensure that employers are clear about the obligations and the consequences for neglecting them. However, despite of these arrangements being in place, workers continue to face an unacceptable number of work-related deaths, injuries and illnesses, most of them preventable (Hornberger, 1972).

Zaman (2011) stated that the United Arab Emirates, being the second-largest economy in the Gulf Cooperation Council (GCC) region, has witnessed rapid development in all sectors in the last four decades. However, all these developments have been happening without any effective enforcement of health and safety regulations. The country has had its federal labour law since 1980, but with a limited regulatory framework for health and safety and a lack of enforcement of

health and safety regulations. A significant percentage of approximately 88.52% of the UAE labour force is from around 200 different nationalities as presented in Figure 4, which further complicates the health and safety culture issues found in the workplace environment. These young immigrant workers, the majority of whom are from rural areas in India, Pakistan, Bangladesh and the Philippines, are for social and economic reasons, forced to live for years without their families in labour camps, for which they might have extended working hours without overtime rates of pay, non-payment of salaries, or unsafe working conditions resulting in deaths and injuries (Hanouz & Dusek, 2013).

In the last five years, the Emirate of Abu Dhabi, the biggest Emirate within the country has been striving to implement a health and safety culture for sustainable development. It has developed a health and safety regulatory framework in the form of a management system supported by mandatory Codes of Practice (Abu Dhabi Occupational Safety and Health Center, 2015). Worldwide, most of the implementation of Occupational Health and Safety Management Systems (OHSMS) are voluntary and not mandatory (Kajiki et al., 2020). The most mature health and safety regulatory frameworks, like in the UK, are based on laws and regulations and not management system based on Health and Safety Executive (2003). It seems that the OHSMS model of Abu Dhabi has been successful in developing a health and safety culture. However, detailed research is required to assess how effective the management system based regulatory framework is, compared to using conventional/traditional laws and regulations in developing a health and safety culture (National Media Council, 2013; The Statistics Centre - Abu Dhabi, 2013)

Yoon et al. (2013) have reported that the implementation of OHSMS among the top 100 construction companies in South Korea shows a decrease in accidents' rates by 67%, and the fatal accidents' rates decreased by 10.3% between 2006 and 2011. There have been similar findings in the quantity and quality of the evidence on the closely-related topic of safety management system effectiveness (Mackenzie & Loosemore, 1997; Hale, 2003).

A detailed evaluation and comparison study of various approaches of traditional regulatory approach of command and control vs OHSMS based regulatory framework has not been conducted yet.

1.4 Problem Statement

Health and safety is a concern in all sectors. However, the manufacturing, as well as the construction sectors, are more suitable to be considered as both of these sectors have a history of a large number of serious incidents, even fatalities due to the lack of effective health and safety management. The OHS yearly environment survey 2013 (The Statistics Centre - Abu Dhabi, 2014) reported that most of the reportable dangerous occurrences were contributed by the manufacturing sector, 37%, and the construction sector, 18%.

Table 2 *Number of Entities by Sector in the UAE 2017.*
Source: Ministry of Human Resources and Emiratisation (MOHRE 2017, Not cited)

	Manufacturing	**Construction**
Abu Dhabi	7,776	18,132
Other Emirates	23,019	47,608

Reference to the information gathered from MOHRE in Table 2, the Emirate of Abu Dhabi has 28% of the total construction companies in UAE, and 25% of the total manufacturing companies in the whole of the United Arab Emirates.

Chaturvedi (2007) states that most large entities have experienced the benefits of health and safety management. However, traditionally, small and medium enterprises have a misconception and consider health and safety measures to be an extra burden. They have failed to realise the tangible economic benefit of implementing a Health and Safety Management System.

The United Arab Emirates has organisations which are governed primarily under two categories.

a. Entities following the conventional/traditional legal framework, complying with the federal UAE labour law 8 of 1980 and the Ministerial Resolution 32 – 1982 by MOHRE (Ministry of Labour & Social Affairs, 1980, 1982) represented by the organisations located from the other Emirates.

b. Entities complying with the mandatory OHSMS regulatory-based Framework (OSHAD SF) in the Emirate of Abu Dhabi (Abu Dhabi Occupational Safety and Health Center, 2017), represented by the Entities which are located in the Emirate of Abu Dhabi.

Considering the entities are categorised into the two as above, there arises a need to compare them and to check how effectively the OHS systems are managed within the United Arab Emirates and which category among them is more effective.

The conventional/traditional legal OHS framework is represented by the federal UAE Labour law 8 of 1980 and the Ministerial Resolution 32 of 1982. The UAE labour law covers all work and labour related affairs, including the Occupational Health and Safety. Articles 91 to 101 of the UAE labour law specifies the mandatory requirements for the entities that are required to comply without prescribing the details or methodology and without categorisation of work sectors (it applies to all nature of works). The UAE labour law has its reporting requirements related to incidents, and inspection requirements where verification of compliance is performed at random. The UAE labour law defines the numbers of OHS officers needed based on the size of the organisation and the number of employees. It also defines the requirements of first aiders based on the numbers of employees. There is no mechanism or tool where level of competency assured.

However, there are some limitations in the UAE labour law, that it does not cover all sectors; it exempts the government departments, agriculture etc. Also, it has no framework for implementation. Reporting, monitoring and assurance activities are also not structured.

The OSHAD OHSMS System Framework (OSHAD SF) is focussed on the Occupational Health and Safety. OSHAD SF regulations are applicable to the entities located in the Emirate of Abu Dhabi only. OSHAD SF has established 11 different sectors in the Emirate of Abu Dhabi. For each of those sectors, a regulator has been nominated by the Government, known as the Sector Regulatory Authority (SRA). The SRA shall be responsible to identify, nominate, register and govern all the entities, whose scope of work is related to that of the SRA concerned. OSHAD SF has comprehensive and mandatory requirements for regular reporting of OHS incidents, OHS Key performance indicators, OHS Audit reporting, etc. There are different levels of Audits and inspections defined through the OSHAD SF mechanisms. The number of OHS practitioners required and their OHS competency minimum requirements have been addressed in the OSHAD SF.

OSHAD SF has a unique feature compared to the other Emirates. It has a hybrid regulation approach, having a combination of two regulation umbrellas. The external one is the OSHAD SF, which regulates all Abu Dhabi entities, be it public or private and regardless of the scope of work. Element 1 of OSHAD SF requires the entities to develop an internal self-regulation mechanism, where the organisation would regulate its OHS performance by itself, through the internal audits, inspections, trainings, and self-monitoring.

The significant differences between the conventional/traditional legal framework and the mandatory OHSMS regulatory-based Framework (OHSAD SF) in the Emirate of Abu Dhabi are the availability of an OHS Institutional Mechanism, enforcement of the OHS system, defining the OHS resource requirements, the cross-checking of the OHS compliance, and mandating External Third-party OHS assessment.

OHS Institutional Mechanism:

Conventional/traditional legal framework

In the conventional system, there is no country-level institutional mechanism. There is no competent federal Authority nominated. Federal laws such as the UAE Labour law 8 is available, which addresses many requirements. Health and safety requirements are briefed in a higher level, but not so specific and customised as the mandatory OHS frameworks. As they are not enforced effectively, they are not enough to assure effective OHS benefits for the organisation.

OHSMS regulatory-based framework

At the Abu Dhabi Emirate level, the OHS Competent Authority (ADPHC) has been officially nominated with a clear administrative structure of Regulatory authorities for 11 sectors and entities under the SRAs. The Sector Regulatory Authorities are required to report to the competent authority on a Quarterly basis on the OHS performance of their sector. Also, they need to report on an annual basis, the OHS cost reporting data. As and when there is any serious and reportable incident, they shall be reported to ADPHC and follow up with the entity involved in the incident, till the investigation is done and the corrective, preventive actions are through.

Enforcement of the OHS system:

Conventional/traditional legal framework

The enforcement of the OHS system is weaker in the conventional system. E.g., if there is a serious incident, the reporting requirements will be decided on a case-to-case basis. There is no cross-checking if the entity is complying with the OHS requirements or not. There is no regular monitoring through inspections or audits.

OHSMS regulatory-based framework

The enforcement of the OHSAD System framework is stronger. Mechanism 11 of the OHSAD SF clearly addresses the incident notification and reporting mechanism with specific timelines. The incidents are classified into nine categories, from recordable near misses to reportable Incidents such as LTIs including fatalities. The incidents shall be notified from the entities to the Sector regulators within the stipulated timeframe (Fatal: Within 24 Hours, Non-fatal: Within 72 hours), then the sector regulators will notify the incidents to the Competent Authorities. After the incidents are notified, the SRAs will follow up with the entities for conducting investigations and initiating the necessary corrective preventive actions. Once the actions are complete, the incident investigation report with the evidence of corrective actions will be submitted by the entities to the SRAs. Once the SRA reviews and approves them, the Competent authority will cross-check and finally close the incident, if the investigation was done well by the entity and SRA has supervised well. Such a two-factor authentication is established for incident notification and reporting.

OHS Resource Requirements:

Conventional/traditional legal framework

In the conventional OHS system, OHS resource requirements and the minimum required competencies are not addressed.

OHSMS regulatory-based framework

The number of OHS staff and their competency requirements are clearly addressed in Element 7 of the OHSAD SF. Further, the OHS practitioner course and practitioner registration systems are available for different categories of OHS professionals.

Cross-Checking of OHS Compliance:

Conventional/traditional legal framework

In the conventional system, there is no mechanism to cross-check the OHS compliance to the applicable obligations.

OHSMS regulatory-based framework

The mandatory OHSAD SF System has a structured framework for cross-checking. The entities are regularly inspected and audited by their respective Sector Regulatory Authorities, and the competent authority ADPHC cross-check how effectively the regulators have supervised the entities under their umbrellas.

External Third-party OHS assessment:

Conventional/traditional legal framework

External verification of the OHS system compliance is optional in the Conventional/traditional legal framework.

OHSMS regulatory-based framework

The OHSAD SF mandates the third-party assessment at a regular interval of at least once per annum. The third-party agencies shall be pre-approved by the competent authority, to pre-qualify them as a Registered Professional entity. Also, the individual auditor, who will lead the audit shall be pre-approved as a registered auditor, as a registered audit professional. The OHSAD SF will be taken as the primary audit criteria. Such a tailored audit brings many customised benefits to the entities, such as checking how effective the OHS framework has been and how the OHS benefits are achieved for the entity. In this way, the audit is focused on assuring the OHS system is integrated with the daily operational activities of the organisation. Also, such a dedicated third-party assessment becomes a strong foundation for the OHS excellence journey of the organisations audited.

1.5 Aims and Objectives.

The objective of this research is:

To compare the two broad OHS compliance frameworks as below and conclude which one of them is more effective.

- Conventional/traditional legal OHS framework (Other Emirates)
- Mandatory OHS regulatory based framework (Abu Dhabi Emirate)

In order to achieve the above objective, the following questions are addressed in this research:

- What are the benefits of Abu Dhabi's OHSMS regulatory based framework (OSHAD SF) in comparison to that of the conventional/traditional legal OHS framework (UAE Labour law number 8 of 1980) as implemented in the other Emirates of United Arab Emirates?
- What is the influence of OHS trainings on the effectiveness of the two different OHS frameworks governance (OSHAD SF in Abu Dhabi and conventional/traditional legal framework as per the federal UAE labour law number 8 of 1980 in the other Emirates) in the Construction and the Manufacturing sectors in the United Arab Emirates?

1.6 Scope of the Research

The scope of this research is to evaluate the effectiveness of Occupational Health and Safety Management System in the UAE.

This research is focused on the framework of the Occupational Health and Safety Management in the UAE, to study the effectiveness of Abu Dhabi's OHSMS regulatory based framework (OSHAD SF) and compare it with the conventional/traditional legal OHS framework which is based on the UAE labour law. In this research, a questionnaire was developed based on the

literature review, and a pilot interview with industry leaders from the Manufacturing as well as the Construction sectors was undertaken. The survey methods included seeking a response to the questionnaire through the mail, email, online, etc., as well as conducting face-to-face interviews at the site with key personnel within the selected entities from the Construction and the Manufacturing sectors. A statistically designed sample size was surveyed. The research also used the online community through professional networks such as LinkedIn, Institution of Occupational Safety and Health (IOSH) UAE forum, International Institute of Risk and Safety Management (IIRSM) Middle East chapter and OHS professional group in WhatsApp etc. as respondents in the study. Also, focus group interactions within the health and safety community were arranged to discuss and gather various behaviour related information, and the challenges the professionals are facing within the Construction and the Manufacturing sectors.

Both the focus group interactions and the face-to-face interviews at the site were the methods of direct interaction used for qualitative data collection, whereas the questionnaire responses were the approach for qualitative and quantitative data collection.

1.7 The Research Contribution

This research assesses and aims at contradicting the negative perception that managing health and safety is an extra burden on the business or does not add value to the bottom line of the business. This research demonstrates how mandatory regulatory-based OHSMS framework has benefited businesses. This will not only boost the Abu Dhabi OHS regulatory based framework but will become a role model for other Emirates and other GCC countries to follow.

This research contributed to the following:

I. A critical evaluation of how the Construction and the Manufacturing organisations within the United Arab Emirates are managing their occupational health and safety performances.

II. An objective comparison between the two compliance frameworks. Abu Dhabi's OHSMS regulatory-based framework (OSHAD SF) in comparison with conventional/traditional legal OHS framework (UAE Labour law number 8 of 1980), as implemented in the other Emirates of the UAE.

III. To evaluate the influence of OHS training on the effectiveness of OHS Governance in the United Arab Emirates.

IV. Recommendations to fix the OHS governance deficiencies for the entities operating within the United Arab Emirates, regardless of their location and sector.

V. A baseline for the forthcoming work by scholars who will evaluate the OHSMS effectiveness in the other sectors of the United Arab Emirates.

This research will additionally support the prospective research-scholars on the contemporary OHS compliance practices and the factors to be considered towards developing a unified OHS institutional mechanism. For the OHS regulatory stakeholders, this research will add information on the loose ends in the enforcement of OHS obligations.

This research contributed to identifying the OHS framework that is the most effective, so that the OHS implementation can be unified across the United Arab Emirates. Furthermore, the decision-makers in the regulatory bodies as well as in the entities will increase the OHS training requirements for the employees, with a view to make the OHS Governance improve continually.

In line with the overall objectives (Refer to 1.5, the aim and objective), this research evaluates the effectiveness of the existing OHS Management Systems and explores viable options to enhance the OHS governance at a federal level. The findings of the study are derived from data collected from both qualitative and quantitative research instruments, which helped to gather different opinions. This research explored various occupational health and safety issues that drive and

enhance the OHS performance of the organisations. The data was processed and analysed using scientific tools and underwent statistical analysis to derive the findings.

The findings were interpreted to gain insights into the current state of occupational health and safety and how the new regulatory framework will be beneficial to the economy and environment in the Emirate of Abu Dhabi. The findings are expected to be beneficial in understanding the similarities and differences among the conventional/traditional, and the regulatory OHS Management Systems in the United Arab Emirates. Considering these findings, many important decisions might be taken. The findings also serve as a guideline for suggesting changes in the regulatory framework or recommendations to all the industries. As these findings came from two diverse sectors, the findings and insights gained could be highly beneficial for the entire industry. As the responding companies were selected at random, there is a probability of gaining unbiased insights, and because multiple methods or mixed approaches were used, the findings are more accurate and precise.

By collecting and analysing the qualitative and quantitative data related to the OHS perceptions, this research involved an innovative component to fine tune the existing regulatory framework and extending it to cover all other parts of the United Arab Emirates so that OHS governance can be unified and strengthened.

1.8 Thesis Structure

The thesis encompasses five chapters, described as follows.

Chapter 1**Chapter 1** presents an introduction and an overview of the United Arab Emirates. This chapter is focused on the motivation for the problems addressed, the nature of the problems and the importance of research in this area. Also, the aims, objectives, scope, and contribution of this research are presented.

0 presents an account of the research undertaken to demonstrate the effectiveness of Occupational Health and Safety across various industry sectors, and identify the research opportunities in the field as well as compare the effectiveness of the different Occupational Health and Safety management compliance frameworks as well as the influence of training and governance in achieving effective OHS management in the Construction and the Manufacturing sectors in the United Arab Emirates. Moreover, this review will provide an insight into the previous knowledge and facts on the research work done in the area of the effectiveness of OHS Management and list out the challenges faced by the previous researchers in the same subject, and finally identify the gaps in the existing theories and the variables to be considered.

Chapter 3 explains the research methodology and details the tools used for the development of this work. It includes the research paradigm in which the research is positioned, the research design and the methodological choices used, including the assessment methods applied to evaluate the results of this work. Finally, the approaches used in this study for the samples and data collection are addressed.

Chapter 4 describes the data collection and reviews the processes adopted for the qualitative and quantitative data collection. The methods used included a research questionnaire (survey), site interviews, focus groups, and engagement with online communities specific to the areas of research objectives. The second part of the chapter presents the results of the qualitative and quantitative analysis of the data obtained from each one of the methods used and discusses the findings from the literature review, questionnaires and interviews. A summary of the process to formulate the research questions, collect the responses and use them for the analysis and evaluation of the research findings. The chapter ends with an overview of the interpretation of the findings and discussion of the merged results.

Chapter 5 introduce the research conclusions and recommendation. It undertakes the summary of the research developed to assess the research questions, identify the contributions provided and mentions niches for future research.

Chapter 2. Literature Review

2.1. Chapter Summary.

This chapter presents an account of the research undertaken to demonstrate the effectiveness of Occupational Health and Safety across various industry sectors, and identify the research opportunities in the field as well as compare the effectiveness of the different Occupational Health and Safety Management compliance frameworks as well as the influence of training and governance in achieving effective OHS management in the Construction and the Manufacturing sectors in the United Arab Emirates. Moreover, this review will provide an insight into the previous knowledge and facts on the research work done in the area of the effectiveness of OHS Management, and list out the challenges faced by the previous researchers in the same subject, and finally identify the gaps in the existing theories and the variables to be considered.

2.2. Introduction.

Occupational Health and Safety focuses on the wellbeing of the growing numbers of employees in the Construction and the Manufacturing sectors. The employee numbers are drastically increasing, which has resulted in a boom of Health and Safety problems in the workplaces, as announced in the World Economic Forum (2018). The safety of the workplaces and their relative Occupational Health and Safety hazards are considered to be what the drive for the efforts to find solutions and ways for preventing injuries and loss of life in the Construction and the Manufacturing sectors (Hämäläinen et al., 2006, pp. 138-139). Many countries have become more stringent in the quality, knowledge and health and safety requirements (Mock et al., 2017).

For the past 20 years, the concept of adopting an Occupational Health and Safety Management System has become more important to organisations (Bottomley, 2001). There are numerous audits and guidelines, which have been developed related to the OHSMS. In many countries, the workplaces have adopted the OHSMS guidelines and reviews within the private sector, public

sector and for the non-profitable sectors. In some regions like Canada, companies are progressing to develop an Occupational Health and Safety Management standard (Robson et al., 2007, p. 5). The focus of OHSMS in some countries is to build a perspective for Occupational Health and Safety through formal and informal consultations with the private sector, public sector, and non-profit institutes (Saracino et al., 2012).

Some existing studies had a secondary goal of conducting research into the research methodology and the appropriate research literature on Occupational Health and Safety Management Systems (Gallagher et al., 2003). The purpose of this literature review is to find out the void space and weakness in the available literature when addressing future research points and research questions. The research study will first discuss the background of the Occupational Health and Safety Management System.

The objective of carrying out this literature review is to gather information from the previous studies conducted globally, regionally and within the United Arab Emirates on the Occupational Health and Safety Management Systems in the Construction and the Manufacturing sectors. The primary sources were reference books, journal papers and conference papers.

The in-depth research was done in most of the databases, including Online British Library, ProQuest, Google Scholar, and Emerald. Specific academic journal related to Occupational Health and Safety like *Safety Science Journal*, *Safety and Health at Work Journal* and Science Direct database, was also searched using the keywords.

2.3. Background.

Occupational Health and Safety initiatives are concerned with protecting the safety, health and welfare of people engaged in work or employment. Employees should be able to carry out their responsibilities in a safe and a protected working environment, free from hazards regardless of the nature of work. Almost all developed countries and some developing countries have set out

these rights in regulations to ensure that employers are clear about their responsibilities and the consequences for neglecting OHS-related accountabilities and responsibilities. Workers continue to face an unacceptable number of work-related deaths, injuries and illnesses, most of which are preventable (International Labour Office, 2001).

The United Arab Emirates, being the second-largest economy in the GCC region, has witnessed rapid development in all sectors in the last four decades. However, all of these developments have been happening without any effective enforcement on the Health and Safety regulations (Kartam et al., 2000, p. 183). The country has had its federal labour law since 1980, which has a limited Regulatory Framework for Health and Safety up until 2009, when the official establishment of OSHAD (Abu Dhabi Executive Council, 2009) took place. Also, there has been a lack of enforcement of Health and Safety regulations. Moreover, a percentage of about 88.5% of the labour force working in the country is from around 200 different nationalities, as presented in Figure 4, which further complicates the Health and Safety culture issues in the workplace environment, according to Lian et al. (2019).

For the past five years, Abu Dhabi, the capital city and the biggest Emirate within the country, has been striving to bring a Health and Safety culture for sustainable development. It has developed and implemented a Health and Safety regulatory based framework in the form of a management system supported by mandatory codes of practices (Abu Dhabi Occupational Safety and Health Center, 2015).

2.4. Why an Occupational Health and Safety Management System (OHSMS)?

In the United States of America, since the Occupational Safety and Health Act (OSH Act) was signed into law four decades ago, workplace deaths and reported occupational injuries incidents have dropped by more than 60 %, according to Occupational Safety Health Administration OSHA

(2012, p. 2). Yet employees continue to face an unacceptable number of work-related deaths, injuries and illnesses, most of which are preventable. The Occupational Safety & Health Administration, US Department of Labour, reported that as per the Occupational Safety Health Administration OSHA (2018, p. 1), more than 14 workers die on the job every day, and every year more than 4.8 million workers suffer from work-related injuries or illnesses. Similarly, in the United Kingdom, the management of Health and Safety at work regulations, 1999, requires employers to put in place control measures to mitigate all Health and Safety risks. According to the Health and Safety Executive in the United Kingdom (HSE) publications (Health and Safety Executive, 2013, p. 4) presented that "*managing health and safety can rarely be achieved by one-off interventions, but requires a sustained, and systematic approach*".

There are several Occupational Health and Safety Management Systems which can be implemented, including the "Occupational Health and Safety Assessment Series ISO 45001", the British Standard BS 8800:2004 "Guide to Occupational Health and Safety Management System", and the International Labour Office ILO-OSH 2001 "Guidelines on Occupational Safety and Health Management Systems" (International Labour Office, 2001). All these management systems are based on the "Plan, Do, Check and Act" management model and represent the principle of continual improvement. However, obtaining an ISO certification is only based on the fulfilment of the minimum conformance criteria, hence in the long run, it is not clear how effective the voluntary standards have been in achieving an effective OHS in an emirate or country.

A variety of Occupational Health and Safety Management System (OHSMS) based standards, guidelines, and audit requirements have been developed (Grayham & Rosario, 1997; Health and Safety Executive, 1997; Dalrymple et al., 1998; The British Standards Institution, 1999; Frick et al., 2000; International Labour Office, 2001; Gallagher et al., 2003).

The public, private, non-profit organisations and workplaces have adopted many of the OHSMS standards, such as the Australia/New Zealand Standards 2001 (SAI Global, 2001). Dababneh

(2001, p. 1) presented that "*The Occupational Health and Safety assessment series OHSAS 18001* (ISO 45001) *specification has been developed as a recognisable Occupational Health and Safety Management System standard against which management systems can be assessed and certified.* Due to the unified structure of all ISO standards released from 2015 onwards based on the Annex SL framework, ISO 45001 is compatible with the ISO 9001 (Quality) and ISO 14001 (Environmental) management systems standards, which facilitate the integration of quality, environmental and Occupational Health and Safety Management Systems by organisations.

Dababneh (2001) has studied the comparison of specifications of three standards/guidelines for the management of Occupational Health and Safety: OHSAS 18001, currently ISO 45001, the International Labour Organisation (ILO) guidelines, and Oregon State OSHA (OR-OSHA). Dababneh stated that "*the three standards had high consistency, agreement on generalities, and few differences regarding some details. However, OR-OSHA included more details to guarantee the effectiveness and practicality of the safety management system"*.

According to the review of their effectiveness in securing Health and Safety, vide the report prepared in Sydney for the national Occupational Health and Safety commission, April 2001, according to Gallagher et al. (2001), one of the problems in evaluating the effectiveness of OHSMS lies within the different meanings given to the term. Their discussion of the definition of OHSMS falls primarily into the following eight elements:

- It began by listing the general features of all OHSMS.
- Secondly, it distinguished voluntary and necessary strategies of implementation.
- The third (and connected) was a distinction between OHSM "systems" and "systematic" OHSM.
- Building on the previous element, the fourth compared managerialism and participative forms of OHSMS.

- The fifth suggested an additional, comprehensive framework for categorising organisational styles of OHSMS. It has supported cross-typology victimisation management strategy and management structure/style as variables.
- The sixth, OHSMS square measure, scaled consistently with the degree of implementation on the associate ascending hierarchy of quality levels.
- The seventh, a new organic process framework, was introduced to support the implementation of continuous improvement.
- The last approach summarised the various aspects of OHSMS, highlighting implications for analyses and measurements.

A few Australian authorities on OHSMS have given definitions according to these system necessities. For example, Bottomley notes of what makes an OHSMS system is the deliberate linking and sequencing of processes to reach specific objectives and to form a repeatable and an identifiable method of managing OHS. Corrective actions are also central to a scientific approach (Bottomley, 1999).

Another researcher defined OHSMS as a distinct component that covers various key aspects needed to manage Occupational Health and Safety. These are interlinked, and therefore the unit is driven by feedback loops (Pearse & Refshauge, 1987). Similarly, Gallagher defines OHSMS as *"a combination of the design and review, the organisational management arrangements, the consultative arrangements, and therefore the specific program components that work along in an integrated manner to improve Health and Safety performance*" (Gallagher, 2000, p. 1).

One way that disagreements arise about the OHSMS is due to the various ways of implementation. Frick and Wren distinguished three varieties—voluntary, obligatory and hybrid (Frick & Wren, 2000). Voluntary systems exist wherever entities implement the OHSMS and govern them internally in the absence of external regulation. Usually, this can be to implement

strategic objectives regarding workers' welfare or smart corporate citizenship, though there could also be alternative motives like reducing insurance prices. In contrast, obligatory systems have evolved in several European countries such as Denmark and Norway, wherever legislation needs a system to be implemented for risk assessment and mitigation. The hybrid approach involves self-regulation as well as specific mandated requirements, wherever external commercial pressures take the place of legislative requirements (Gallagher et al., 2001, p. 5).

2.5. Factors Responsible for the Successful Implementation of the OHSMS.

For a company to succeed in the creation of safe workplaces, an effective safety management system needs to be developed and implemented (Weekes, 2017). Weekes reported that a safe working environment can be created and maintained by the application of various aspects. A safety management system ensures that multiple elements are combined to ensure the provision of safe working environments for all the companies' stakeholders. A Safety Management System ensures that Health and Safety are the core of the company's operations. Weekes further emphasised an effective safety management system is one that is efficiently designed, developed, and implemented and one that also ensures that report management, responsibilities, resourcing, and planning are incorporated. The company should not only adopt a safety management system but should also continually ensure that workers are complying with instructions and procedures, ensure the training of employees, and the supervision of employees for their compliance.

According to Weekes (2017), the effectiveness of safety management in a company depends on adhering to six elements, including:

- Effective Safety plan.
- Outlined policies, processes, and procedures.

- Continued training and employee induction.
- Monitoring.
- Supervision.
- Reporting.

A safety plan is a blueprint that is a part of the company. The above six elements ensure that there is an analysis of both the current and prospective risks associated with the company. A chart should also be in place, showing how the risks will be eliminated and controlled over a given period. Planning is crucial for the identification of strategic aspects in the identification of opportunities available for improvement (Dalto, 2016). He emphasised that planning of an OHSMS should take place in an organised way that follows the steps outlined below:

1. Identification of the OHSMS issues through gathering and reviewing of information available.
2. OHSMS issue prioritisation.
3. OHSMS objectives development based on the OHSMS issues prioritised.
4. Creation of an implementation plan for the objectives identified.
5. OHSMS planning should continually be done to ensure its effectiveness.

Dalto (2016) further emphasised other factors that contribute towards successful Occupational Health and Safety Management are policies, procedures, and processes. These processes, policies, and procedures are captured in a company's paperwork that describes behaviour, incident reporting, expectations, and incidents' management.

Training and induction are other factors that ensure the success of Occupational Health and Safety Management. There is a variety of Health and Safety training that employers must ensure their employees attend the training sessions regularly. The training sessions are either provided by the employer, unions, and the Health and Safety organisations. The training sessions are either conducted in-house, or the supervisors attend external training sessions. Trainings should adapt to the works and workplace changes. A company should consider giving its employees trainings

on the rules of the company, site rules, and location rules. The content provided during training depends on the risk level the employee gets exposed to (Bayram, 2019).

The other factor contributing to the success of OHSMS is supervision. Supervision ensures that all the employees are adhering to safety rules and regulations. Thus, close supervision is required in situations where the company has implemented less effective control measures (Ailabouni et al., 2009; Cagno et al., 2011).

Monitoring is the other factor that ensures the success of an OHSMS in a company. Control mainly depends on the needs and circumstances of a company. If the employees get exposed to higher risks, then monitoring at higher frequencies is vital. Monitoring is also crucial in ensuring that the risks in a company are taken care of by risk assessment being out as a result of changes. Control also plays a significant role during an investigation after an accident occurs (Weekes, 2017).

Reporting is also extremely critical for the success of an OHSMS because the structure of governance in the company requires reports at all levels. A worker in the company requires to be updated on what is going right in terms of their safety and what is going wrong. Therefore, it is the responsibility of the company to give feedback on the number of hazards identified and the levels of risks associated and also the control measures that have been implemented (Bottomley, 2001).

2.6. Existing Research Works– Outside the Middle East Region.

The studies on Occupational Health and Safety started in the 1970s, with a three-stage research conducted at the U.S. National Institute for Occupational Safety and Health (NIOSH) in the late 1970s, that identified aspects that resulted in an improved Health and Safety performance. In the initial two phases, comparisons were undertaken of safety program practices within companies the incur low and high injury rates (Alexander Cohen et al., 1975).

Occupational Health and Safety Management practices have been acknowledged to improve the workplace environment (Eyssen et al., 1980). A large number of discriminating factors were reported in the NIOSH study and other related studies linking Occupational Health and Safety Management practices with information about occupational injuries (Vredenburgh, 2002). Also, findings across the studies have highlighted a vital challenge faced by senior managers with inefficient OHSMS's, and therefore the importance of effective communication, workers involvement and consultation are critical (Zanko & Dawson, 2012).

The Health and Safety programs of five firms with excellent Health and Safety performance were examined by Cohen and Cleveland (1983), who concluded that the five plants studied revealed a mature and an effective OHS performance. That was due to the common OHS characteristics demonstrated within these plants, such as management commitment, management efficiency, industrial and human relations, workforce characteristics and the plants' physical characteristics such as the working conditions with adequate lighting, ventilation, and welfare facilities.

Taylor (2010) indicate that the culture of an organisation is assessed in terms of motivation, behaviours, and attitudes of the workers, supervisors, and managers. This mainly has a significant influence on not only the perception but also the working practices of any organisation. It also greatly affects the management of the Occupational Health and Safety risks, which needs to be dealt with on a regular basis. This also determines the level of risk that is acceptable and the level of change that is required in the responsibilities of each of the firm's employees, in order to adopt prescribed Occupational Health and Safety (OHS) behaviours within the organisations. Health hazards that have risen from workplaces can impair the well-being and health of the employees and workers at Construction sites. Also, Mortensen (1988) state that, it is necessary to anticipate, evaluate, recognise and control such hazards and risks.

Dawson et al. (1988) reported that Health and Safety performance was hardly considered as a factor, regardless of whether a formal or informal management appraisals are being conducted.

A study was conducted to assess the impact of and effectiveness of the Scandinavian “internal control” initiatives (Hovden & Tinmannsvik, 1990) as a part of the “voluntary approach”. It was reported that a high degree of understanding between the company’s management and the regulators, as well as between employers and the employees, resulted in the successful implementation of internal controls.

The focus of the implementation was more repair-oriented than preventative, primarily in large public sector companies. A significant gap between rational management systems and the failure of individuals to make rational decisions and adequate behaviours is highlighted in a study by Rasmussen and Jensen (1994).

Comprehensive integration into the workplace management system is a prerequisite for an effective OHSMS. Several authors have widely supported the requirement for integrated management systems. For instance, (Quinlan & Bohle, 1991; Else, 1994; Rahimi, 1995) refers to the integration as a precondition to making Health and Safety effective within the workplace.

However, the current practices indicate those who are nominated for the cross-functional teams, shall do it as an additional responsibility for them, and there is no recognition for this additional contribution (Pantry, 1995). Hence this factor shall also be considered.

Gallagher et al. (1998), in their study of 20 companies, reported a lack of proper practices to accomplish appropriate management accountability for Health and Safety. Using assessment criteria from high to low compliance on a scale of five, none of the organisations studied could even achieve an average scoring for management accountability. Some companies had Health and Safety as a criteria for performance appraisal within their systems but had little evidence to conclude that Health and Safety was given the same appraisal weightage as for achieving production or quality targets. Usually, Health and Safety is considered as a critical factor in appraisals only in the event of a problem or in the case of a serious incident. Moreover, the

emphasis was limited to superficial items like housekeeping or injury levels rather than performance-based Health and Safety objectives.

Scholes and Clutterbuck (1998), in their research, they highlighted that a key part of the OHSMS is the inclusion of consultation and communication requirements. They also stated that, employers have the moral responsibility to consult with employees, stakeholders, and the community, and work together to eliminate or reduce work-related illness and injuries and to encourage and promote health and well-being. However, the consultative approach requires careful planning and strategic selection of consultation methods. It guarantees a safe and a healthy workplace where procedures work practices, and programs are actually established, retained and maintained by the people who must work within these systems and be guided by them (Scholes & Clutterbuck, 1998).

Rogers (1998) stated that it is essential to strategically plan the implementation of the Occupational Health and Safety standards within an organisation. It is considered as the key to the long-term success of the organisation via vision, mission, and goal setting. Rogers also pointed out that this strategic planning also helps in shaping the future of the organisation while also incorporating the need for Occupational Health and Safety implementation.

A study shows that a truck can tilt and fail relatively more frequently on a sunny day at a good road than under bad weather, due to a false sense of security (Reese & Eidson, 1999), which requires a further analysis given that complacency is a contributing factor that influences the effectiveness of the OHS Management System of the organisation.

A supervisor with a positive relationship with the employees has an excellent safety performance record. Singh et al. (1999) explains how to establish a positive relationship and how to develop a positive OHS Culture, are the most challenging aspects of OHS internal governance.

Considering the United Arab Emirates has more than 200 nationalities in the expatriate workforce, maintaining unified Health and Safety work practices is a real challenge. However, organisations started to focus on their organisational factors, weather conditions and the cultural factors of Health and Safety (Reese & Eidson, 1999). The multinational workforce with a diverse set of cultures, habits, beliefs and behaviours at work would influence the overall Health and Safety performance at work (Kartam et al., 2000).

Very little research has been undertaken to study the effectiveness of OHSMS. Frick et al. (2000) reported that although "*OHSM has progressed internationally as a key tool to cut down the major social and economic issues of ill-health at work*", there was a surprising scarcity in the assessments of the effectiveness of such systems. However, there were a few studies that reported the effectiveness of an OHSMS and can be termed the "effectiveness studies". Most of these studies sought to isolate the identifying characteristics of corporations with higher Health and Safety performance and, intrinsically, they were not primarily assessing Occupational Health and Safety Management Systems. Rather they covered a spread of findings on the variables related to positive Health and Safety outcomes. Also, most analyses had been conducted within the USA and Europe. Given the probable significance of cultural variables (relating to management and worker behaviour), it is a vital question of whether or not findings for these countries would necessarily apply to businesses in the rest of the world. Moreover, studies covered a very small scale and did not allow reliable generalisation. There were only a few large-scale studies (other than to check the consequences of Norwegian and Danish legislation) that were statistically reliable for business in general (Gallagher et al., 2001).

The most important empirical study of the OHSMS effectiveness was in the Australian industry, and the relationship between the OHSMS type and system performance was conducted by Gallagher (2000). The term "Adaptive Hazard Managers" was used to indicate a planned approach to the management of the entire range of hazards, as compared to other systems, which

only focussed on improving the OHSMS through systems activity innumerably having underlying risk management or cultural change drive. The type of “Adaptive Hazard Manager” was defined by the roles of management and employees in the companies studied. As stated by Gallagher, the study further strengthened the findings of several “effectiveness” studies that highlight the vital role of senior management and the involvement as well as consultation with the employees. The studies by Gallagher also emphasised the importance of precise roles for the major players, pointing out that Health and Safety change should be driven by senior management and that Health and Safety representatives, rather than limiting themselves to traditional Health and Safety Management, should get significantly involved in mainstream planning, implementation and review of Occupational Health and Safety Management.

While studying the Esso gas plant disaster, Hopkins (2000) demonstrated through a case study, how a lack of management commitment could result in the failure of the OHSMS practice. Esso had an Operational Integrity Management System, which is their version of OHSMS, that was considered by most companies as a model system rated by the company audits as operating at its pinnacle. Hopkins, based on the evidence drawn from the Longford Royal Commission, demonstrated several failures in the Esso system that were directly responsible for the disaster. These included faulty auditing processes, inability to properly identify hazards and assess risks, absence of strategic management direction, lack of procedures to take immediate incident action, insufficient training, weak mechanism of communication and an improper hazard reporting system. Hopkins challenged those who claimed that the Esso disaster disgraces the concept of an OHSMS and have alternatively suggested the need for “organisational mindfulness”, a concept that is expected to account for the success of high-reliability enterprises. Hopkins recommended that mindfulness could reinforce an OHSMS by emphasising the Health and Safety Management aspects that are critical for high reliability.

Where self-regulation is embodied, the duty of care becomes voluntary, and the obligations are well managed pro-actively. With reduced formality for approval and verification, the organisations can develop better resources to reach the stakeholders and assure them that the business is effective and efficient (Parker, 2002).

The success of the OHS performance management depends on planning and establishing the right indicators, making necessary follow-ups and ensuring appropriate actions to achieve the performance objectives. (Arezes & Miguel, 2003).

Robson et al. (2007) reported a systematic literature review investigating the effectiveness of mandatory and voluntary OHSMS interventions on the employees' Health and Safety and associated economic outcomes. The review identified several gaps in the research. The most important one was the lack of research whose explicit purpose was to study the effectiveness of OHSMS based System Framework and traditional/conventional OHSMS interventions on the employees' health, safety, and economic outcomes. Moreover, the studies were seldom sufficiently rigorous in their methodology to allow for high confidence in the reported findings. Their limitations also inhibit the ability to apply the results to other workplaces.

The organisation needs to motivate their staff, to involve and contribute well to the OHS Culture (Kaufman, 2008), however many organisations do not have a framework for motivating their staff, even if they had such a motivational or a recognition program, the criteria for that recognition included only the operational parameters and not the safety-related ones.

Gunningham (2008) reported that an approach to implementing internal disciplinary procedures as part of the company's compliance/enforcement strategy was still not developed. Such requirements would be aligned with the OHSMS approach. Gunningham suggested that the first step towards identifying gaps and reforming the OHSMS of an organisation would be to identify those supervisors and line managers who are responsible for OHS breaches.

Sa'ed et al. (2010) in his studies of considering the diverse human knowledge and safety competencies of the expatriate workforce, especially as most of the labourers are either illiterate or school dropouts, their knowledge will give them limited ability to understand the job expected from them. While they may be physically able to perform the jobs, their cognitive ability will be deficient. This may make it difficult for them to understand the operational methods as well as the safety know-how to be exercised on the job. While they ought to perform work safely, they have limited knowledge of operations and safety, consequently putting operations in general, and in particular, the OHS performance at stake.

The industry self-regulation and its impact on the workplace were investigated by Gunningham (2011), who remarked there was no clear dichotomy between self-regulation on one hand and government regulation on the other. Instead, there is a variety, with forms of self-regulation and government command and control regulation at opposite ends. *Co-regulation* involves the points between the two ends, involving elements of both self and government regulation, which is the most common option available in the United Arab Emirates.

Gunningham further emphasised on co-regulation, in other words coexistence, of mandatory systems and self-regulation, which is revealed through the government command and control regulation by the OSHAD regulatory framework element 1 for the entities operating in the Emirate of Abu Dhabi, voluntary self-regulation is available in the other Emirates through the international standards (OHSAS 18001/ISO 45001).

However, the self-regulation mechanism is currently developed and is required in the Emirate of Abu Dhabi only and not from the other Emirates. Hence, we have a variable of heterogenous self-regulation mechanisms, which scatter the focus of unified and effective OHSMS governance within the United Arab Emirates.

Following research by Rodrigo (2012) studied between 2001 and 2009, a range of business imperatives was clearly identified within companies that were successful in addressing the occupational health risks. The key imperatives were as follows:

1. Management commitment and active participation.
2. Participation of the employees.
3. The setting of goals and measuring performance.
4. Integration of Occupational Health and Safety strategies into the business plan.
5. Positive feedback and recognition of achievements.

The following variable human factors (Salvendy, 2012) were also identified:

- Memory lapses.
- Impaired judgment or reduced reasoning power.
- Inattention or distraction.
- A delayed or false sensation of the sensory organs.
- Lack of competence and experience.
- Skill level inadequate for the task performed.
- Personality or attitude, such as negligence, arrogance, or overconfidence.
- Poor risk perception due to inadequate knowledge and experience.

The OHS trainings needs for the staff of dissimilar categories shall be identified, and their training programs shall be provided accordingly. All such trainings (In-house, Instructor-led classroom, Computer-based and e-learning, or any kind of Interactive methods) shall be evaluated, and their effectiveness is measured and ensured to achieve the training needs (Järvis, 2013).

Edwards et al. (2013) explained that for the effective engagement of staff, a cross-functional OHS teams would be a viable choice, such as an HSE committee, Emergency Response Team, etc. Achieving excellent OHS Performance and maintaining a positive OHS Culture is through

teamwork. It requires a cross-functional team of staff from various departments to be chosen carefully to represent the whole organisation.

Yoon et al. (2013, p. 207) reported that voluntary OHS systems among the top 100 Construction companies in South Korea showed a decrease in the accident rate by 67%, and the fatal accident rate decreased by 10.3% between 2006 and 2011; it was a form of qualitative data analysis (QDA).

It was found that in the Construction and the Manufacturing sectors, a significant focus on risk management was required, due to a higher rate of incidents, as explained in the official publication from The Statistics Centre - Abu Dhabi (2014).

An adequate number of studies have proven that senior management's accountability for OHS is mostly lacking, as concluded by Alglilat et al. (2017).

Effective multicultural communication comes down to much more than just words spoken. Non-verbal communication is a complicated and nuanced part of cultural interaction that can lead to misunderstandings or even offence between team members from several countries. Things like secure levels of physical space, making or maintaining eye contact, and waving can all be very different across cultures (Gjylbegaj & Jararaa, 2017).

Human factors are responsible for a large number of incidents that occur in the workplace (Arezes, 2017).

2.7. Existing Research Works– in the Middle East Region.

Malca et al. (2006) reported on the Occupational Health and Safety regulations in the Middle East countries, including Oman, Qatar, and the United Arab Emirates. The study concluded that, although OHS regulations were quite well established in these counties, the capability of the Occupational Health and Safety regulatory authorities was limited due to the lack of a sufficient number of location-specific and sector-specific OHS regulation, which in turn undermined the enforcement of OHS in the workplace within the region.

The International Labour Office held a study about OHSMS in the Arab region (Habib, 2007). The study was meant to offer a background on Health and Safety in the Arab countries. The research was conducted by sending questionnaires to the ministries of labour in the selected countries. The survey was supposed to be filled out by the Occupational Health and Safety officers and sent to the International Labour Office. After the analysis of the surveys, it was evident that there were distinct differences in the various Arab countries in terms of Health and Safety Systems implementation levels. It was observed that there were obstacles that prevented the consistent improvement of Occupational Health and Safety across the Arab region. Insufficient reporting, coverage of compensation, and inadequate comprehensive data on incidents and diseases were also highlighted as potential barriers. In conclusion, ratification of the International Labour Office, Occupational Health and Safety conventions by the federal governments was the primary solution for Health and Safety. Research institutions were also encouraged to conduct studies on Occupational Health and Safety.

In the dissertation on OHSMS in Saudi Arabia (Al-Shehri, 2015), a framework was developed to use in the implementation and the improvement of safety performance at the Construction sites. The researcher aimed towards developing a framework by exploring incident rates and the relationship between safety behaviour and the personality traits of each worker. The data analysed in this study were derived from Construction companies in Saudi Arabia, and the main

results indicated that *the three components of safety performance (compliance, motivation, and participation) have a medium-level of negative relationship with incident rates*.

Mohammadfam et al. (2017, p. 160) studied the implementation of OHSMS in OHSAS 18001 certified companies in Iran and concluded that the "Safety performance of OHSAS 18001-certified companies is better than that of noncertified companies. Therefore, it can be concluded that OHSMSs improve OHS conditions and support the healthy and the safe workplaces. However, establishing and implementing an OHSMS is only the first step in the structured management of Health and Safety Systems in the working environment. To consolidate their role and increase their acceptance by employees and other beneficiaries, it is imperative to monitor their performance using significant SMART (Specific, Measurable, Achievable, Realistic and Timebound) performance indicators.

In their study, Alglilat et al. (2017) conducted research into OHSMS that focused on the impact of Health and Safety in the workplace. The research was to also find out the governmental and non-governmental roles in Health and Safety measures application. In addition, the study reviewed the control of risks and incidents by adhering to Health and Safety measures. The study found that there were two primary deficiencies which affected the effectiveness of the OHSMS, which were the lack of commitment of the senior management and the inadequate Health and Safety direction (OHS Policy).

Another study on OHSMS in the region (Nawwas et al., 2017) was conducted to review the literature relevant to Health and Safety System applications for helping in the employee performance. The research recommended ways for the performance improvement of the employees in Construction companies through the implementation of systems for Health and Safety.

2.8. OHSMS Studies in the United Arab Emirates.

The keywords such as Construction and Manufacturing, and the output of the research from a different type of documents like theses and dissertations, books, research articles and review articles are presented in Table 3.

Table 3 *Sources of Past History on the Research Subject.*

Source: Developed by Author

The Main Search : (United Arab Emirates OR UAE AND Safety)								
Name Of the Research Engine	British Library EThOS	British Library Online	ProQuest Online	ScienceDirect.com	Safety and Health at Work Journal	Safety Science Journal	Journal of Safety Research	Google Scholar
Total Number of Findings	14	76	373	4688	7	10	8	>999
Health and Safety and Management System	1	6	39	73	1	1	0	230
Construction and Manaufactring	1	6	6	1	1	1	0	35
The periode of the Document	2002 -2018	2001 -2019	2001 -2019	2001 -2019	2011 -2018	2005 -2019	2002-2018	2003-2019
Type of Documents	Thesis	Article, Books, Thesis	Dissertations & Theses	Research articles, Review articles, Books	Research articles, Review articles,	Research articles, Review articles,		Research articles, Review articles, Books, Thesis

This research involved 51 unique references from the previous research studies from the above database in Table 3. This is exclusive of the external corporate sources of data and some journals from an informal and personal collection.

In the UAE, there is no single government agency that is officially ratified to govern the OHS systems. In every Emirate, the competent authorities and their regulations are totally different. This leads to a heterogeneous governance of OHSMS, which in turn affects the unification of the OHSMS effectiveness (The National Emergency Crisis and Disaster Management Authority, 2016; Ministry of Human Resources and Emiratisation, 2017).

There are about 170 various legislations, orders, guidelines, and regulations covering Health and Safety in the United Arab Emirates (Turley, 2010). The 170 legislations, rules, guidelines, and regulations have apparent differences and applicability across the United Arab Emirates. The compliance requirements in the United Arab Emirates are broadly classified into federal laws and local regulations requirements.

Public interest groups, local communities, and occupational and professional associations are constituents of the institutional environment that delineates, diffuses, or imposes prevailing norms and requirements of acceptable company conduct (Meyer & Rowan, 1977). In addition to the remarks of Mayer and Rowan, the regulatory bodies are also the constituents of the institutional framework to enforce the necessary compliance to OHS requirements and unify the practices across the UAE.

North et al. (1990), presented that the federal institutions create the rules for defining the means for the entities to operate, cooperate, compete through forging the ways in which the organisations come into existence and develop.

The Ministry of Human Resources and Emiratisation (MOHRE), previously called (Ministry of Labour and Social Affairs) is a federal level ministry, which has defined the Occupational Health and Safety requirements for all entities operating within the United Arab Emirates, regardless of its scope, size and being private or government-operated. It has the chapter five of the labour law 8 1980 (Ministry of Labour & Social Affairs, 1980), specifying the OHS regulations such as the working conditions being free from hazards (Article 91), first aid arrangements (Article 93), cleanliness, ventilation and illumination (Article 94), occupational health screening and reporting (Article 95) and the prohibiting the use of alcohol at work (Article 99) in a comprehensive manner. However, the means to enforce the implementation and ensuring the effective compliance is not unified across the United Arab Emirates. In the other Emirates, this enforcement is not adequate.

The UAE Labour Federal Law 8 (Ministry of Labour & Social Affairs, 1980) addresses the safety requirements extensively. Articles 91-101 of the UAE labour law 8-1980 clarify the provisions related to workers' safety, protection and health care. However, the labour law has the following limitations as per the UAE Ministry of Human Resources and Emiratisation (2017).

The Labour 8 of 1980 does not include all categories of workers. E.g. Public Sector, Municipalities, Government Projects and Agriculture are not included. It covers the private entities only.

Also, the initial pre-employment medical examination is not mandatory, and the requirement of the first aid boxes is not addressed clearly, for entities having below 100 employees, as per the labour law 8 of 1980.

On the other hand, Abu Dhabi has a mandatory regulatory based on Occupational Health and Safety Management System Framework, which is quite effective. The current research is aiming to study the effectiveness of Occupational Health and Safety Management compliance frameworks in achieving effective OHS management in the Construction and the Manufacturing sectors in UAE.

The entities operating in the United Arab Emirates are categorised under one of the two major compliance umbrellas, such as i) The entities complying primarily with the conventional federal laws and ii) The entities whose OHS is influenced mainly by the OSHAD SF regulatory norms. However, there are no official studies performed yet on which one among them is having more effective OHSMS, in line with the categories as identified in previous research (Frick & Wren, 2000).

One of the significant factors related to the compliance obligations is that they are not defined evenly across the United Arab Emirates; they are established and mandated in the Emirate of Abu Dhabi only. The obligations below are available and mandated in the Emirate of Abu Dhabi only and not mandated in the other Emirates. The aim of the current research is to identify a common effective OHS compliance framework that can be applied across the United Arab Emirates.

Ministry of Human Resources and Emiratisation (2017) released the government report, with a salient outcome as below:

- The practices and conditions of Health and Safety in the seven Emirates are not the same; they differ from one another.

- The absence of a national level OHS policy and program.
- A specific federal OHS competent authority is not available.
- OSHAD is expected to contribute significantly to the development of OHS in the UAE.

A research remarked it was very important to develop Regulatory Impact Assessment (RIA) and policy guidelines to be developed by the Government Authorities, specifically to the highest of its protocol, the Prime Minister's Office (Kirkpatrick & Parker, 2004), which was exactly fulfilled by the United Arab Emirates, where the Prime Minister's Office has ratified a Regulatory Impact Assessment "Policy Manual" developed by Prime Minister's office at the UAE. However, there is no federal OHS authority or OHS Federal Governance framework yet; hence the Regulatory Impact Assessment stage for OHS national policy framework has not been reached yet.

Al-Kaabi (2006) studied the scope of Artificial Intelligence in managing the safety requirements, with the objective of creating an intelligent system that could solve the safety needs of the Construction sector in the United Arab Emirates. The study concluded that the model had the potential for application in Construction projects, with the additional recommendation that Construction safety advisors had the potential for modification and expansion to accommodate additional safety requirements.

Further, the compliance requirements are categorised into the location-specific and sector-specific requirements, making them diversified (Table 4).

Table 4 *Location-wise Availability of OHS Compliance Regulations.*

Source: Developed by Author

Regulatory Requirements	**Availability of the Regulation**	
	Abu Dhabi	**Other Emirates**

A comprehensive and mandatory OHS regulatory framework shall be established with a Policy, 9 Elements, 12 Mechanisms and 54 Codes of Practice (Abu Dhabi Occupational Safety and Health Center, 2015).	✓	X
The entities shall be nominated under a specific sector regulatory authority	✓	X
The entities shall be classified as “High”, or “Medium” or “Low” level of risk by the Competent Authority with specific OHS requirements to be fulfilled by them	✓	X
Mandatory requirements shall have complied for the quantity and competency requirements for the OHS staff working at the entities.	✓	X
Quarterly and annual OHS Performance reporting requirements through a specified and unified electronic platform (Al Adaa)	✓	X
Mandatory requirements developed for the entities to plan and account for the OHS annual budget.	✓	X
Specific formats and timelines shall be complied with to notify, investigate and report the Serious Dangerous Occurrences, Serious Injuries and Serious Occupational Illnesses.	✓	X

The primary objective of a thesis that studied OHSMS in the UAE (Alhajeri, 2011) was to investigate the perceptions of safety, behaviour, and attitudes of the workers in Construction sites. The researcher identified that little work had been done in Health and Safety in the UAE. The researcher also noted that there was not any data available for research support, but that the companies in the Construction sector in the United Arab Emirates were aware of the importance of Health and Safety. It was also pointed out that most incidents occurring in the United Arab Emirates were a result of poor planning. Therefore, the author inferred that planning is an essential part of a safety program. A contributing factor affecting Health and Safety Standards was identified as the size of the company. The larger Construction companies were identified as better performers in Health and Safety than the small Construction companies, which didn’t have

the motivation for achieving higher standards for Health and Safety as compared to the large Construction companies in the United Arab Emirates.

Loney et al. (2012) studied the challenges of raising safety awareness among the multinational workforce in the UAE. The study revealed that rapid development in the Construction and the Manufacturing projects necessitated the recruitment of a large multinational workforce that outpaced the ability to develop a proper Health and Safety culture at workplaces through adequate training and awareness programs. The authors concluded that educational interventions alone cannot prevent injuries or fatalities, but effective risk assessment, mitigation measures and surveillance are required.

In the region and within the United Arab Emirates, some studies on Occupation Health and Safety Management have been undertaken. However, most studies focus on either the regulatory framework or the causes of injuries (Grivna et al., 2012). A detailed evaluation and a comparison study of various approaches of the traditional regulatory approach of command and control vs OHSMS based regulatory framework has not been conducted yet. Evaluating the effectiveness of OHS Management Systems at a country level has not been completed so far. Grivna et al. presented an account of the legal framework and various initiatives for promoting safety in the United Arab Emirates. The research reported that although the country had a well-developed Occupational Health and Safety regulatory instrument in place, the leading cause of morbidities and fatalities remain as the common incidents in a workplace environment.

Shibani et al. (2013) investigated the influence of Health and Safety on Construction performance. The research explored the approved methods that have been adopted in the United Kingdom, to aid in the improvement of the existing practices in the United Arab Emirates. The results pointed out that all small companies and some of the medium companies were not aware of the Health and Safety policies. 25% of the companies involved in the study had a Health and Safety policy. The research also pointed out that none of the medium-sized Construction companies in the

United Arab Emirates had specialised Health and Safety officers. Also, in all oil companies and some of the large companies involved in Construction, policies on Health and Safety were developed by safety managers. The researchers also noted that the implementation of Health and Safety Programs was beneficial to the Construction players as it helped in the improvement of productivity and reduction of incidents.

Bhat and Gowda (2013) wanted to find the specific relationship between the drivers' characteristics and transport incidents caused by them while bringing the workforce to the Construction site or while dropping them at their accommodation after their work, as well as the indoor site vehicular movements, all of which were regarded as occupational incidents. The researcher started collecting the data in 2011 and 2013 from the Construction sites. The data were compared for two years and showed that incident rates had decreased from 80% to 10%, which was attributed to proper monitoring by the authorities in the United Arab Emirates. The researcher concluded that implementing a Safety Management System is very important in the United Arab Emirates, particularly in the Construction sector. The author discovered that challenges could be encountered in the process of Safety Management System implementation. The author noted that the success of implementing a Safety Management System could be categorised into six categories. The categories included external, financial, procedural, stakeholder involvement, organisation, and involvement from the top management. The author concluded that the overall success of the Safety Management System must outline the managements responsibilities and leadership.

Maraqa and Mohamed (2013) Identified the challenges encountered during the implementation of a Safety Management System in the Building and Construction sector within the Emirate of Abu Dhabi as below:

- Commitment by the senior management in developing, implementing, and improving the Health and Safety within the organisations.

- The involvement and coordination among various stakeholders, who influenced the Health and Safety performance of the organisation. This addressed the involvement of the top management, contractors, suppliers, and staff members. The Health and Safety requirements of such stakeholders need to be identified and considered while developing the OHSMS and integrating the same with the business model.
- Identifying the compliance obligations from the federal, local and other voluntary sources and ensuring effective compliance.
- The technical aspects of assuring Occupational Health and Safety provisions matched the Health and Safety hazards through a comprehensive risk assessment and control. A formal hierarchy of risk control measure was recommended by the above research, which included the consideration of design for Safety and planning to fail-safe methods at various stages of the key business processes.
- The financial aspects to develop and manage effective OHSMS such as an OHS budget allocation or long-range OHS capability building and Health and Safety-related incentives provision.
- On the job training to develop Health and Safety competencies.
- The procedural aspect of developing a site-specific OHS plan and other procedures to define the methods of implementing OHS on site.
- The display of safety signages in par with the risks on site.
- Internal tools such as inspections and regular monitoring of the OHS performance such as internal audits.

- The external tools such as voluntary accreditation to the ISO standard and mandatory accreditation to a local framework (Local regulatory requirements in the Emirate of Abu Dhabi was called as AD EHSMS then in 2009).
- Enforcement of OHSMS requirements by the Governments and regulatory bodies was not adequate and unified.

Sookdial (2014) studied the occupational stressors with relevance to the productivity and Safety of the workers. The interview was done from a sample of twenty migrant workers, whereby 25% of the participants were affected by occupational stressors. The data were analysed through inductive coding and sequentially analysing the transcripts from the interviews. The analysis led to the emergence of three themes a) lack of support, b) pressure on performance, and c) management. The researcher also aimed at contributing social change through awareness creation among migrant workers in Construction companies on occupational stressors.

Considering that the expatriate workers from around 200 different nationalities, language and communication are critical drivers to make the people understand and comply with the site safety requirements (Maraqa et al., 2016).

Mbazor and Okoh (2014, p. 22) presented that *"People from different nationalities and ethnic groups express themselves and understand the behaviours of others in different ways, which are informed by specific sets of cultural knowledge and conventions"*. This often results in cross-cultural misunderstandings, which can lead to Occupational Health and Safety problems. The inability to immediately communicate verbally on Construction sites represents one of the major challenges to the successful management of Health and Safety on the Construction site. The most significant barrier that the Construction site managers in the United Arab Emirates are facing is communication; it does not only hamper daily communication but also leads to the late completion of the project. In the United Arab Emirates, Arabic, English, Hindi, Malayalam, and Urdu are in common use in the Construction sector. This creates a difficulty when interpreting

safety signs on-site because of the composition of the workforce. Due to the influence of the British colonialism, there are a few who spoke English, but as their accent and fluency was not as descended, it was posing a challenge of understanding and interpreting of Health ,Safety and Environmental rules on site (Mbazor & Okoh, 2014; Sookdial, 2014; Kumar & Jamil, 2020).

Adeleke et al. (2016) proposed that regulations had the potential to moderate between internal and external organisational factors and management of risks in the Construction sector. The researchers proposed that laws and rules require validation through future research. The findings of this paper provided insight to the Construction companies on the critical role of internal and external organisational factors. The article also included the management of risks with regulations and rules.

The social values related to recruiting and retaining a culturally diverse labour force should be taken into account (Pitts, 2006). Considering the different cultures and official religious holidays by granting the unpaid worker leave and holding prayer rituals for all religious beliefs will please all employees. It will make their workplaces an attractive environment for work, knowing that the administration will bear additional burdens and costs that are guaranteed by the law in the country through the multiple labour laws that were issued from the Ministry of Human Resources and Emiratisation. The safety behaviour of employees belonging to certain religious perceptions were not in line with the safety precautions. For example, the blue-collar employees from the Sikh religion of India were not, according to their religion, supposed to remove their Turbans. This does not comply with the personal protective requirement to wear a hard hat, which will not fit onto their heads, in lieu of their Turbans. Another example is the religious practice of using candles, camphor or incense sticks which are associated with fire hazards at an ordinary labour camp. However, care has to be taken in balancing between nurturing the multi-cultural beliefs and safety enforcement (Ministry of Labour & Social Affairs, 1980; Ministry of Human Resources and Emiratisation, 2016b).

Considering the compliance obligations are diverse and not evenly established across the United Arab Emirates, the lack of enforcement makes it more challenging to evaluate and govern the OHS Management System at a federal level.

A few examples of key OHSMS aspects that are not enforced are below, but not limited to:

Section 5.4 – Compliance requirements and the Section 6 – OHS Culture of the NCEMA UAE National OHS Standard (The National Emergency Crisis and Disaster Management Authority, 2016) specify the respective requirements, but the implementation of the same has not been mandated.

Considering the rate of employment by the Emiratis is less than 1% in the private sector (Almessabi, 2017), a government policy was developed and approved to encourage UAE citizens to have development opportunities within the workplace. It is called “Emiratisation” (UAE Government Web Page, 2019). Capability building in the field of expertise in Occupational Health and Safety within the Emirate of Abu Dhabi is one of the key features of the system. An important element of the capacity building initiative is to proactively encourage citizens of the United Arab Emirates to engage in the OHSMS initiative (Almessabi, 2017). However, the ground reality poses a challenge that Emirati employment is less than 1%, and it is even less for the OHS field in the Construction and the Manufacturing sectors as provided by MOHRE as shown in Table 1.

The Emiratisation is not mandated in the other Emirates. In the Emirate of Abu Dhabi, the Quarterly reporting in the Al Adaa Portal (Form E for the private entities and the Form E2 for the government entities) has a Key Performance Indicator (KPI) on the employment of Emirati OHS resources. However, there is no enforcement if such KPIs are not produced. The article one of the Ministerial Decree 711-2016 (Ministry of Human Resources and Emiratisation, 2016a) by the UAE Ministry of Human Resources mandates that for every entity having more than 500 employees hired in any organisation within UAE, an Emirati shall be recruited as a safety officer, which is not enforced yet since 23.6.2016.

A research was conducted on evaluating the impact of implementing the OHSMS in the United Arab Emirates and its impact on Health and Safety performance (Suan, 2017). The research concluded that the implementation of OHSMS positively influenced the OHS performance of the organisations.

The diversification of economic policy of the UAE government has created a big boom in the Construction industry, making the Construction sector a valuable economic player and more appropriate for OHS performance. The United Arab Emirates is regarded as a competitive economy in the Arab world as per the World Economic Forum et al. (2018).

Another qualitative study was conducted to analyse the relationship between the leading variables on Occupational Health and Safety Management in the United Arab Emirates (Nair & Tauseef, 2018, p. 1572). This research confirmed a positive correlation between the leading variables with the OHS Management System. The variables were derived from the leading indicators such as audits, campaigns, inspections, training, and awareness sessions, which prove their positive influence on the OHSMS.

It is a system requirement for Sector Regulators and entities to establish their OHS performance targets, KPI's and goals, and to implement a monitoring system, and to have a formal performance management system integrated into their OHS Management System (Nair & Tauseef, 2018). However, such a performance reporting system has not been mandated in the other Emirates.

2.9. Factors Affecting this Study.

Further to the references to the previous literature available and the challenges faced by the previous researchers, the following variables have been proposed to be considered in this research, based on their influence on the external and internal business context. For example, the institutional mechanism is found to be the most influential factor on the entities in the United Arab Emirates, irrespective of the location and sector; hence this factor has been identified as the

first one. In contrast, the consultation and engagement with the staff are purely internal business issues with much less impact on the overall OHSMS effectiveness at the UAE level.

The factors affecting this study are listed out in the following Table 5, in a descending order with regards to their influence on the overall OHSMS effectiveness within the United Arab Emirates.

Table 5 *The Factors Affecting This Study.*

Source: Developed by Author

#	Factor / Variable	Literature References
1	Lack of institutional mechanism for OHSMS	(Meyer & Rowan, 1977; North et al., 1990)
2	Uneven Compliance Obligations	(Frick & Wren, 2000; Turley, 2010)
3	Lack of enforcement	(Arezes & Miguel, 2003; Nair & Tauseef, 2018)
4	Weak Self-regulation framework	(Parker, 2002; Gunningham, 2011)
5	OHS Leadership gaps	(Singh et al., 1999; Kaufman, 2008)
6	Multinational Cultural Factors	(Reese & Eidson, 1999; Kartam et al., 2000; Stoyanova, 2013)
7	Communication / Language factors	(Sookdial, 2014; Gjylbegaj & Jararaa, 2017; Kumar & Jamil, 2020)
8	Human factors affecting the OHS	(Reese & Eidson, 1999; Sa'ed et al., 2010; Salvendy, 2012; Järvis, 2013; Arezes, 2017)
9	Inadequate participation of the Emirati in the OHS field	(Almessabi, 2017; UAE Government Web Page, 2019)
10	Inadequate staff consultation / engagement	(Pantry, 1995; Scholes & Clutterbuck, 1998; Edwards et al., 2013)

2.10. The Literature Gaps

The principal gap in the literature remains the one identified by Robson et al. (2007) a lack of research whose explicit purpose is to study the effectiveness of OHSMS based System Framework and traditional/conventional OHSMS interventions on the employees' health, safety, and economic outcomes. There are several studies that have evaluated the effectiveness of an OHSMS. However, most of the literature examined a single case, or demonstrated that one type of OHS system is better than having no system. These studies were either at the company level,

e.g. (Yoon et al., 2013), or as a “before and after” study of the introduction of a national system, for example in Denmark and Norway as presented by Gallagher et al. (2001).

The most similar prior work is that of Gallagher (2000), who carried out an extensive study of the impact of OHSMS in Australia, but did not consider frameworks at a national or state level.

The second gap is a proper evaluation of the influence of training on the effectiveness of OHSMS. Many studies identify the importance of training e.g., (Hopkins, 2000; Loney et al., 2012; Järvis, 2013; Maraqa & Mohamed, 2013), but have not specifically measured its effectiveness quantitatively at a national level. There is just one prior study that touches on this point. Nair and Tauseef (2018) looked at the effect of various factors on Occupational Health and Safety Management in the United Arab Emirates, one of them being training. However, they only studied four organisations, one with an OHSMS and three without.

The fact that the UAE currently operates with two different frameworks, the mandatory regulatory based framework in Abu Dhabi, and the conventional/traditional legal framework in the other Emirates. Therefore, this provides an opportunity for a comparative study of the effectiveness of the two frameworks in reasonably comparable contexts. The influence of training will also be compared both quantitatively and qualitatively under the two frameworks.

2.11. Setting the Direction of this Research

In the process of reviewing the existing literature in Sections (**Error! Reference source not found.**2.4, **Error! Reference source not found.**2.5, 2.6, 02.7 and 2.8) the following key factors were instrumental in proposing the direction of this research, as below:

- The entities located in the Emirate of Abu Dhabi are regulated by the OSHAD System Framework. The entities from the other Emirates do not have any regulatory framework as such. They are supposed to comply with the conventional OHS requirements as

specified by the Federal Laws concerned, such as the federal labour law number 8 of the year 1980.

- The effectiveness of OHS management was influenced by effective monitoring, supervision, control, and training.
- So far, limited research studies have been conducted to evaluate the effectiveness of the OHSMS.

Hence, this research is proposed to check the effectiveness of the OHS Management System within the United Arab Emirates (Categorised broadly into the Emirate of Abu Dhabi and the other Emirates), with due consideration of the Federal and the local regulatory OHS requirements.

Chapter 3. Research Methodology

3.1. Chapter Summary

This chapter introduces the research methodology and details the tools used for the development of this work. It includes the research paradigm in which the research is positioned, the research design and the methodological choices used, including the assessment methods applied to evaluate the results of this work. Finally, the approaches used in this study for the samples and data collection are addressed.

3.2. Research Design Approach

In this study, it is proposed to investigate the effectiveness of OHSMS in ensuring the health, safety, and well-being of workers within the Construction and the Manufacturing sectors in the United Arab Emirates. The research is carried out on a group of small, medium and large Construction and Manufacturing companies as presented in Table 6 as both these sectors have a history of a large number of serious incidents, even fatalities due to the lack of effective Health and Safety Management (The Statistics Centre - Abu Dhabi, 2014). The entities located in the Emirate of Abu Dhabi are supposed to comply with the federal laws related to OHS as well as the mandatory regulatory OHS framework (OSHAD SF). The Entities from the other Emirates do not have a structured regulatory OHS framework, but they are supposed to comply with the conventional/traditional federal laws related to OHS.

In the current research, the site interview protocol matrices and processes (**Error! Reference source not found.** were developed and were used as a basis to develop the research instruments.

Questionnaire surveys were carried out in about 200 entities related to the Construction and the Manufacturing sectors covering the Emirate of Abu Dhabi as well as other Emirates. Also, a small

group of entities (13) who have already responded to the questionnaire survey were selected for the site interviews (face-to-face interaction).

Table 6 *Research Study Group Targeted Sample*

Abu Dhabi	(North Cities) Other Emirates
Manufacturing industries:	Manufacturing industries:
10 Large	10 Large
15 Medium	15 Medium
25 Small	25 Small
Construction Projects:	Construction Projects:
10 Large	10 Large
15 Medium	15 Medium
25 Small	25 Small
Total Abu Dhabi: 100	Total Other Emirates: 100

In this study, the target group included the primary respondents from a total of about 200 entities within the Construction and the Manufacturing sectors in the United Arab Emirates, as presented in Table 6. The study interviewed various participants that included the chief executive officers, directors, and managers from the Construction and the Manufacturing sectors who participated in the questionnaire survey. Discussion from the focus group was conducted to gather information on the effectiveness of OHSMS in their respective sectors. This group of participants provided important information concerning the Occupational Health and Safety implementation practices and challenges within their organisations. In addition to the respondents, a survey was organised with 16 government entities as well as 13 site interviews covering both sectors. The inclusion of different individuals from different sectors and professional backgrounds helped the study to come up with various opinions and thus ensured that in-depth research was conducted.

3.3. Philosophical Standing

There are many philosophical approaches when it comes to research methodology. The philosophical approach is determined considering the research questions. Remenyi et al. (1998) asserts that a researcher must consider various aspects and perspectives that would answer the what, why and how of research before deciding upon the exact philosophical methodology. The researcher has to consider which form of inquiry will answer the research questions, should it be the qualitative approach that utilises tools of investigations like interviews, case studies, focus groups or group discussions, or more explicit quantitative approaches that use questionnaires or telephonic surveys or a combination of both (Remenyi et al., 1998). There are multiple views as to why research should be conducted from a philosophical point of view; the researcher must make considerations regarding the nature of society and the nature of science. Objectivism and subjectivism are considered in the literature as contraries or parallels of one another. Objectivism explains how social entities exist, independent of social actors. Subjectivism is an ontological position that asserts that entities are created from the perceptions and consequent actions of those social actors responsible for their creation (Saunders et al., 2009).

The two paradigms are also labelled variedly in literature. Easterby-Smith et al. (1991) have termed the same notion of Objectivist and Subjectivist notion as “positivism and phenomenology”, whereas (Hughes & Sharrock, 1997) have also identified similar philosophical paradigms and labelled them as “positivism and interpretive alternative” (Easterby-Smith et al., 1991; Hughes & Sharrock, 1997).

The biggest differences and the ontological dissimilarities among the approaches were illustrated in depth by Burrell and Morgan (2005).

Figure 6 *Analysing Assumptions from the Varied Philosophical Paradigms.*
Source: Burrell and Morgan (2005, p. 3) [Redeveloped].

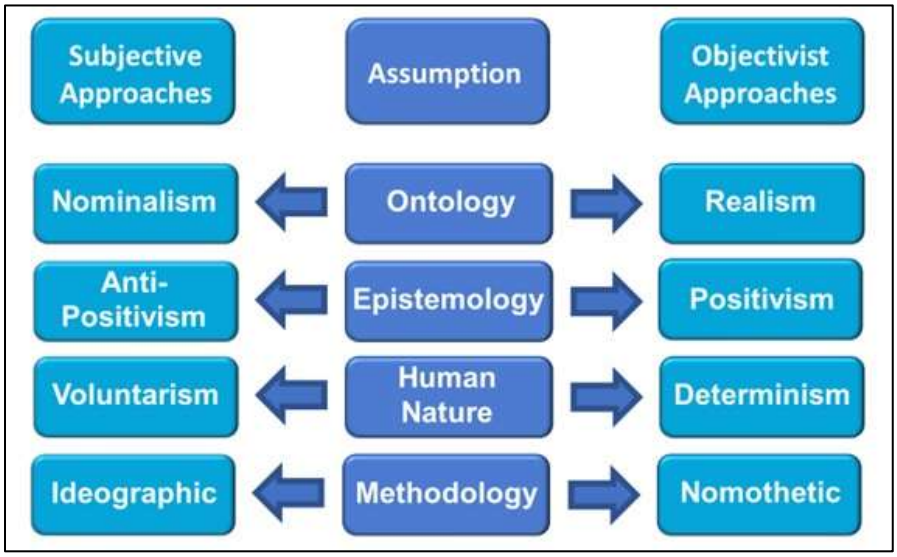


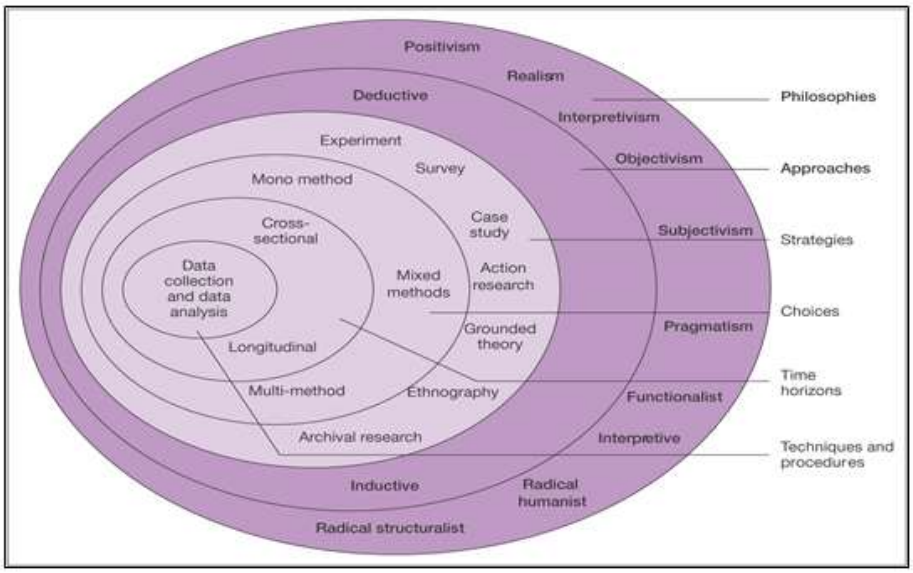
Figure 6 illustrates how the two research paradigms differ and how the researcher can decide on which approach will be best suited for the research, or the researcher might need to adopt both approaches simultaneously to create a mixed methodology. The first assumption is an ontology. An Ontology covers the state of realism or the nature of actuality. It focuses on the concept or the problem being researched, whether it is a real problem, or a hypothetical one which is solely a product of imagination (Burrell & Morgan, 2005). The second assumption is epistemology, where this is related to how the knowledge about the research problem is gained, can it be observed or not, and how is the relevant information is structured. The third assumption is human nature, and this is relevant as to whether the research involves humans and can the nature of the human subjects be controlled or not. The final assumption is a methodology that the researcher would like to determine in order to find solutions to the research problem. Considering the assumptions of the research paradigm and the research objectives, the right perspective would require working with both approaches simultaneously and opting for a mixed method of research. The following sections illustrate the various options available in qualitative and quantitative methodologies

available and how a mixed or a multi-model of the methodology can be created for this study to satisfy the purpose it.

Bogdan et al. (1975) described the expression "Philosophy" as the mechanism employed to seek answers to research problems. The process of exploration or resolution or research problems can be done through a method that consists of six steps or six layers (The research 'Onion'), as described in Figure 7. (Saunders et al., 2009, p. 108).

- Philosophies.
- Approaches.
- Strategies.
- Choices.
- Time Horizons and;
- Techniques and Procedures.

Figure 7 *Six Layers of the Research Paradigm (The Research "Onion").*
Source: Saunders et al. (2009, p. 108)



The six layers approach was developed by Saunders et al. (2009, p. 108). The layered approach is also known as the research onion approach, where each layer is represented as a layer or skin of the onion, proceeding to reveal further information and to narrow down the mechanism.

Every step or layer is decided considering the various aspects of research objectives and research problem at hand. The researcher has to review the problem through the lens of various philosophical assumptions and presumptions and make a decision regarding the system and methods that would be employed for seeking answers to the research problems (Gill & Johnson, 2010).

The first and foremost layer is examining the rationality of the problem at hand. The term rationality refers to the mechanism of gaining insights and information about the research problem (Saunders et al., 2009). The next layer focuses on methodological decisions or the choices that are available to the scholar. Some of the options that a researcher has to make regarding the philosophical suppositions as indicated by Burrell and Morgan (2005) in the Subjective-Objective dimension include:

- Ontology (realism v. nominalism).
- Epistemology (positivism v. antipositivism).
- Human Nature (determinism v. voluntarism) and,
- Methodology (nomothetic v. ideographic).

These four suppositions are identified with the way of sociology. Two pillars of methodological decisions, taking into account these presumptions, are the target and subjective measurements (Burrell & Morgan, 2005, pp. 1-4). “Ontology” is concerned with suppositions about what constitutes social reality (Blaikie, 2007, pp. 13-17). As such, it is the hypothesis of being (Burrell & Morgan, 2005, p. 11). Marsh and Stoker (2010, pp. 17-41) distinguished by two differentiating ontological positions, in particular, authenticity and nominalism. Authenticity considers the social world as a compound of genuine and substantial structures, while nominalism sees the social

world as being comprised of names, ideas and marks that give a structure to reality. The nominalism supposition considers the social world as being outside to individual acknowledgement. No target reality exists if there should arise an occurrence of nominalism, and along these lines, this ontological position requires the development of examination destinations (Iskander, 2008, pp. 139-284). “Epistemology” is concerned with presumptions about what constitutes information of social reality (Blaikie, 2007, pp. 13-41). As such, it is the hypothesis of learning (Marsh & Stoker, 2010).

Burrell and Morgan (2005, pp. 14-37) recognised two differentiating epistemological positions, in particular, positivism and hostile to positivism. Positivism aims to draw a clear picture of various problems like what may result if something happens based upon patterns and a causal relationship among components. Likewise, the hypothesis is used to produce theories that can be analysed. In addition to that, part of the examination is to test the hypotheses and further build up these speculations if conceivable (Bryman & Bell, 2007, pp. 628-701; Saunders et al., 2009). Then again, hostile to positivism supporters claim that it was imperative for the researcher to realise the differences among humans and to consider them as characters on a social platform (Burrell & Morgan, 2005). While under positivism, the exploration can create speculations. Those against positivism contended that generalisability is not of an essential significance (Bryman & Bell, 2007, pp. 16-28).

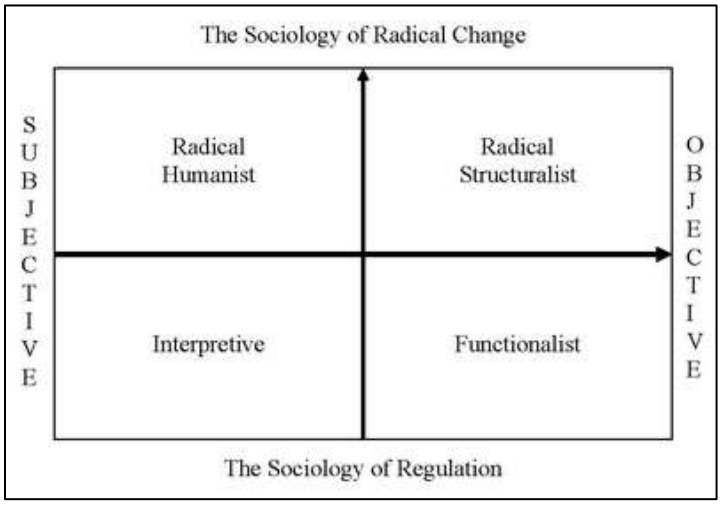
“Human nature” suppositions are concerned with the relationship between people and their surroundings. Burrell and Morgan (2005) recognised two differentiating human instinct positions, to be specific determinism and voluntarism. Determinism proposes that people and their exercises are controlled by the circumstances or by the environment in which they are found. Voluntarism, then again, expects that people are totally self-governing and free-willed who make the earth instead of being dictated by it. “Methodology" is concerned with the routines used to examine and find out about the social world. Burrell and Morgan (2005) distinguished two differentiating

methodological positions, to be specific nomothetic and ideographic. The nomothetic method underscores the significance of constructing research in-light of methodical convention system, which includes thorough and experimental testing of the speculations. On the other hand, the ideographic method accepts that one can just comprehend the society and the world around them by getting undeviating and first-hand information of the researchable issue or the researchable individual. It includes the investigation of subjective information that the specialist produces by being involved in the circumstances (Belkaoui, 2004; Burrell & Morgan, 2005; Gill & Johnson, 2010).

Notwithstanding the four suppositions regarding the way of sociology, two further suppositions are identified with the way of society, specifically radical change and regulation. Radical change is concerned with suppositions about the way authoritative undertakings ought to be directed and gives recommendations concerning how these issues may be led, keeping in mind the end goal to roll out major improvements to the typical requests of things. Then again, regulation clarifies the way hierarchical issues are controlled and gives recommendations concerning how they may be enhanced inside the current structure. Likewise, radical change embraces a basic viewpoint on authoritative life, while the administrative point of view is less judgmental and less discriminating. Radical change addresses hierarchical issues from the perspective of the present situation, while regulation methodologies them inside the present situation (Burrell & Morgan, 2005; Saunders et al., 2009).

“Paradigm” is a way of perceiving things from a specific perspective and comprehending them from a different social viewpoint (Saunders et al., 2009). Burrell and Morgan (2005, pp. 21-33) recognise four ideal examination models for the investigation of social hypothesis in particular: interpretive, radical structuralism, radical humanist, and functionalist.

Figure 8 *Four Ideal Examination Models for the Investigation of Social Hypothesis. Source: Burrell and Morgan (2005) and Saunders et al. (2009)*



The radical humanist ideal model (Figure 8), situated at the upper left corner, speaks to the subjective and radical change measurements. This ideal model reflects a discriminating viewpoint on authoritative life and is concerned with changing the current status. Likewise, it infers a subjective way to deal with sociology: nominalism, hostile to positivism, voluntarism and ideographic. The radical structuralist standard, situated at the upper right corner, additionally looks for an essential change to the present state yet fits the target way to deal with sociology: authenticity, positivism, determinism, and nomothetic. The interpretive standard, situated at the base left corner, speaks to the administrative methodology, which looks to clarify hierarchical undertakings and offers recommendations for development by finding irrationalities. Its concern is to comprehend and clarify what is going on instead of accomplishing change.

The ideal functionalist model, situated at the base right corner, speaks to the administrative method and the goal measurement. This ideal model accepts that associations are level-headed elements, in which normal clarifications give sane answers for balance issues (Saunders et al., 2009). Likewise, it suggests a targeted way to deal with sociology: authenticity, positivism, determinism, and nomothetic.

The choice of appropriate and best research method is a part of the planning and designing of research. According to (Creswell, 2013a), research approaches can be either a Qualitative or a Quantitative or a Mixed Research Method.

Thus, the difference in qualitative and quantitative research can be decided by reviewing Table 7 below:

Table 7 *Differences between Qualitative and Quantitative Research Methods.*
Source (Zaman, 2011) [Redeveloped]

Qualitative Research Method	Quantitative Research Method
It helps in answering the questions i.e. Why? How? What kind of?	It helps in answering the questions i.e. What? Where? How Much? How Often?
Concise, discretionarily gathered sample	Based on Numerical representative sample
Study and Analysed through qualitative, or soft data i.e. Literature Review	Studied and Analysed through Quantitative or Numerical Data

As remarked by Allen et al. (2012), the qualitative research approach is practical for the study under consideration because it is conducted with the aim of getting insights regarding the knowledge management approaches.

The second layer in Figure 7 is describing the approaches, and they are either inductive or deductive. The use of the inductive approach can be used to develop an idea or a theory based on a set of data which are summarised and are linked together from raw data.

However, the deductive approach aims at testing theories. It starts with a hypothesis and focuses on causality. It is associated with quantitative research (Saunders et al., 2009). The inductive approach is used in this research.

The third layer relates to the strategy, and in this layer, the researcher plans on how to answer the research question; the researcher might use a different type of strategy to help him achieve the right plan in the designing stage of the research (Saunders & Tosey, 2013).

Choices or making a final selection from the available options is the fourth layer that further narrows down the scope of the entire research process and brings the researcher closer to Initiating the actual research process. Saunders et al. (2009) models the choices available to the researcher, including mono research methods, mixed research methods and multiple research methods. The Mono research method relies on the use of just one type of method or research instrument, and there is only one method or technique for the collection of data. The mixed-method uses a combination of techniques; usually, it is a mix of both qualitative and quantitative approaches. Multiple method types of research uses even a broader set but is different from the mixed-method as the data collection may be divided into segments like longitudinal research (Bryman, 2012). The mixed research method design is used in this research.

The fifth layer is the final one before the core layer, and it considers the time that the researcher will take to complete his research, and it is divided into two parts. The first part is called "cross-sectional", and the researcher spends time on answering a question or stating a problem. The second one is called longitudinal, and it is concerned with the time spent in collecting the data in order to solve a problem or to answer a question (Saunders & Tosey, 2013). The cross-sectional timeframe and the longitudinal timeframe for this research were three years and two years, respectively. However, in this research, the above fifth layer is not applicable as the research data was collected at one time.

The final and the sixth layer is deciding upon the actual methodology. It involved the empirical decisions that defined the result, such as who were the samples, how the sample was selected and approached, what was the research instrument and how was the research instrument designed, and how was the actual designing of the research instrument managed? The questions

relating to primary and secondary data and their use in the research, the complete research design and other practical methods that were employed, and their application is methodology. This is the heart of the entire research paradigm and occurs only when all the different layers are completed.

3.4. Research Design and the Right Approach

There are various ways of classifying research designs. The research design can either be distinct or a combination of various designs. Research design serves as a roadmap or a blueprint for the researcher, where it covers the entire strategy that the research may abide by for gathering information and processing it into something meaningful (Bryman & Bell, 2007). The research design is dependent on several elements like the type of information, availability of data, the size of the study and how difficult or easy it is to gather and process information. The research design can be either qualitative, quantitative or a grouping of the two types (Tashakkori & Creswell, 2007). The kind of research study that is chosen should be able to provide accurate and reliable results. It is also important to consider the type and nature of data when selecting the research methodology to be used (Knoblauch, 2005).

In some cases, a mixed research method design that consists of both qualitative and quantitative techniques can be applied. Some of the research designs that are often used in business or in a marketing research can include descriptive, correlation, semi-experimental, review and meta-analysis (Smith, 2012). In this research study, a mixed methodology research design was employed.

3.5. Mixed Method Research

It is also important to note that business research can employ a combination of techniques which includes both qualitative research techniques like interviews, focus groups and quantitative techniques like questionnaires. The use of multiple methods of inquiry gives multiple perspectives on the research, and the researcher can be in a better position to make a final finding (Hesse-Biber & Leavy, 2010).

Mixed methodology research also has certain advantages. First, it addresses the weaknesses of each singular form of study, and second, it offers a more detailed and a more in-depth understanding and confirmation of the findings. If the results and findings of both techniques of research validate each other, the research findings are further strengthened. If any of the findings fail to match with one another, then the researcher has an opportunity to dig deeper and evaluate and review the reasons for the discrepancies. The triangulation of techniques or the practice using both the qualitative and quantitative approaches concurrently adds more accuracy and reliability to the research findings (Creswell & Clark, 2011). It also ensures that the results obtained from the study are valid since it is subjected to various tests and analyses.

This grouping of methods also facilitates the understanding of complex and sophisticated problems that would not be resolved by a singular technique. There are many kinds of mixed-method research such as: sequential explanatory, sequential exploratory, sequential transformative, concurrent triangulation, concurrent nested, convergence model, instrument building model, sandwich model, iterative model, multistrand model, fully integrated mixed-method design, convergent parallel design and many others (Bryman & Bell, 2007; Creswell & Clark, 2011).

The cross-matching of results from each technique can also offer unique perspectives which a single technique alone would not offer (Lisle, 2011). The choice of mixed research method in this

research study is, therefore, it is considered as an appropriate method since it will help towards understanding the research problems that are concerned with the Occupational Health and Safety of workers in the United Arab Emirates. A convergent parallel research design was used in this research (3.7) after considering the choice of qualitative and quantitative data collection and parallel analysis.

3.6. Reasons for the Use of Mixed Methods in the Research

The mechanism selected for the collection of data for this research is a mixed methodology which is the use of both qualitative and quantitative techniques. It was selected after taking into consideration several factors and reasons. One of the primary reasons is that, in order to evaluate the effectiveness of Occupational Health and Safety Management using traditional, regulatory systems in the United Arab Emirates can be associated with different outcomes. This indicates that data for the research can be generated from different sources; therefore, one source alone cannot be adequate for the study. This makes it essential to consider a research methodology that can help capture more than one set of data that can include both numerical and descriptive data.

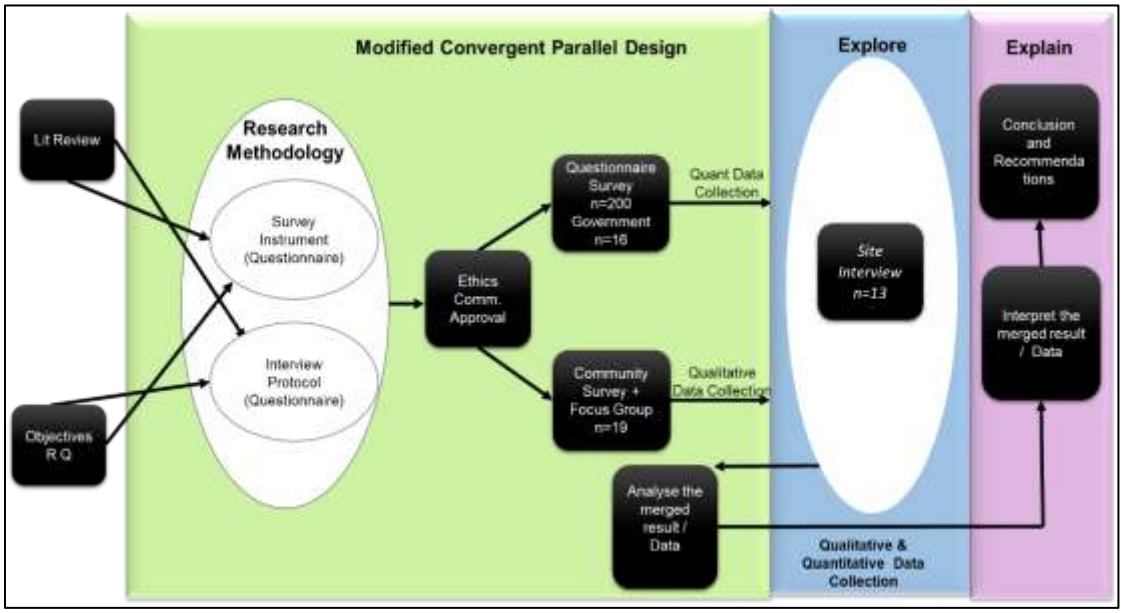
The other reason for the choice of the mixed research method is to enable the explanation of the initial results (Driscoll et al., 2007). Hence, the decision was taken to use both qualitative and quantitative research techniques. The use of a single research technique cannot provide the research study with an adequate background to allow for further analysis of the data and results obtained from the study (Work, 2000). The second research method can also help in enhancing the primary method. In other words, the primary method of research can be supported if the research uses the other research methodology that is different from the primary research that is employed.

Furthermore, a project that is conducted in multiple phases usually ends up with different data sets that require an in-depth analysis. This made the mixed research methodology appropriate for this research study as it is concerned with a multi-phased project with various variables that are under investigation (Arocena & Nunez, 2010).

3.7. The Choice of Appropriate Mixed Method Research Design

Various factors should be considered when selecting the appropriate mixed research method design, which will be used in a given study (Arocena & Nunez, 2010). One major consideration when choosing the mixed research method design is the level of interaction between the two strands that include the independent or interactive variable. The level of interaction between the independent and the dependent variable can help determine the best design.

Figure 9 *Diagrammatic Presentation of the Research Approach.*
Source: Developed by Author



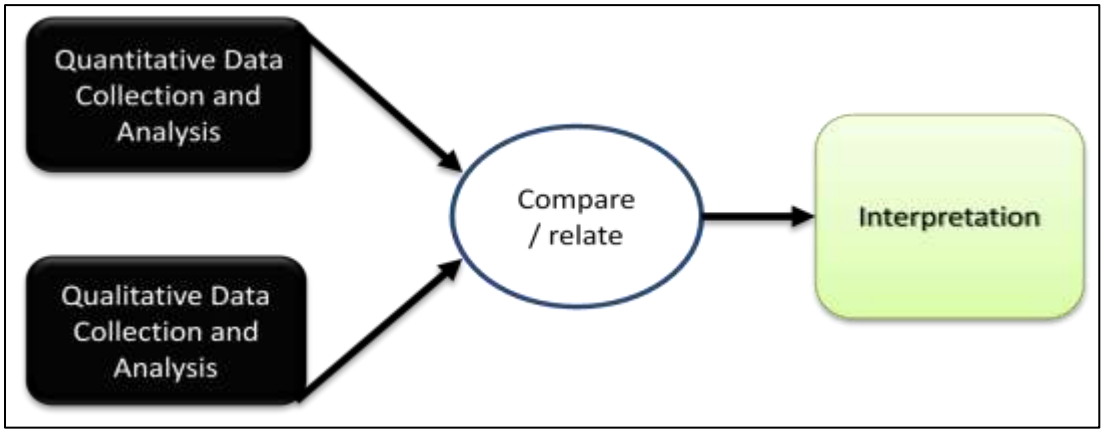
Timing is also an essential factor that should be considered while deciding on the mixed research method design. This can involve determining whether the quantitative and qualitative research techniques should be used simultaneously, in sequence or combination, as shown in Figure 9.

The qualitative and quantitative methods of this research were managed in parallel to one another equally.

For this research study, the convergent parallel design was considered appropriate. Convergent parallel design is mixed methods research where the quantitative and qualitative methods are implemented at the same time. In addition, the findings are integrated and interpreted together (Creswell & Clark, 2011, pp. 70-71).

In a convergent parallel design, both the quantitative and qualitative data are independently and simultaneously selected, after which the results are analysed. In this research design, an equal weightage is given to both the qualitative and the quantitative data when collecting and analysing the data obtained from the research (Byrne, 2001). This enables the researcher to compare and contrast the results and findings to evaluate the contradictions and patterns. In this research, the data collection and data analysis would be processed simultaneously as presented in Figure 10.

Figure 10 *Diagram of the Convergent Parallel.*
Source: Creswell and Clark (2011) [Redeveloped]



The primary purpose of the convergent parallel design (Creswell & Clark, 2011), which is also referred to as a triangulation design, is to help in obtaining a different and a complementary set of data regarding the central phenomenon that is under the study. This research design aims to converge on the truth about a given phenomenon or problem. This is achieved by allowing the

limitations associated with one research approach to be offset by the strengths that are associated with the other approach to the research study (Symon & Cassell, 2012). In this type of mixed-method research design, qualitative and quantitative sets of data are collected simultaneously, with equal priority. In the mixed research method, the following procedure was followed to help achieve the objective of the research.

3.8. Data Management

Data management or data handling is exceptionally crucial for the success, or the reproducibility of the data involved in the statistical analysis. This requires the selection of the right tools and utilising them in the most suitable manner in order to be productive as well as achieving efficient results and to allow the researcher to deliver the best possible results through the study. With the growing business opportunities in the United Arab Emirates and the increasing size of the database, it is crucial to manage this size of data and to invest resources to avoid inefficient data management (Bose, 2006).

3.8.1. Eligible Case Samples for Analysis

There are several steps involved in the management and analysis of this statistical data. These sets of data need to be composed of different data streams and to be integrated into a single database. With the advent of technology, these data are now required to be transformed into an electronic format and to be handled more effectively. These sets of data are debugged and cleared in the process of input in order to eliminate the errors and to also reformat them according to the requirements of statistical analysis (Ontario Human Rights Commission, 2010).

Data management's handling and collection jointly played an important role in this research. The plan for data management provides a thorough roadmap documenting the flow of data and through a detailed sequence of different phases of collection, storage, indexing, processing, editing and eventually, the archiving of data. The data management involves the relationship to

be generated between the software tools and all the programs required for the analysis of data through the research cycle in data management. For data management, the plan was developed and researched from the start of the project (Bryman, 2012).

Data management plays a vital role in ensuring data consistency. The management of data also aids in avoiding the duplication of data and also the ineffective handling of data transaction. The concept of data management relies on the effective exchange and integration of data, where it is highly optimised and standardised in accessing the data through multiple techniques. Through data integration, the problem of unifying the data is handled by providing transparent access to the heterogeneous sources as required in order to answer to different queries, making it difficult for individual sources of data to be accessed. With the changing technology, there is an increasing need for the support to the systems and techniques of data management in order to be able to handle the challenges faced in the field. Data management is centralised in order to perform various functions more effectively and to determine more beneficial results for the project (Golab & Özsu, 2010). The samples for the qualitative and the quantitative analyses were randomly chosen.

3.8.2. Data Editing

Waal et al. (2011) stated that the data editing is extremely important in the process of data management. The process of data editing includes reviewing data and detection of different errors in the process of data maintenance. This helps in improving the quality of data and making it suitable for the purpose for which data is being collected. The process of data editing contains different measures and indicators which provide easy access to the data and ensure its accuracy through numbers and percentages in order to support its management more effectively.

The database contains two different types of data, i.e., qualitative data and quantitative data. In this process, the quantitative data are either discrete or continuous; they are more focused on

other types of information, including gender, educational attainment, or other types of information except for statistical information, while the qualitative data do not have any numerical numbers involved. Data are edited before being actually presented as information. The process of data editing ensures that all the information collected is not only accurate, but also complete and consistent according to the requirements. Regardless of the type of data, different surveys need to be performed where the data should either be treated manually or even through the effective programming of data (Golab & Özsu, 2010).

It is extremely important to identify the reasons behind the errors observed in the files which are being edited. These situations arise from different stages of research activities which are responsible for introducing errors into data. In certain cases, the reason behind data errors is misunderstood or is generated through an incorrect response. In other cases, errors result from miscoding or inaccurate responses. In order to avoid any potential errors, it is important to ensure the accuracy of data, consistency of data, and determining whether the data is complete or not. It is also important to ensure the coherence of aggregated data and to utilise the best possible data available.

This research uses the below types of data:

Absolute Data: The isolated data specific to one parameter, e.g., The number of fatalities at work.

Normalised Data: The data expressed relatively over another variable, e.g., The Lost Time Injury Frequency Rate (LTIFR), which is the LTI expressed over a million hours of work.

Individual Data: The data collected from the survey respondents about the OHS Statistics of their individual organisation.

Aggregate Data: The master data compiled from various sources, time periods and various measurements, usually across a greater geographical location or industry, e.g., the OHS

performance federal statistical reporting of the UAE for the year 2014 (The Statistics Centre - Abu Dhabi, 2014).

Disaggregate Data: The data explicitly derived on a subject from the aggregate data, e.g., from the national level OHS performance reporting, to extract data on the OHS Performance in the Emirate of Abu Dhabi for 2015.

In order to determine the process of data editing, it is essential to identify the different levels and different types of data editing. These levels and types are discussed below:

a. Microdata Editing

Microdata editing is responsible for correcting and dealing with the data at the record level. This process of data editing detects different errors in data by checking it thoroughly and keeping a check on individual records of the data maintained. The main focus at this point of data management is to ensure the consistency of data and ensuring that the data are maintained and managed correctly through different records (Statistics Canada, 2001, p. 54).

b. Macro Data Editing

The process of macro editing of data is responsible for detecting errors in different ways. This is done through the analysis of data as an aggregate. In this process, data are compared from different sources, i.e., surveys, administrative files or also other versions of data maintained in the same structure. This process of data maintenance also helps to determine the compatibility of data with the project, or the purpose for which data are being collected (Statistics Canada, 2001, p. 54).

There are different types of data editing, which is supporting data management at different levels.

c. Validity Edits

This type of editing observes the initial question first, records the identifiers first and edits the data based upon the specified units of measures which are used in different means. This type of editing differs, depending upon the reporting time within the specific limits of data management (Statistics Canada, 2001, p. 54).

d. Range Edits

This type of data editing is very similar to validity editing where it focuses on the type of editing and also ensures that the data would be edited based on different values, ratios and calculations that are based on different pre-established limits of data management (Statistics Canada, 2001, p. 54).

e. Duplication Edits

This type of data editing is focused on checking the data for any duplication while collecting and recording the responses. This type of editing ensures that the data is only entered once into the system. This prevention of duplication also helps in preventing misunderstandings or any misinterpretation of data (Statistics Canada, 2001, p. 54).

f. Consistency Edits

This type of editing is responsible for ensuring that the data maintained is coherent from any other data stored. This type of data editing ensures that a particular edit of data is verified in one section corresponding with the figure of data reported in any other section(s) (Statistics Canada, 2001, p. 54).

g. Historical Edits

This data editing compares data in different levels of data maintenance and indifferent current or previous records maintained. This often involves the data maintained in the form of ratios or calculations or also through the percentage variance, which needs to establish a number of limits that need to be noted and questioned more effectively (Statistics Canada, 2001, p. 54).

h. Statistical Edits

This type of editing observes the data overall, where the editing is applied to correct the data more effectively. The data in this editing process is compiled in a process through extreme values and rejecting any suspicious data or data which needs to be outlined (Statistics Canada, 2001, p. 55).

i. Miscellaneous Edits

This type of data editing is responsible for editing a special reporting arrangement. In this process, data are edited with more dynamism and classified through different checks and different changes to physical addresses to ensure the legibility of the edits.

The complexity of the data influences the process of editing the data. The complexity of data is determined through the length of the data maintained. Editing also helps in assessing the data in detail and also supports the subject matter more effectively. This also supports the arrangement and reporting of data more effectively according to the specific demands of data management (Statistics Canada, 2001, p. 55).

j. Missing Data Treatment and Editing

Treatment of data in the process of data management requires a distinction to be created in terms of data, information and knowledge. Data need to be explicitly collected in order to identify the mathematical truths and also to ascertain the facts as a statement of the type of interpretation of

data. The process of data treatment performs certain specific operations on a particular type of data or database. McKnight et al. (2007, p. 8) stated that "*It is very important to select the right missing data handling technique and the implication that diagnostics have for the validity of the study results".*

Data treatment is performed on information systems following a broad concept which encompasses a number of different related devices that are managing the data. The process of data treatment can be achieved by accomplishing the manual or automatic transformation of data into effective output. Treatment and editing of data are processed by comparing data through alternative actions and storing the data for different purposes. Treatment or the editing of data manages the data by exerting the greatest control over the data. This ensures that the data maintained can be retrieved in order to ensure that the outstanding value is derived from the data through different tools for attaining the right results.

k. Outlier Treatment

Outlier treatment of the data involves the extreme values that deviate from types of observation made on the data. This type of data arrangement also indicates the variability of the data in its measurement and avoids experimental errors and novelty. The process of the outlier treatment of data helps in diverging the data from the overall pattern of the sample of data collected (The Statistics Centre - Abu Dhabi, 2017, p. 6).

There are two different types of data outlier treatment. These types include univariate and multivariate procedures. Univariate outliers are observed when focusing on the distribution of values of various features of data while multivariate data treatment is mostly observed in a different n-variate feature of data which is also challenging to comprehend for a human brain and to train these models of data treatment more effectively (Leys et al., 2019, p. 2).

3.8.3. Study Limitation

This research involved certain limitations which were broadly classified into two categories: generic limitations and specific limitations. The former was more related to this research method and the latter was related to the scope and location of this research, as elaborated below:

Generic limitations:

- Materiality of data.
- Completeness of data.
- Responsiveness of data.

Specific limitations:

- Lack of aggregate data.
- Lack of disaggregate data.
- Coverage of only two sectors (Construction and Manufacturing).

a. Generic Limitations

The materiality of data refers to the availability of the required response from the target participants. Out of the received responses, some of the samples were not truly demonstrable, e.g., a small organisation having one or two employees.

Completeness refers to the surveys which were not completed in all fields or were not considered to be reflecting a genuine response. Hence, they had to be filtered out.

Responsiveness refers to the subjective bias of judgemental error that could have happened normally when the data were obtained as a result of the subjective decision of the respondent, for example, the nationalities which respected the OHS protocols. Also, the data collected were based on the nationalities available at the respondent's company. If a respondent mentioned that nationalities A, B & C respected the OHS protocols, that did not mean the other nationality D was

not respecting it, but sometimes that indicated that the organisation had only the A, B & C nationalities.

The responding entities were selected on a random sampling basis, hence presented a sampling error Type I and II. The Type I error involved the OHSMS effectiveness being under-estimated due to unfair or bad sample(s) of organisations. The Type II error involved in the OHSMS effectiveness being over-estimated due to good samples of entities, where a good sample is a sample that truly represents the lot, and a bad sample is the sample that does not represent the lot.

The responding organisations were random samples, partially stratified based on the sectors only, but not fully stratified based on the scope of work. Hence, a Manufacturing company can be having the scope of work from a diversified set of activities.

b. Specific Limitations

This research lacked aggregate OHS data at the United Arab Emirates level and even on the individual Emirate level, which impaired the baseline study and the understanding of the OHS Culture. The OHS performance statistics available for researchers were limited.

The disaggregated data was not available specific to the location or sector. For the period from 2011 till 2015, some data were available here and there, for example, the OHS statistics for 2015 released by a certain government department, but there were no annual publications for sale or freely available. Some departments had the data, but they could not officially share them with the researcher, as there was no formal mechanism to share the statistics and information to aid the research.

Diversity of the workforce from more than 200 countries and the Emirati employees being marginally less than 1% of the workforce indicated a cross-cultural work environment in studying

the effectiveness of the OHSMS culture and the risks associated with the dependencies in developing the OHS Culture.

This research involved two sectors of business activities, namely the Construction and the Manufacturing sectors. Other sectors influencing the OHS performance were not considered in this research, such as the Transportation, Food, Healthcare and Tourism sectors.

This research covered the period between 2011 and 2015 only. The period upwards from 2016 was not covered in this research.

This research was based on a stratified random sample. In the Manufacturing sector, the sub-strata such as each sub-sector within the Manufacturing sector was not covered.

3.9. Qualitative Part of the Mixed Research Methodology

Reference to the mixed research design for this research as explained earlier (3.7, Figure 9, and Figure 10), Qualitative research methods have plenty of options available for the researchers to select from.

On the other hand, the option of a case study is available. The analysis of data allowed the categorising, summarising, and reconstructing of the qualitative data in order to capture the required concepts and to address the research problems (*The SAGE Encyclopedia of Qualitative Research Methods*, 2008). Considering this critical approach, the current research has been designed to qualitatively compare the effectiveness of different Occupational Health and Safety Management Frameworks, the regulatory based vs the conventional/traditional law-based.

On the other hand, there is a grounded theory, observations, focus group discussions, and one-on-one interviews that are also used to gather information through qualitative methods (Ritchie et al., 2013). The qualitative research methodology is a research method that does not subject the data and information collected during the research to quantification. In most cases, qualitative research methodology is descriptive in nature and does not make use of the figures and numbers

(Creswell, 2013b). This research method attempts to examine attitudes, motivation and feelings and is usually characterised with small samples. The major limitation of this research methodology is that it does not adequately represent the target market owing to its small sample size; also, its findings depend on the skills of the individuals involved in the research. The main techniques that are used in qualitative research includes focus group meetings and interviews. These techniques are used to gather data and information from the various study participants.

The qualitative collection and analysis of data implemented a number of steps to ensure its effectiveness. The first important step was to identify the appropriate set of qualitative questions to be administered to the study participants. The next step was to identify the approach to be used in the qualitative data collection and their analysis. The analysis depended on various factors such as the nature of the data and the responses received. The sample for the data collection was determined appropriately. In qualitative data collection and analysis, a selective sample is recommended since it can help identify the respondents who are able to provide the necessary information and data required for the study. The data which were collected through the use of the agreed and approved approach. Finally, the collected data were subjected to analysis to determine the outcome of the study.

In the end, all the data collected were analysed using computer-assisted qualitative data analysis such as NVivo, which is a software, that is proven to be one of the most notable developments in qualitative research (Bazeley & Jackson, 2013).

Multiple strategies were used to establish a qualitative research method. These included the narrative approaches, qualitative interviews, online survey, focus group meetings, online forums and modified grounded methods.

Corbin and Strauss (2014) involved identifying or recording passages, which were linked by a common idea/theme, that enabled text to be indexed into themes or categories. Accordingly, the qualitative analysis in the current research (4.2) has been designed to analyse the positive and

negative themes of governance, trainings, etc., that influence the effectiveness of OHS management in the Construction and the Manufacturing sectors in United Arab Emirates.

The following explains the qualitative methods of data collection that were used in this research:

3.9.1. Narrative Approaches

The narrative approaches included the use of the problem-centred interview which was administered to a number of participants. The questions for the interview mainly focussed on the issues related to Occupational Health and Safety within the United Arab Emirates. The responses from the interviews were noted down in a narrative form and analysed using the qualitative research method.

3.9.2. Qualitative In-Depth Interview

In-depth qualitative interviews were conducted with a number of participants in the study. The in-depth qualitative interview was designed following the guideline that the researcher set (Hesse-Biber & Leavy, 2010), and was conducted in two primary forms that included face-to-face interviews, which was the preferred method in cases where the researcher could easily reach the interviewees. The researcher visited the study participants at their various workplaces and interviewed them. The phone interview was also used to gather information from the respondents who could not be easily reached by the researcher. The phone interview was convenient since it was used to reach the study participants that were far away from the researcher due to the geographical distance.

3.9.3. Online Survey

The online survey is used as an alternative mean of gathering information from the respondents of the study. The online survey is one of the quickest, most convenient and cost-effective means of gathering data from the study participants. Qualitative data are obtained using an online survey.

The online survey is mailed to the study participants, and the responses are received back after the successful completion of the survey questionnaires. This study, however, prefers a hardcopy survey as opposed to an online survey due to its reliability.

3.9.4. Focus Groups

Focus groups are important components of gathering information from the participants in the study. Focus groups consisted of different groups of individuals who were engaged in a variety of discussions that were designed by the researcher (Hesse-Biber & Leavy, 2010), which pertain to Occupational Health and Safety. All the individuals who were involved in the focus groups consisted of various professionals and workers from the Construction and the Manufacturing sectors in the United Arab Emirates.

A portion of the focus group had not responded to the survey questionnaire, who are also members of professional bodies like IOSH, IIRSM, industrial associations etc. When members arrived at the focus group meetings, they were identified by a unique number and not names to keep it as anonymous as possible.

3.9.5. Online Community

The research also engaged an online community in the study. Online forums were essential in gathering information from people that were from diverse backgrounds. Such forums provided data and information that facilitated the successful completion of the project. The online community was engaged through various forms of social media such as LinkedIn and WhatsApp.

3.10. Quantitative Part of the Mixed Research Methodology

Reference to the mixed research design for this research as explained earlier (3.7, Figure 9, and Figure 10), The quantitative research techniques are concerned with the analysis of numerical data and information as well as the development of statistical models in an attempt to explain a

given phenomenon. The main techniques that were used to conduct quantitative research included interviews and questionnaires.

The process of collecting and analysing data using quantitative methods involved a series of steps. Several measures were implemented in the quantitative data collection and analysis phase of the research, including the identification of the quantitative set of questions to be used. The questions identified should be able to facilitate the responses that were in numerical or quantitative form so as to ensure that quantitative analysis could be achieved (Lisle, 2011). The approach that was used to conduct quantitative data collection and analysis was also based on the nature of responses and data available. The identification of the appropriate sample size for the quantitative data was also important at this stage of the research.

A quantitative research method was used in this research in order to understand the descriptive statistics of OHS management dimensions and the identification of relevant preventive dimensions (Feyer & Williamson, 1998). It was also used to compare the Abu Dhabi Occupational Health and Safety approaches, both conventional/traditional and regulated OHS Management Systems, to that of the other Emirates. This was done by using variable percentages for the OHS Management System to make the proper decisions and to numerically understand the whole system. Also, it showed us the ratio in comparison to the different systems within the Construction and the Manufacturing sectors in the United Arab Emirates.

The analysis of the data was achieved through the use of descriptive statistical methods or tools using cluster analysis, analysis of categorical variables, correlation analysis, analysis of variance (ANOVA), regression analysis and the binomial regression, since there might have been a relationship between the significance of the over-dispersion negative binomial parameter and the inequality of mean and variance of the data collected from the statistical information using a different kind of survey.

The software which was used to analyse most of the quantitative data was SPSS, MATLAB and Excel for windows which are widely used by social scientists. Below is an outline of the methods of quantitative data collection.

The survey was used to collect data from various business entities across different Emirates in the United Arab Emirates. The survey was distributed within the United Arab Emirates and targeted the small, medium and large business entities across the country. The survey was distributed mainly to the business entities that were from the Construction and the Manufacturing sectors. The data which was obtained from the survey were analysed through the use of quantitative research techniques, including correlations, linear regressions, comparison of the measures of central tendency such as the mean, median, standard deviation (SD) and cross-tabulations.

3.11. The Targeted Respondents

In this research study, the targeted respondents were those who responded to the surveys (Refer to Table 10). They consisted of the individuals to be interviewed for the study, such as chief executive officers, directors and managers from the Construction and the Manufacturing sectors. These groups of participants provided valuable information concerning Occupational Health and Safety at their organisations. The directors of the Finance departments were also involved in the study as they helped in providing valuable information regarding the relationship between Occupational Health and Safety and the economic progress. The Occupational Health and Safety offices of the competent OHS authorities in the United Arab Emirates were also contacted to help in the study by providing reports or secondary datasets if necessary. Other individuals who were included in the qualitative part of this study were the Industrial Development Bureau (IDB), Civil Defence in different Emirates, Municipalities in the United Arab Emirates, Health and Safety Experts in the Ministry of Human Resources and Emiratisation (MOHRE) previously known as Ministry of Labour (MOL), and the Statistics Centre of Abu Dhabi (SCAD), and Abu Dhabi Public

Health Center (ADPHC) previously The Centre of Abu Dhabi Occupational Safety and Health (OSHAD). The inclusion of different individuals from different sectors and professional backgrounds helped the study to come up with various opinions and thus ensured an in-depth study was conducted.

3.12. Interpretation of the Merged Results

Data collection, processing and management are essential for understanding important aspects of the study, which are quantifiable and can be associated with one another through a singular point of reference. As explained in 3.9 and 3.10, after the collection and analysis of the quantitative and qualitative data, the research proceeded to the phase that was concerned with the analysis and interpretation of the results. As presented in Figure 9, in the interpretation phase, all the data collected and analysed using the two primary research methodologies were interpreted to come up with the findings of the developed research questions. The interpretation started with brief summaries and quantitative results. This was followed by brief summaries and qualitative results. It is important to note that the summaries and interpretation of the quantitative and qualitative results were made simultaneously but independently.

The overall procedure followed in the interpretation of the data included a collection of both types of data concurrently, making the analysis of the two datasets separately, merging of the results and interpretation of the combined results.

It is a basic rule under convergent parallel - mixed methodology to keep the data analysis independent. In this study, two independent strands of quantitative and qualitative data were collected and analysed at the same time/in a single phase (Bryman & Burgess, 2002). The methods that used in the study were prioritised equally. The results of the study were mixed during the overall interpretation. At this phase, the researcher looked for convergence, divergence, contradictions, or relationships between the two sources of data, with an expectation that there

should be similar results from different perspectives that included a collection of data from the quantitative instrument and qualitative data simultaneously.

After the summary and interpretation of both the quantitative and the qualitative data, the two results were compared and contrasted. This could provide insights into how each of the results were achieved and whether the two results related to each other positively or negatively. This stage was the validation of the results. In some cases, the results had both similarities and differences, and thus, the results obtained were harmonised. The validation of the outcomes considered the various factors such as sample sizes that were either equal or unequal, considering the data collected from different sources using surveys or interviews or both.

At this stage, the results were validated through the transformation of the data. The analysed data were merged for a more in-depth analysis, and this merging of data offered new insights which a singular form of analysis alone would not have offered.

3.13. Ethical Standards

This research follows Aston University's "Research Ethical Guidelines", and the researcher followed the highest standard of integrity in all the steps of this research.

A general summary of some ethical principles that were taken into consideration in this research (Shamoo & Resnik, 2003) are as follows:

- Honesty.
- Objectivity.
- Integrity.
- Due diligence.

3.14. The Research Instruments

Various ways were used to collect the data for the study. Initially, the researcher developed a web-based questionnaire which was designed to collect quantitative and qualitative data. The questionnaire was sent to the respondents for the targeted sample through email or by hand. Also, the researcher used face-to-face interviews from visiting the establishments' workplaces. Email and interviews targeted a wide range of workplace employees, such as CEO/General managers, Chief Operating Officers, Health and Safety Directors/Managers and other OHS professionals. This study utilised the questionnaire to measure Occupational Health and Safety practices for the target sample. The questionnaire had 66 questions to assess Occupational Health and Safety practices and statistics such as the fatalities and Lost Time Injuries.

3.15. The Survey Questions

The primary tool that was used in the study to help gather data from the participants was the survey questionnaire. The questions in the survey were similar to ensure that there were no discrepancies with regards to the responses expected. The questions developed were comprehensive to cover various areas of concern. The questions were a mix of open-ended and close-ended ones to encourage prompt answers and responses from the participants.

As explained in the research methodology chapter in 3.9.3, the survey included questions seeking a response to the questionnaire (See 3))3) through the mail, email, online. All the responses were collected as a hard copy, as well as conducting face-to-face interactions with key personnel within the selected entities from the Construction and the Manufacturing sectors. Site interviews were conducted on selected respondents to collect their perceptions of OHS practices. Also, focus group interactions with Health and Safety professionals were arranged to discuss and gather varied, related information and challenges faced by them within the Construction and the Manufacturing sectors. The methods of the in-person interactive questionnaire and focus groups were used primarily for qualitative data collection, whereas the questionnaire responses were used to manage the approach for both qualitative and quantitative data collection.

3.15.1. Survey Channels

Online, Emails and Mail surveys were used as a means of gathering information from the participants in the study. The quantitative data were obtained using these surveys. The survey questionnaires were mailed, emailed and accessed via a web link by the participants. The responses were then received and analysed. This study also involved a hardcopy version of surveys that were collected by visiting the respondents at their workplace, as opposed to the online survey, email questionnaire or mail survey, due to the greater reliability of data collected by the in-person interactive surveys (Fink, 1995).

a. Online Survey

In the Qualtrics itself, the questionnaire was designed such that the respondent could read the consent part of the form and click their acceptance, after which they were able to access the main questionnaire. In this research, the Qualtrics Survey was used to design and launch the online survey with due respect for the privacy of the respondents. Only after the respondent read the statements and accepted their consent were they able to read the questions and began their response.

Alternatively, the consent form (Refer to 2)) was sent to the participants, and once they signed the form and sent it back to the researcher as a scanned copy, the link to the online survey was sent to them.

b. The Survey by E-Mail or Mail

In this research, the consent form was sent to the participants, and once they signed the form and sent it back to the researcher as a scanned copy, the soft copy of the questionnaire was sent to them and got filled and received by e-mail or through a courier.

3.15.2. Focus Groups

Focus groups were instrumental in gathering information from the participants of this study, as explained in 3.9.4. Focus groups consisted of different groups of individuals who were engaged in various discussions designed by the researcher (Hesse-Biber & Leavy, 2010) pertaining to Occupational Health and Safety. All the individuals (n=19) who were involved in focus groups were professionals and workers from the Construction and the Manufacturing sectors within the United Arab Emirates. The focus group members were selected from the Construction and the Manufacturing sectors, from government departments and OHS practitioners. These had not responded to the survey questionnaire but were the members of professional bodies like IOSH,

IIRSM, industrial associations etc. Also, when they arrived at the focus group meeting, they were identified by a unique number and not names to keep them anonymous. The subjects, who were pre-approved based on the research objectives, were proposed for discussion during a focus group. The researcher was playing the role of the moderator and asked open-ended questions to encourage objective responses from the focus group members who identified the common and varying aspects of OHSMS practices and challenges among the Construction and the Manufacturing sectors. People from both the Emirate of Abu Dhabi and other Emirates responded through the dedicated questionnaire prepared for the focus group (For details, please check 4)).

3.15.3. Site Interviews

The site interviews were concerned with Occupational Health and Safety, as explained in 03.9.1 (narrative approaches) and 03.9.2 (the qualitative site in-depth interview). The various workgroups that promote health and safety in workplaces were studied. The primary way used to achieve site interviews was by visiting (13) of the selected companies whose participants had completed the questionnaire earlier.

Regarding the interviews, a stratified sample of 13 random companies were chosen from those who had responded to the survey. The respondents gave a formal consent for the site interview.

Site Interview questions were not at all linked with the survey questionnaire, as shown in (5)).

3.15.4. Online Community Engagement

As explained in 3.9.5, using online tools such as LinkedIn, WhatsApp, etc., specific questions about OHS were presented to the online community members who are OHS practitioners, professionals, and government representatives working in the field of OHS who responded with their perceptions. Such responses were tabulated and analysed to arrive at useful findings.

3.16. Study Sample.

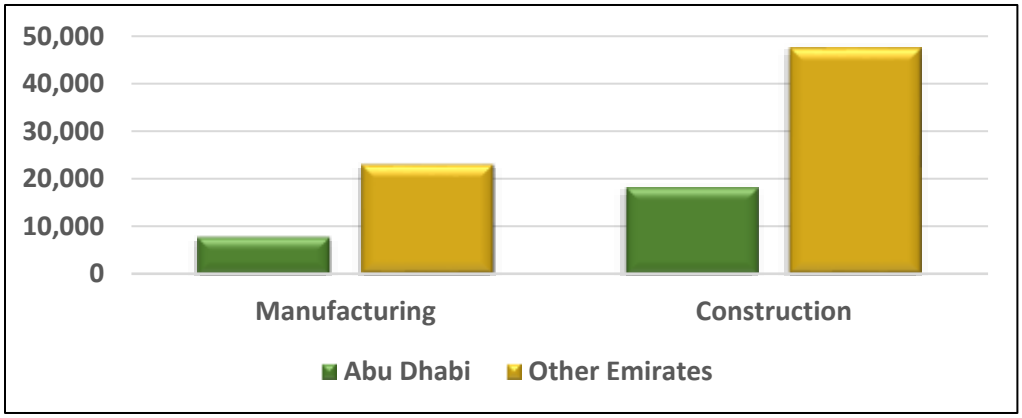
The survey aimed to cover a sample from the Emirate of Abu Dhabi and the other Emirates, targeting a population of the private Manufacturing and the private Construction establishments, as mentioned in Table 6. The method of purposeful sampling was used to develop a sample of the research, which belongs to the category of stratified random sampling techniques.

The researcher used stratified random sampling or “stratification” to obtain a sample population that best represented the entire population being studied. In addition, stratified random sampling involved dividing the entire population into homogeneous groups called strata.

Table 8 *Number of Entities in 2017.*
Source: (MOHRE; Not cited).

	Manufacturing	Construction
Abu Dhabi	7,776	18,132
Other Emirates	23,019	47,608

Figure 11 *Number of Entities in 2017.*
Source: (MOHRE; Not cited).



Each group was stratified according to the objective. Equal numbers of each category were randomly allocated to the three groups. The groups are described below according to their economic activity:

3.16.1. Group 1: Construction Sector

This included general Construction and specialised Construction activities for buildings and civil engineering works. It included new work, repairs, additions and alterations, the erection of prefabricated buildings or structures on the site and also Constructions of a temporary nature.

3.16.2. Group 2: Manufacturing Sector

This included the physical or chemical transformation of materials, substances, or components into new products. The substantial alteration, renovation or recycling of goods was generally considered to be Manufacturing.

3.16.3. Main Levels

According to the detailed objectives set for this thesis, the sample was designed and selected with consideration for the main indicators of the survey at the following main levels:

- The Emirate of Abu Dhabi and the other Emirates in the United Arab Emirates.
- Size of establishments.
- Application of OHS practices/systems.

In each of the sectors, the sample size was determined based on the relative standards and the total number of employees as key variables for this survey in order to define the establishment size as mentioned in Table 6.

Table 9 *Distribution of the Received Sample According to the Sector and the Size of the Organisations*

Row Labels	Construction	Manufacturing	Grand Total
Small	59	49	108
Medium	59	77	136
Large	42	26	68
Grand Total	**160**	**152**	**312**

Surveys were organised for a sample of 312 establishments through online and face-to-face interactions as per Table 9. The total number of eligible questionnaires were 200, which had all the required inputs as per Table 10. Data were collected and examined during the collection period. Documents related to Health and Safety were relevant, and both were used as a source of information and to verify the interview data.

Table 10 *Eligible Sampled Entities*

Row Labels	Construction	Manufacturing	Grand Total
Abu Dhabi	**40**	**60**	**100**
Small	13	13	26
Medium	13	29	42
Large	14	18	32
Other Emirates	**60**	**40**	**100**
Small	17	16	33
Medium	30	17	47
Large	13	7	20
Grand Total	**100**	**100**	**200**

3.17. Link between Literature, Factors, and Questions

The literature gaps 2.10 which are identified have been linked to the questions for both the questionnaire surveys and/or Focus groups, through the factors that affect this study (Table 5) as per the table below:

Table 11 *Mapping of the questions*

#	Literature gaps	Relevant factors	Data source(s)	
			Questionnaire	Focus Groups
1	Lack of research whose explicit purpose is to study the effectiveness of OHSMS based System Framework and traditional/conventional OHSMS interventions on the employees' health, safety, and economic outcomes.	Lack of institutional mechanism	Questions 20 & 25, 60, 61, 63	Question 1
		Uneven compliance obligations	Questions 21, 22, 26, 63, 65	Question 1
		Lack of enforcement	Questions 20, 30, 64, 52	Question 5
		Weak Self-regulation framework	Questions 35, 53, 62	-
		OHS Leadership gaps	Questions 32, 33, 36, 37 & 38	-
		Others	Questions 28, 43, 47, 48, 49, 50, 51, 56	-
2	Proper evaluation of the influence of training on the effectiveness of OHSMS	Human factors affecting the OHS	Questions 36, 44, 45, 54, 55	Questions 2, 3
		Inadequate staff consultation / engagement	Question 46	Question 4
		Others	Questions 23, 28	-
Other aspects				

3	UAE context	Multinational cultural factors	Questions 10, 40, 41, 44, 45, 54, 55	-
		Communication / Language factors	Question 42	-
		Inadequate participation of the UAE local nationality in the OHS field	Questions 9, 35	-
4	Basic company information	-	Questions 1, 4, 8, 14, 15, 16, 17, 18	-
5	Personal demographics	-	Questions 2, 3, 5, 6, 7, 11, 12, 13, 19	-
6	Health and Safety statistics	-	Questions 31, 34	-
7	Generic questions	-	Questions 24, 27, 29, 39, 57, 58, 59, 66	-

Chapter 4. Data collection and results from discussion and findings

4.1. Chapter Summary

This chapter begins by explaining the data collection and reviews the processes adopted for the qualitative and quantitative data collection. The methods used included a research questionnaire (survey), site interviews, focus groups, and engagement with online communities specific to the areas of research objectives. The second part of the chapter presents the results of the qualitative and quantitative analysis of the data obtained from each one of the methods used and discusses the findings from the literature review, questionnaires and interviews. A summary of the process to formulate the research questions, collect the responses and use them for the analysis and evaluation of the research findings. This chapter ends with an overview of the interpretation of the findings and discussion of the merged results.

Abu Dhabi follows the mandatory OHSMS Regulatory Framework, whereas the other Emirates are complying to the conventional/traditional regulatory framework (UAE Labour low 8) reference to 1.4.

4.2. Qualitative Data Analysis

The gathering and the processing of the qualitative data were done simultaneously with the quantitative data gathering and processing. The qualitative collection and analysis of data involved a few steps to ensure its effectiveness. In the current research, for qualitative data collection and their analysis, a selective sample was identified to consider which of the target respondents would be able to provide the necessary information and data required for the study. The data were then collected through the use of the agreed and approved approaches (Refer to 3.7).

The qualitative research method included site interviews, open-ended questions in the online survey, focus group meetings and engagement with the online OHS community.

The site interviews explained in 3.15.3 were effective research instruments (Refer to 3.14) to investigate Occupational Health and Safety. The various nationalities that promoted Health and Safety at the workplaces were studied. The site interviews were conducted by visiting (13) of the selected companies. The interviews involved a selected group of participants. The questions for the interview mainly focussed on the issues relating to Occupational Health and Safety within the United Arab Emirates. The site interview was designed to address all research questions (Hesse-Biber & Leavy, 2010), as shown in (5)). Face-to-face interviewing was a preferred method in the selected cases of the respondents for a detailed qualitative data collection. The study participants were visited and interviewed at their various places of work.

The focus group interviews (Refer to 3.15.2) were recorded by audio after having the approval from the participants via the consent form, and the responses from the interview were documented in narrative form, coded and analysed later using the qualitative research method.

All the data were collected and analysed through computer-assisted qualitative data analysis using NVivo software, according to Bazeley and Jackson (2013).

4.2.1. Qualitative Data Analysis from Focus Group

The outcome of this focus group discussion, which was held once with 19 OHS practitioners from all over the United Arab Emirates working either in Government, Construction, or Manufacturing sectors, drove the research journey in:

- Understanding the existing OHS practices within the United Arab Emirates.
- Their perception of the conventional/traditional and regulatory OHS requirements.
- The risks associated with multinational dependency.

The key subjects discussed, and the outcome are as follows:

Subject 1.

What are the typical challenges you face with respect to compliance with OHSMS?

Common Points.

a. Internal communication for the employees of different nationalities (language problem). This input was given by the government sector and agreed to by others.

b. More time is taken to implement such a comprehensive framework.

c. Many entities, despite implementing the OSHAD SF, are reactive, not pro-active.

d. Lack of commitment from the senior management

e. Lack of institutional enforcement mechanisms for OHS.

Variants / Unique Points

As inputted by the government sector, federal laws are comprehensive. However, they are not effectively enforced as in the OSHAD regulatory framework of the Emirate of Abu Dhabi.

The level of staff education also plays a vital role in complying with the OHS System. As per the private sector (Construction), the staff have no idea about the work set up, and it makes them feel ill-equipped to adopt OHS on site.

Subject 2.

Do you find complacency among workers? If yes, why do you think there is complacency among workers even after training and making them aware of the associated risks?

Common Points.

Almost all entities agreed that complacency was observed among workers, especially the experienced ones who were overconfident.

a. To avoid complacency issues, implementing a genuine self-regulation mechanism is essential.

b. Staff behavioural training was useful to reduce complacency issues.

Variants / Unique Points.

7 out of the 19 respondents remarked that the Construction sector employees, especially the blue-collar employees from Bangladesh, were found to include almost illiterate persons working on the field. Therefore, people may not be aware of the actual risks due to the lack of knowledge and safety awareness.

Regarding the complacency among workers, a proper investigation should be done by the leadership team and to take into consideration, whether it has been done intentionally or not (Al Yammahi, 2016, p. 8). Accordingly, a penalty should be imposed on the worker who does not follow the regulations and instructions.

Subject 3.

The operations function of the entities always has challenging targets to achieve; Do you think this makes them compromise the risk control measures? If Yes, how do you overcome such issues?

Common Points.

"Cutting corners" was found in general to be commonly happening in government organisations as well as in private sectors.

To save time or costs, the first non-core discipline to be compromised is Health and Safety, as its values are not as tangible as operational values.

Wherever OHS was not properly committed and agreed, cutting corners happened.

Variants / Unique Points.

a. The senior and middle management should be trained on how to lead OHS in their respective functions, which in turn would avoid OHS from being compromised.

b. Conducting a detailed risk assessment reduced the chance to cut corners. (As inputted by the private sector entities)

c. Some organisations did not have weightage for OHS in the technical evaluation, which gave room for cutting corners. (As perceived by the government entities)

Subject 4.

How can we ensure that the operations supervisors and site engineers are committed to health and safety practices and comply with OHSMS?

Common Points.

a. By defining the OHS Competency of all staff (OHS & Non-OHS).

b. By linking the performance evaluation for the operations supervisor/staff with:

    1) The amount of OHS training taken by the staff concerned and;

    2) OHS performance of his project/department.

c. Motivation or recognition for the operational staff who are performing well in OHS.

Variants / Unique Points.

One grey area in this regard, which was raised, was the type of support that should be extended legally by the Ministry of Labour for the staff who can potentially be ill-treated for their OHS commitment and actions, affecting the productivity (Raised from the Government sector).

Another idea suggested by the private sector was to enhance the OHS commitment of the operational staff, was to make it clear that the operational staff are responsible for the OHS performance in their project/department.

Subject 5.

In this highly competitive market, do you think that operations and marketing feel that Health and Safety is a burden and is the first area to cut costs? If so, would mandatory compliance to OHSMS be helpful and effective?

Common points.

Yes, the reality is that OHS, while being a support function, has an intangible value not visible to the senior management.

OHS compliance obligations are helpful to ensure OHS is not compromised.

Variants / Unique Points

One variant raised by the private sector entities was that the OHS compliance obligations had not been unified in United Arab Emirates. The framework is comprehensive and mandatory in the Emirate of Abu Dhabi, which ultimately makes it more powerful than the conventional/traditional OSHMS in the other Emirates.

The private sector entities suggested through best practices that a certain percentage of total project budget must be allocated for OHS and accounts for the same must be kept, for corporate checking and verification at all points in time.

4.2.2. The Outcome from the Focus Group Discussion

As a result of the focus group discussion, the following points were obtained, which drove the research further:

a. Within the United Arab Emirates, the OHS compliance obligations are not the same. The local regulatory requirements are more explicit only in the Emirate of Abu Dhabi. The federal OHS requirements are well established; however, the enforcement mechanism is not effective.

b. The senior and middle management should be trained on how to lead OHS in their respective functions, which in turn will avoid OHS from being compromised.

c. Self-regulation of OHSMS is not a mandatory requirement, except in the Emirate of Abu Dhabi, which has been proven to be effective, as suggested by the participant.

d. The diversity of the workgroup makes the OHSMS implementation more challenging and involves the safety behaviour issues specific to the demography and country. One example is human factors such as the illiteracy of the Bangladesh field staff (Blue Collar).

e. The support by the governmental authorities for those who strictly adhere to OHS is not clear, as well as the institutional mechanism for OHS.

f. OHS is the responsibility of the OHS team only; it does not reflect on the performance of the operational staff.

g. Mandatory budgets for OHS and minimum conformance to OHS have not been enforced, making OHS implementation more challenging.

4.2.3. Qualitative Data Analysis from the Survey

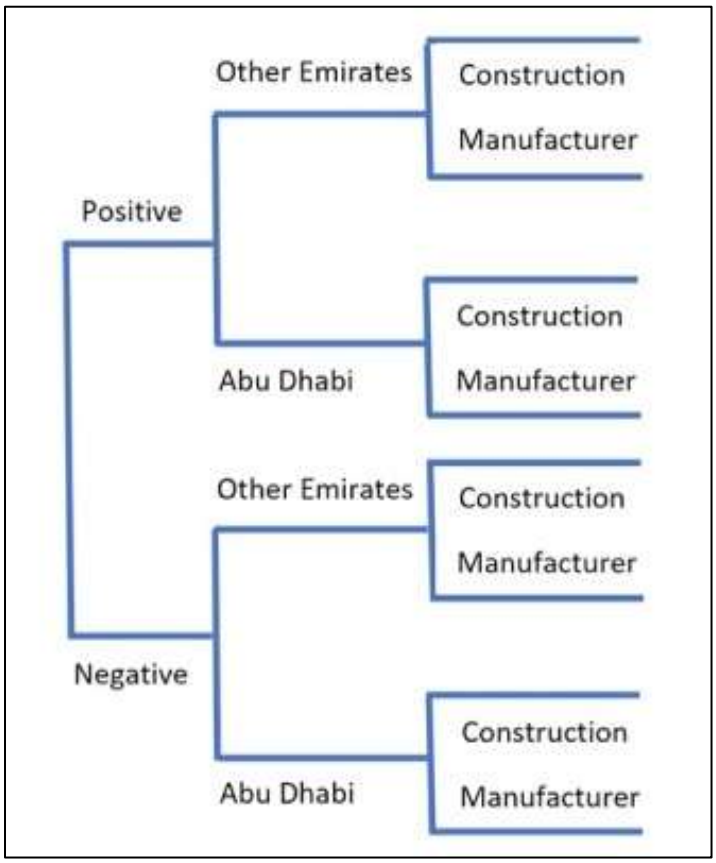
I. The Main Survey Questionnaire (Construction and Manufacturing)

The data collected were used to establish the negative and positive aspects of Health and Safety in the organisations' OHSMS. The data analysis procedure was largely based on thematic analysis. To achieve this end, computational qualitative data analysis was utilised, specifically, NVivo. The coding process used was three-tiered and involved open coding as the first process, according to Maher et al. (2018).

Open coding was used as a foundational process to identify all possible themes regardless of their linkage to the so-coded themes. Focused coding is the level-two coding which further refines the data and narrows the focus to a relatively fewer number of codes. Axial coding was then done, whereby the open codes were further evaluated for possible relationships and links. Subsequently, new tree nodes were created with their corresponding sub-themes as put forth by Choi et al. (2018). The last stage involved the contextual review of the themes, and the core themes were identified in-line with the prescriptions by Yin (2017). The results from the analysis are illustrated using several techniques, including, but not limited to, word trees, cluster analysis, thematic maps and hierarchy figures.

Figure 12 *Two-dimensional Cluster Analysis.*

Source: Developed by Author.



As presented in Figure 12, the data for this study were collected from companies in the Construction and the Manufacturing industries from two regions of the United Arab Emirates, the other Emirates, and the Emirate of Abu Dhabi. With a view to establishing the main similarities and differences in the data used, cluster analysis was carried out for two dimensions of the study: the positive aspects and the negative aspects of the OHS Management System.

From the outcome, there was no conflation between the positive and negative characteristics of the OHS Management System. More importantly, the clustering established that the primary determinant of the themes extracted from the data for either the positive and negative characteristics of the OHS Management System was, the location of participants and not the sector in which they worked. This internal consistency that is seen through all the sources

generally points to the relative appropriateness, replicability and trustworthiness of the data referred to by Silverman (2010).

4.2.3.1. Negative Aspects of the OHS Management System

The surveys question number 58 asked: "Describe three negative aspects of Health and Safety that you would not like included in your organisation's OHS Management System". After the open, axial and selective data coding process, five broad themes were established as being the key negative aspects which were rated as per the count of cases reported by the respondents.

Five key negative aspects which were reported and presented in Figure 14 are management incompetence, high costs associated with OHS, lack of OHS consciousness, lack of human resources, and restrictive procedures. The hierarchy chart in Figure 13 maps the five major themes on what was observed to be adversely affecting the successful implementation of the OHS Management System among the companies that participated in the survey. Management incompetence was cited, with the key attribute of poor OHS implementation. The second major problem affecting the efficacy of the OHS Management System was reported to be the high cost of OHS equipment. The lack of OHS consciousness was reported by most of the respondents and emerged as the third major problem, which was largely attributed to a lack of training and organisational behaviour issues. The aspect of human resources and restrictive procedures were the other themes, though not as dominant in the discourse as those mentioned above.

Figure 13 *Hierarchy Chart: Negative OHSMS Themes and Sub-themes*

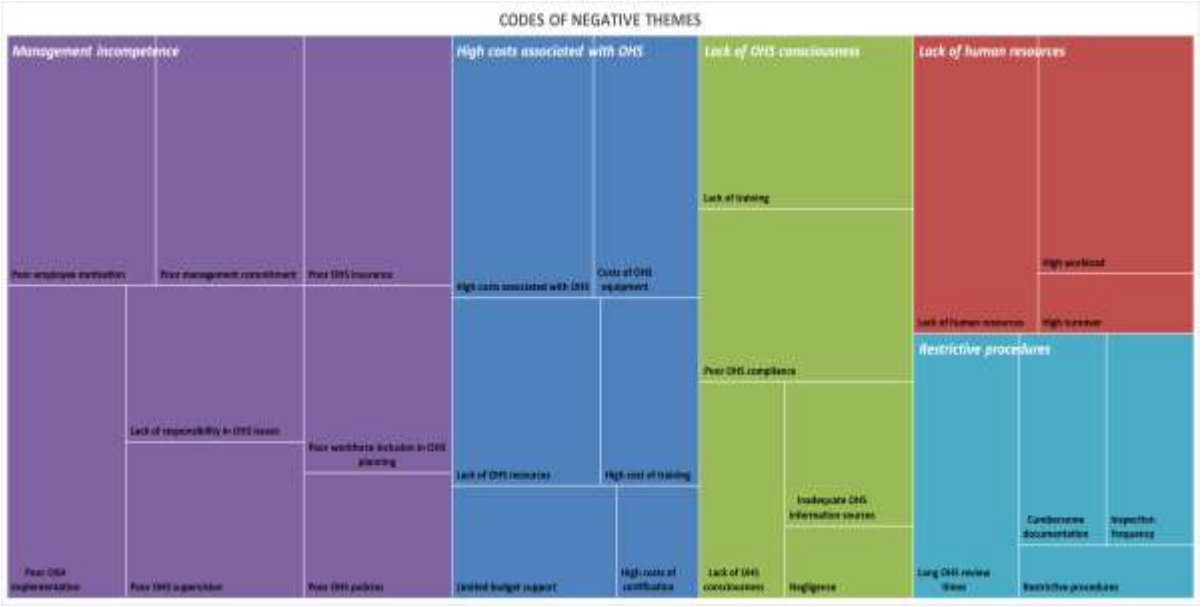


Figure 14 *Codes of Negative Themes*

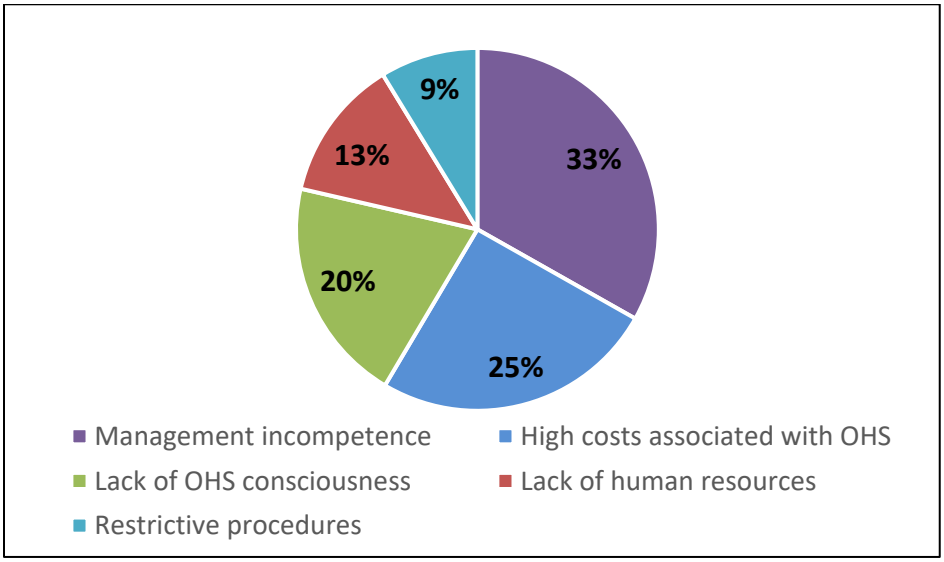


Figure 15 *Negative Themes in Construction Sector*

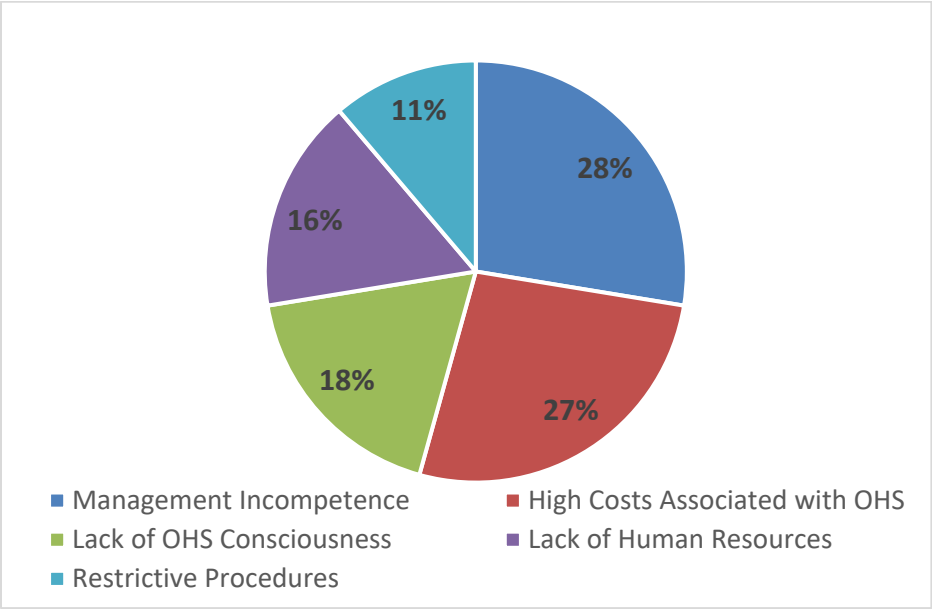
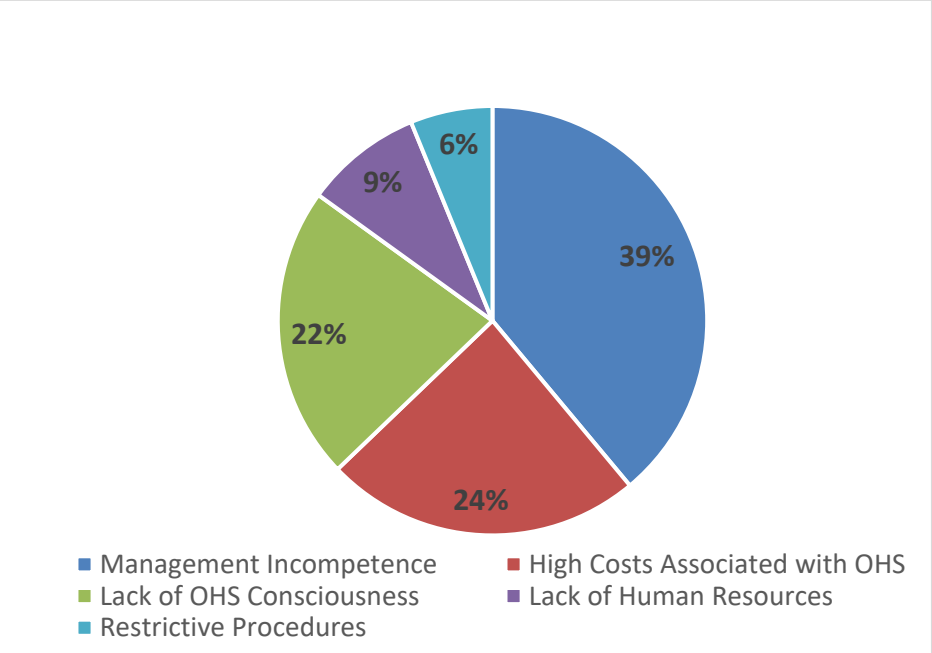


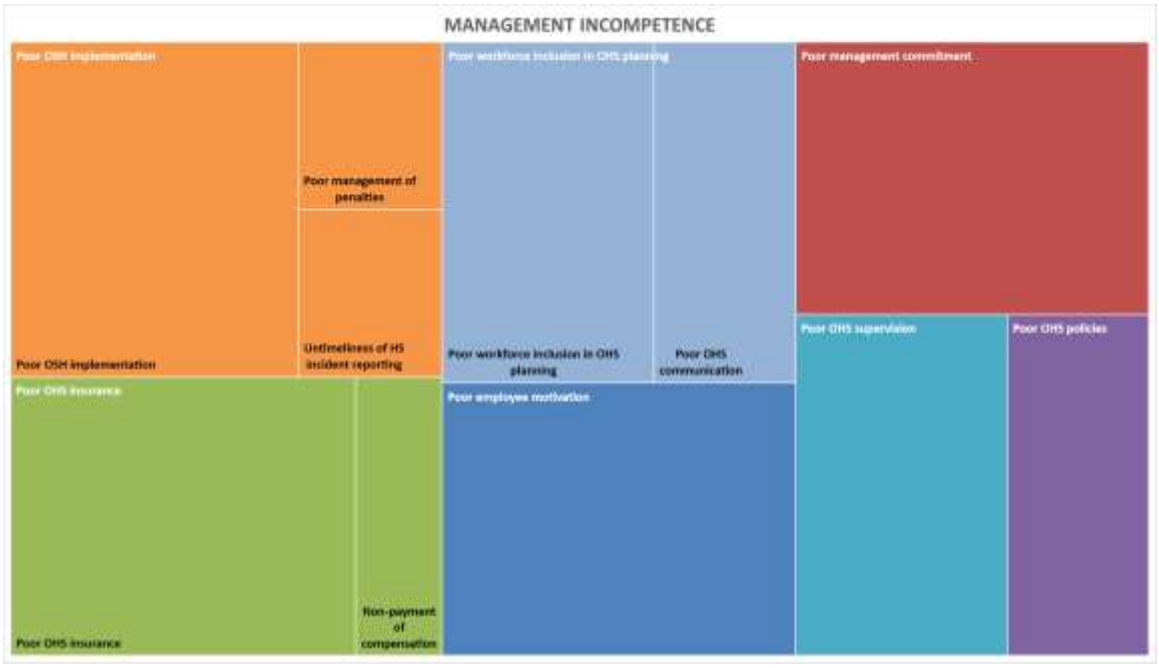
Figure 16 *Negative Themes in Manufacturing Sector*



Negative Theme 1: Management Incompetence

The first dominant-negative theme based on the coding references was management incompetence. Under this theme, it emerged that the reduced efficacy of the OHS Management System in the companies that were reviewed by the researcher, was as a result of negligence by the management. Thomas et al. (2002, pp. 6-8) describes that poor management commitment, lack of motivation, and poor teamwork are the main barriers in achieving the quality outcomes in Construction projects. With respect to the order of the sub-themes according to the count of the cases reported by the respondents, the main one was the poor OHS implementation by the management, as shown in Figure 17. Poor employee motivation strategies by the management were found to have a negative effect on the effectiveness of the OHSMS. The other sub-themes identified were the inadequate OHS insurance, inadequate workforce inclusion in OHS planning, poor OHS motivation, poor management commitment, poor OHS supervision, and the poor OHS policies.

Figure 17 *Hierarchy Chart: Management Incompetence and Sub-themes*

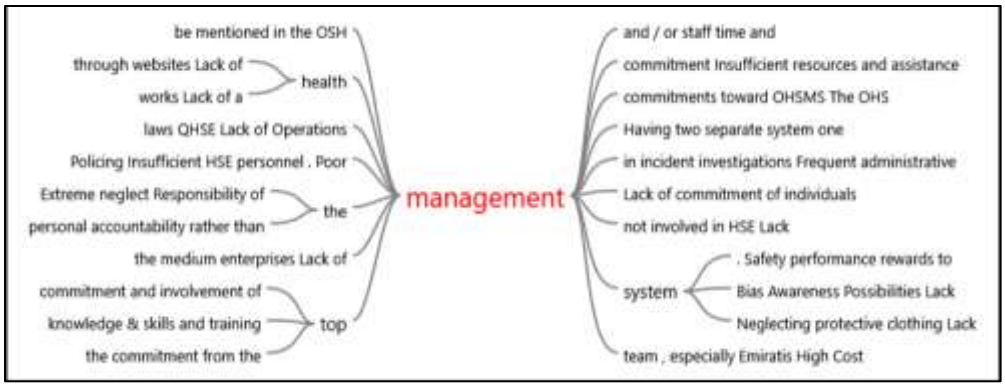


With respect to poor implementation, it emerged that there were poor internal policies crafted to reduce accidents. Examples were the absence of OHS procedures, the lack of operations management and the lack of ownership of OHS at work as some workers went blindly into their jobs, assuming their employer had done everything to keep them safe. The situation was further compounded by the lack of commitment by the management towards OHS, which was the other sub-theme, as shown below.

Table 12 *Excerpts on Lack of Management Commitment*

Case	Text
Case 5	Lack of management commitments toward OHSMS
Case 14	Absence of commitment and involvement of top management team
Case 47	The level of top management's commitment on OHS

Figure 18 *Word Tree: Lack of Management Commitment*



As a part of management incompetence shown in Figure 17, and as a result of the lack of commitment by the "management" as presented in Table 12 and Figure 18, the other theme-related issue was poor OHS supervision, both in terms of frequency and efficiency. Poor OHS supervision explains the other theme: the lack of responsibility by the management over OHS issues. It emerged that managers were not ready in some companies to be held accountable, thus the blame culture proliferated. This is in contrast to the principles of OHSMS, whereby executive responsibility and mandate is a prerequisite. Poor management commitment would be

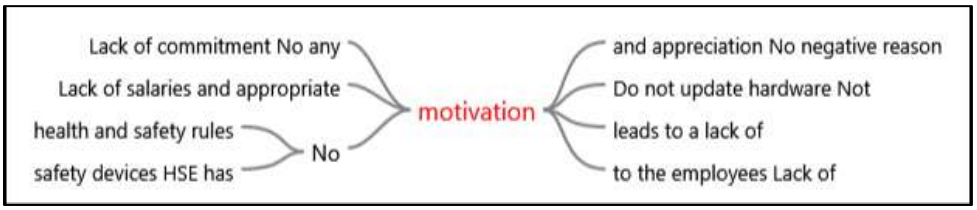
a bottleneck towards OHS, despite the spirited efforts by the employees to be active partners of OHSMS. It was identified that there was a very low level of participation in OHS planning by the workforce.

As a result of the poor communication and coordination between the employees and managers, the degree of motivation for the employees was diminished, and this was the other sub-theme as in Table 13 and Figure 19.

Table 13 *Excerpts on Poor Employee Motivation*

Case	Text
Case 223	No any motivation to the employees
Case 238	Lack of appreciation for employees

Figure 19 *Word Tree: Poor Employee Motivation*

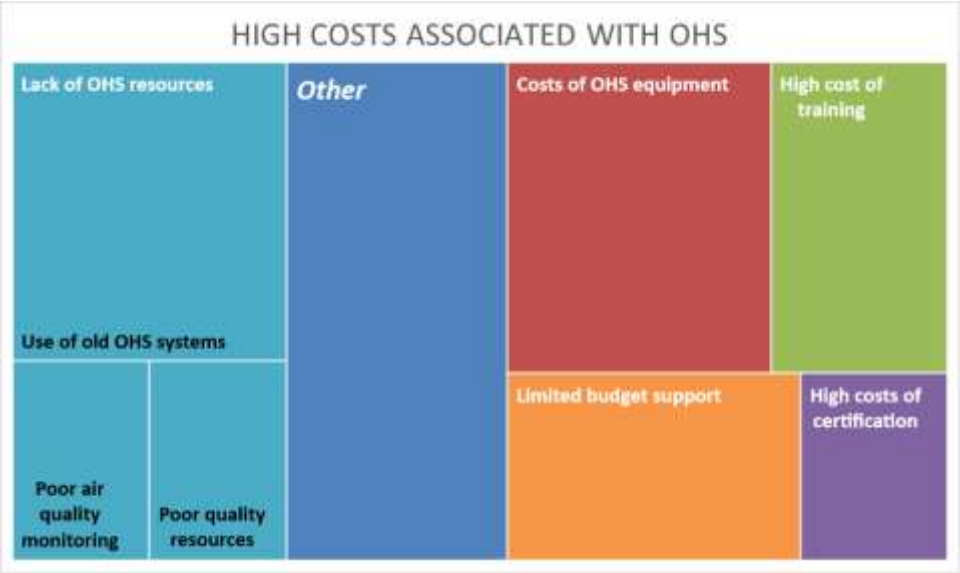


In light of the poor employee motivation, the management was cited as failing to keep in pace with the monthly remuneration and incentives expected by the employees, something which negatively affected the motivation by the employees and their attitude towards OHS.

Negative Theme 2: High Costs Associated with OHS

The second broader theme on the negative aspects of the OHS status quo was, the high costs that were associated with the OHSMS, as shown in Figure 20.

Figure 20 *Hierarchy Chart: OHS High Costs and Sub-themes*



From the findings, the reduced efficacy of the OHSMS was negatively affected by the lack of adequate non-human OHS resources, the first sub-theme. The participants cited that they were using old OHS resources, some of which were now poor-quality resources. From the analysis, it emerged that this was a result of the companies failing to meet the high costs of equipment, as shown in the word tree below in Figure 21 and Table 14.

Figure 21 *Word Tree: OHS High Costs and Sub-themes*

Table 14 *Excerpts on OHS High Costs*

Case	Text
Case 92	The cost of personal protective equipment and safety is very expensive
Case 93	The cost of training especially for small companies
Case 129	Excessive costs of applying Occupational Health and Safety plan at the workplace

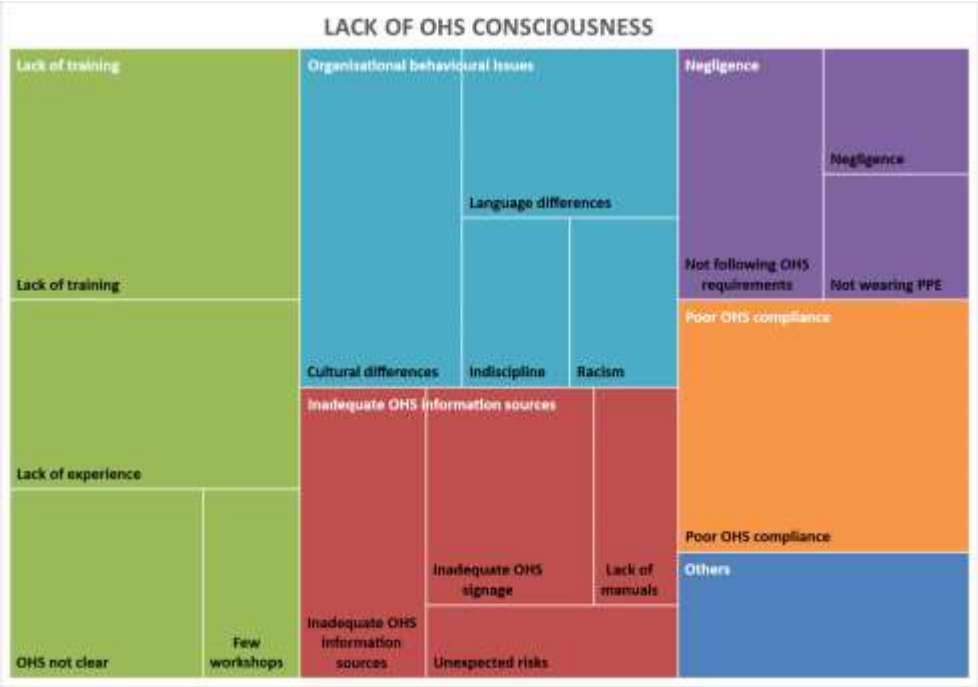
In the analysis above, the predominance of the cost aspect is evident. This is intricately linked to the cost of safety equipment. It emerged that the cost of personal protective equipment (PPE) and other safety equipment were very expensive. The other aspect was the cost of training, which emerged as another sub-theme. Some participants argued that this is even more expensive for small and emerging companies. The other aspects of the cost that affected the efficacy of the

OHSMS were influenced by the different categories of the indirect costs of OHS, such as the costs of OHS failure (e.g., the costs of health insurance premium proportionate to the number of serious incidents), the cost of OHS appraisals such as the cost of OHS Audits, Inspections, the cost of issuing permits and the cost of certification). The preventative components of OHS includes, OHS governance costs such as awareness promotion, training and OHS capability development measures. Against the backdrop of a limited budget, another sub-theme, there were insufficient resources and support mechanisms to implement OHSMS.

Negative Theme 3: Lack of OHS Consciousness

The hierarchy chart of the key negative aspects that were reported to adversely impact the effectiveness of Occupational Health and Safety Management in the companies of the respondents, clearly shows that the lack of OHS consciousness emerged as the third major theme. That was reported to have a negative effect on the OHS Management System based on the number of responses reported for various sub-themes that are grouped under this theme. The sub-themes under this theme were analysed and are presented in the hierarchy chart given in Figure 22.

Figure 22 *Hierarchy Chart: Lack of OHS Consciousness and Sub-themes*



As discussed in the previous section, lack of Occupational Health and Safety consciousness among the employees of different levels of workers, was reported by most respondents as the most critical factor which can be attributed to a number of sub-themes. Those sub-themes include lack of adequate training or no training, lack of experience, lack of clear understanding of Occupational Health and Safety requirements, inadequate information on Occupational Health and Safety or poor compliance with the Occupational Health and Safety requirements, which could be due to negligence or indiscipline or behavioural issues. Most of these sub-themes can be very well related to the governance of the Occupational Health and Safety Management System. Also, the lack of training and awareness is clearly leading in this study to an understanding of the impact of training on the effectiveness of Occupational Health and Safety Management in an organisation.

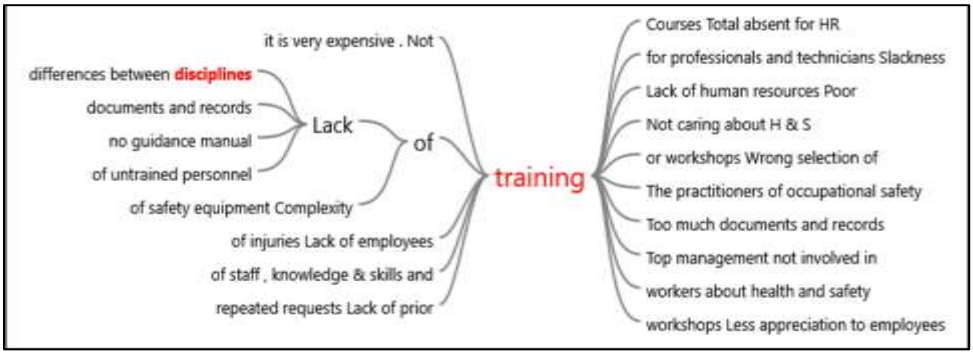
An analysis of the highest number of cases reported by the respondents was for the sub-theme lack of training (Table 15 and Figure 23). It emerged that there were very few training workshops being held and that the OHSMS was not clear to the participants and further compounded by the

lack of experience in OHSMS. The word tree below provides the context for the sub-theme "lack of training" and clearly demonstrates its linkage to the poor understanding of Occupational Health and Safety requirements and also to its non-compliance.

Table 15 *Excerpts on Lack of Training*

Case	Text
Case 122	The safety factor is impacting the nature of the business as the company is committed to a specific time for project delivery, compliance and safety training affect the time factor
Case 244	Lack of training or workshops

Figure 23 *Word Tree: Lack of Training*



The lack of Occupational Health and Safety consciousness was also evident in the second sub-theme, such as organisational behaviour issues, where cultural differences, employee indiscipline, language differences and racism were identified as impeding the efficacy of the OHSMS. The third sub-theme characterised the poor OHS consciousness related to the inadequacy of information sources on OHS, and this included but was not limited to signage and manuals. Negligence, which was the fourth sub-theme, was mainly characterised by the failure to follow the appropriate OHS requirements and the failure to wear Personal Protective Equipment (PPE).

The analysis of these sub-themes clearly demonstrates how poor governance could lead to inadequate information about Occupational Health and Safety requirements, which may also be

attributed to behavioural issues, indiscipline, and finally, noncompliance. Under circumstances where the essence of OHS is underscored through adequate training, respect for life, and the need to prevent injuries, those will outweigh any cultural or behavioural or language differences. The last sub-theme extracted for the lack of OHS consciousness was poor OHS compliance.

Most of the respondents from the Construction sector reported a lack of training. This can be interpreted as a general perception of senior management in the Construction sector that Health and Safety training is non-productive and is a cost burden. The companies who had effectively implemented OHSMS experienced the benefits of training by reducing the hidden cost associated to LTIs, such as worker compensation, time lost and labour replacement cost, cost of treatments as well as image and reputational damage which affects the company's market value. Moreover, at times, a major incident may result in a project over-running and causing substantial financial loss, involving penalties. Hence, it can be clearly interpreted as a lack of senior management's commitment that leads to poor governance of Occupational Health and Safety Management, which was analysed in more detail in section 0 Management Incompetence.

Negative Theme 4: Lack of Human Resources

The fourth weighted theme was the lack of adequate human resources (Table 16).

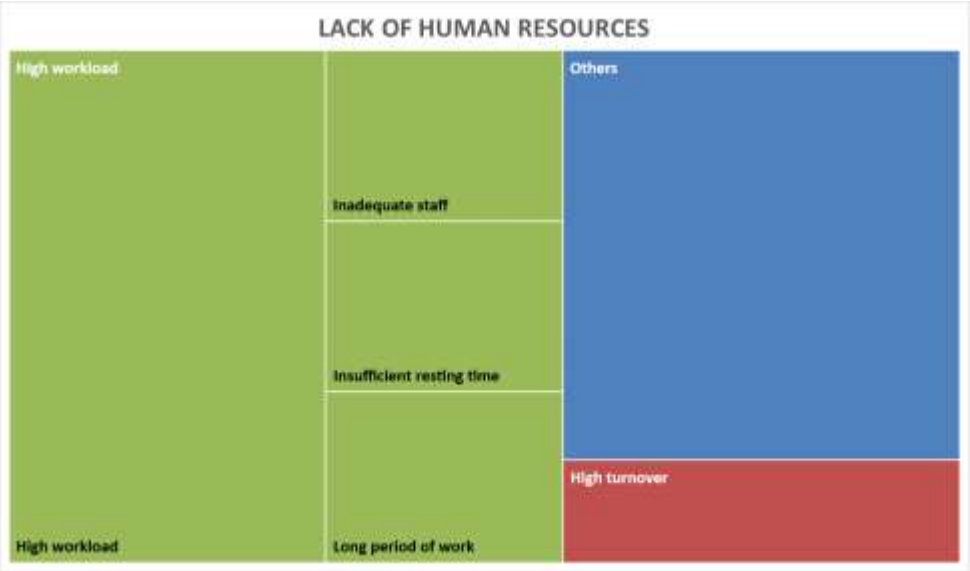
Table 16 *Excerpts on Lack of Adequate Human Resources*

Case	Text
Case 161	Lack of salaries and appropriate motivation leads to a lack of human resources
Case 255	Lack of human resources

Cristina and Gheorghe (2009, p. 399) present that the lack of human resources is one of the most difficult problems in safety operations.

The corresponding hierarchy chart is presented in Figure 24.

Figure 24 *Hierarchy Chart: Lack of Human Resources*



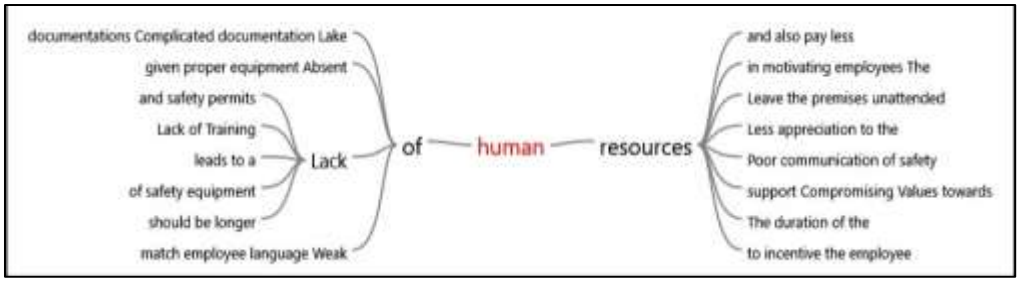
From the illustration, there was one main sub-theme, which is the high workload that was identified among the employees, which was a limitation towards the effective implementation of OHSMS (Table 17).

Table 17 *Excerpts on High Workload*

Case	Text
Case 19	The number of papers necessary for the issuance of health and safety permits
Case 157	The long-time taken to obtain health and safety permits
Case 239	More workloads at works

With respect to the high workload, the major problems emerged as being insufficient resting time and long working periods, all of which, related to the lack of human resources, as shown in the word tree below in Figure 25.

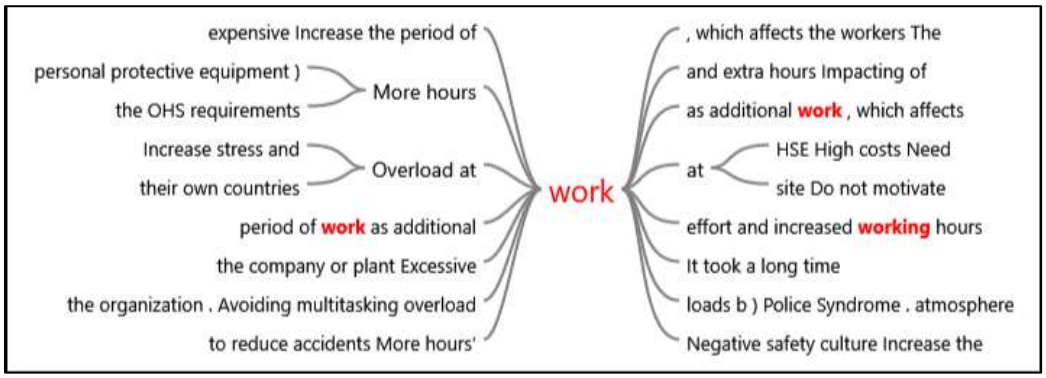
Figure 25 *Word Tree: Lack of Human Resources*



The aspect of more hours of work was predominant. Other participants mentioned that they were exhausted by long working hours without enough breaks.

The companies were cited as not complying with the working hours specified by government norms, as set out in federal labour law number 8 for 1980, according to the official publication from the Ministry of Labour & Social Affairs (1980). Some of the related concerns are presented in Figure 26.

Figure 26 *Word Tree: High Workload*

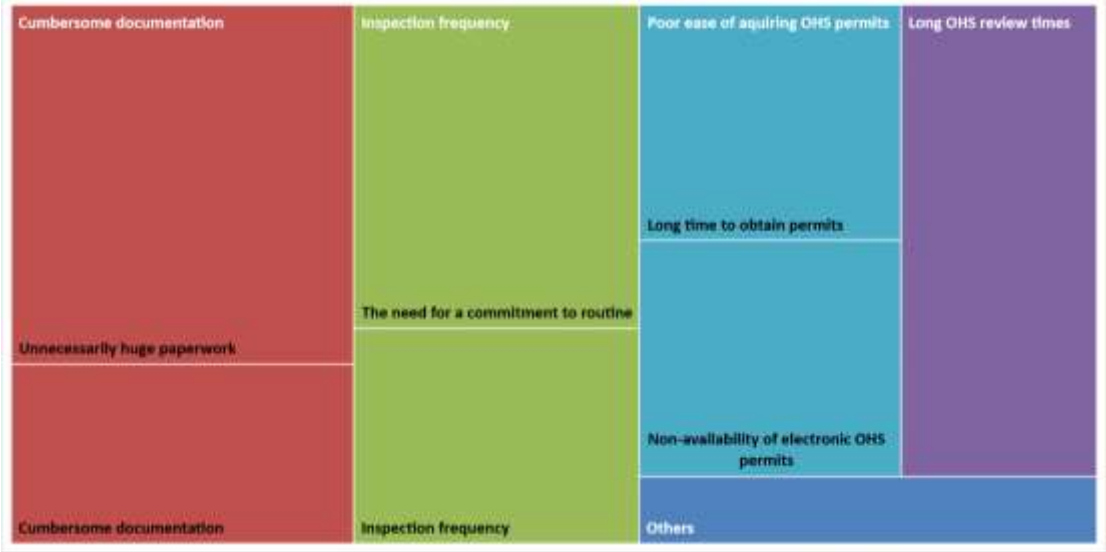


As a result of the insufficient daily rest hours, other participants argued that it caused mental pressure on the workers which led to fatigue and stress, and in turn had a negative effect on the productivity and morale of the employees. These unbearable working conditions, as cited by some of the respondents, compounded the poor work morale of the employees, and ultimately affecting the OHS performance.

Negative Theme 5: Restrictive Procedures

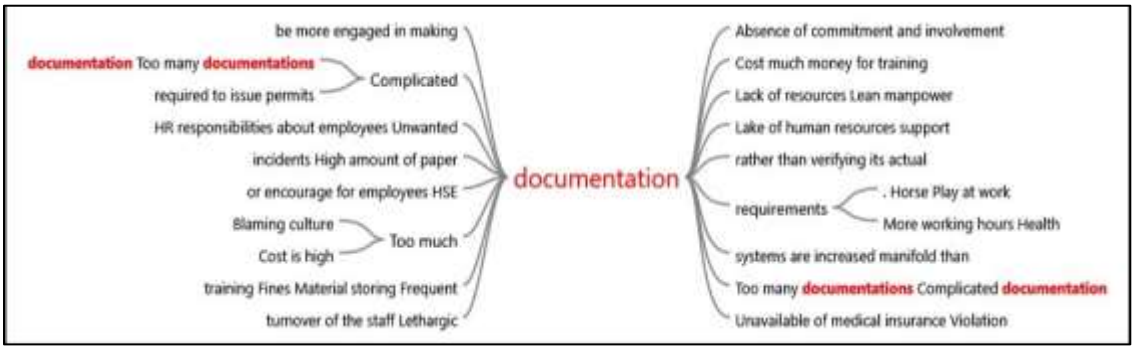
The last and least significant theme in Figure 27 that emerged as an obstruction to the successful implementation of the OHSMS system was, the somewhat retrogressively restrictive procedures in the current regulatory framework. The major sub-themes are presented below.

Figure 27 *Hierarchy Chart: OHS Restrictive Procedures and Sub-themes*



Of all the subthemes, the most outstanding related to the documentation which was cited as being too cumbersome as shown in the corresponding word tree.

Figure 28 *Word Tree: Cumbersome Documentation*



From the results above in Figure 28, the pre-eminence of the documentation problem is clear. One of the participants (Case 5) cited:

"OHS *documentation systems have increased manifold than earlier in the Industry, making the* OHS *staff to be more engaged in making documentation rather than verifying its actual implementation*".

The participants further cited that some of the paperwork was unnecessary, stating that this complicated the process, and in some instances, there were duplicated efforts. Mustapha et al. (2017, p. 163) presented that, organisations have faced difficulties in managing multiple standards with different documentation and procedures. They state that *"multiple documentations due to the adoption of more than one management system would cause confusion as a result of unclear guidance".*

The second sub-theme related to the inspection frequency, citing that this was very often being intrusive and affecting the workflow. On another note, the participants mentioned as the third sub-theme, that it was not easy to get OHS permits both in terms of being time-consuming as well as the failure to avail them through alternative channels of choice, such as an online facility (Table 18).

Table 18 *Excerpts on OHS permits*

Case	Text
Case 249	The number of papers necessary for the issuance of health and safety permits
Case 251	The long-time taken to obtain health and safety permits

The last sub-theme related to the very untimely review response. After reporting any incident, participants mentioned that the managers' response often took more time, and the same applied to OHS reviews carried out from time to time.

4.2.3.2. Summary of the Negative Themes:

From the respondents, the top five negative aspects reported were:

Management incompetence, the high costs associated with OHS, lack of OHS consciousness, the lack of human resources, and the restrictive OHS procedures. These were depicted in Figure 17, Figure 20, Figure 22, Figure 24 and Figure 27, respectively. Under each one of these aspects, the themes were as follows, and their hierarchy was represented.

a) The theme, "Management incompetence" is comprised of the three sub-themes, Poor OHS insurance, Poor employee motivation and Poor management commitment.

b) The theme, "High costs" is comprised of the sub-themes, lack of resources, the high costs of the OHS equipment, and other.

c) The theme, "Lack of OHS Consciousness" is comprised of the top three sub-themes, namely the Lack of Training, Lack of experience and Poor OHS Compliance.

d) The theme, "Lack of Human Resources" is comprised of the three sub-themes, High workload, Inadequate Human resources, and Lack of Human resources.

e) The theme, "Restrictive procedures" is comprised of by the cumbersome documents, Inspection frequency and long OHS review time.

4.2.3.3. Positive Aspects of the OHS Management System

The survey questionnaire's question number 57 asked: "Describe three positive aspects of Health and Safety that you would like in your organisation's OHS Management System". After the open, axial and selective data coding process, five broad themes were established as being the key positive aspects and are rated as per the count of cases reported by the respondents.

From the process and according to the Figure 30, five major themes were established as being the critical positive aspects of the OHSMS, and they are in sequence as per the count of cases by the respondents, and they are as follows:

1. Safety and security maximisation.
2. Centralised OHS management.
3. OHS strategy and enterprise strategy integration.
4. Integrated OHS system implementation.
5. Productivity and performance oriented OHS management.

The respective hierarchy chart is presented in Figure 29 below, and this chart maps the above five major themes, showing what the OHSMS should focus on to ensure the successful implementation of the OHS Management System among the companies that participated in this study.

Figure 29 *Hierarchy Chart: Positive OHSMS Themes and Sub-themes*

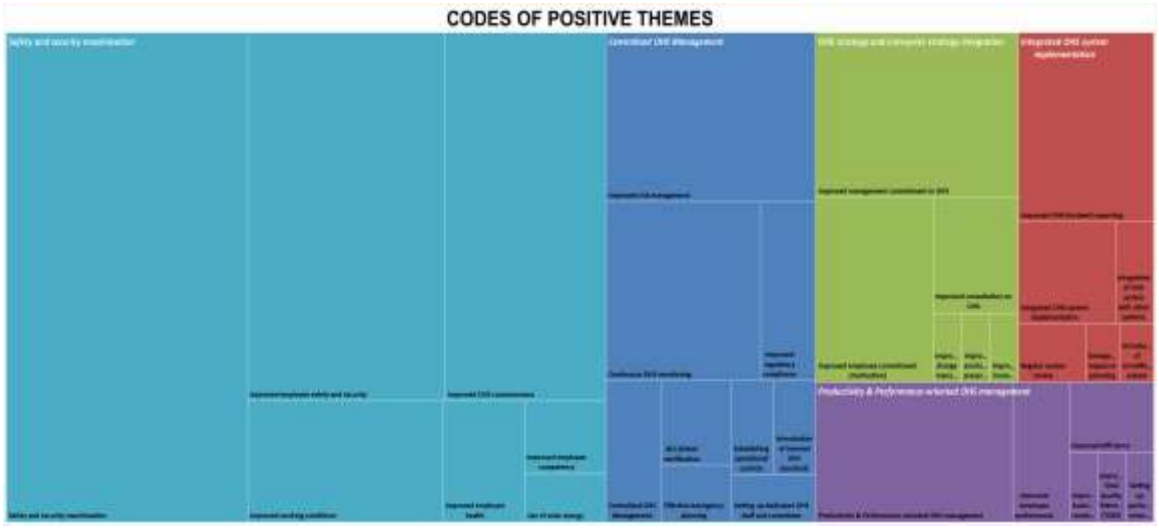


Figure 30 *Codes of Positive Themes*

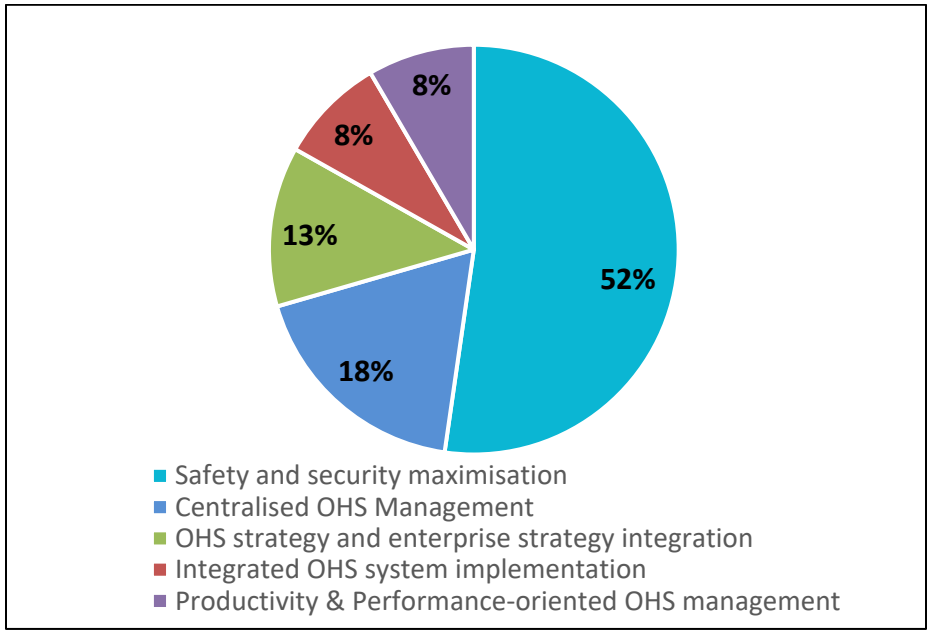


Figure 31 *Positive Themes in Construction Sector*

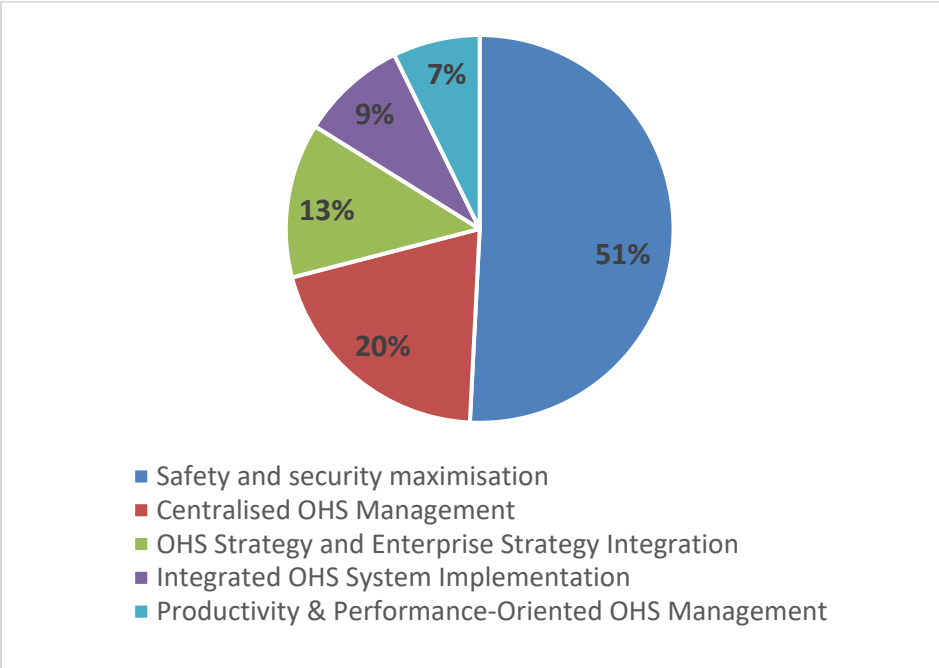
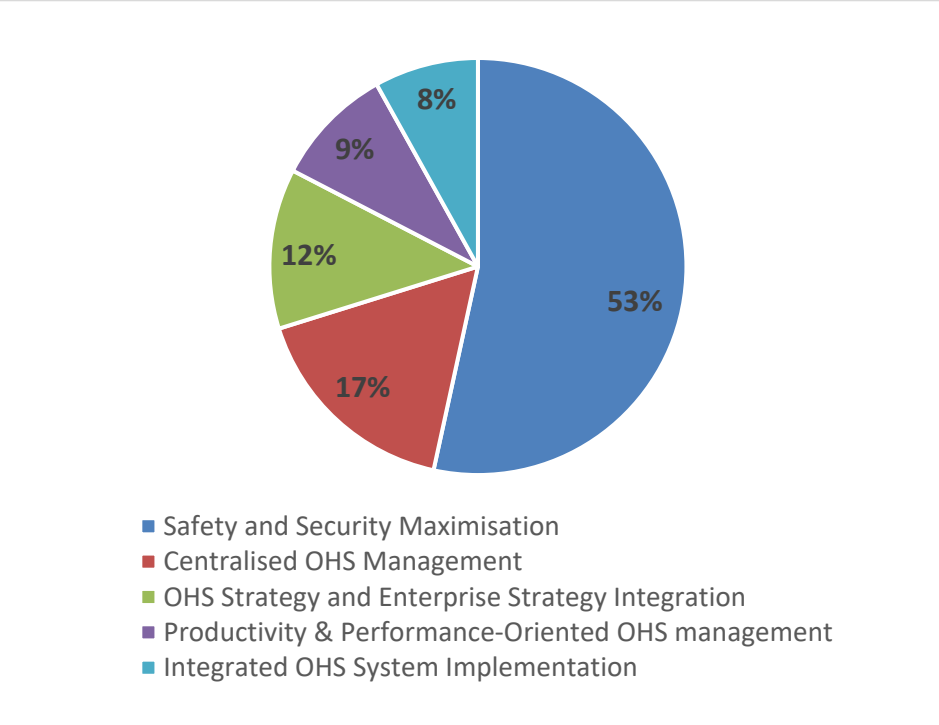


Figure 32 *Positive Themes in Manufacturing Sector*



Positive Theme 1: Safety and Security Maximisation

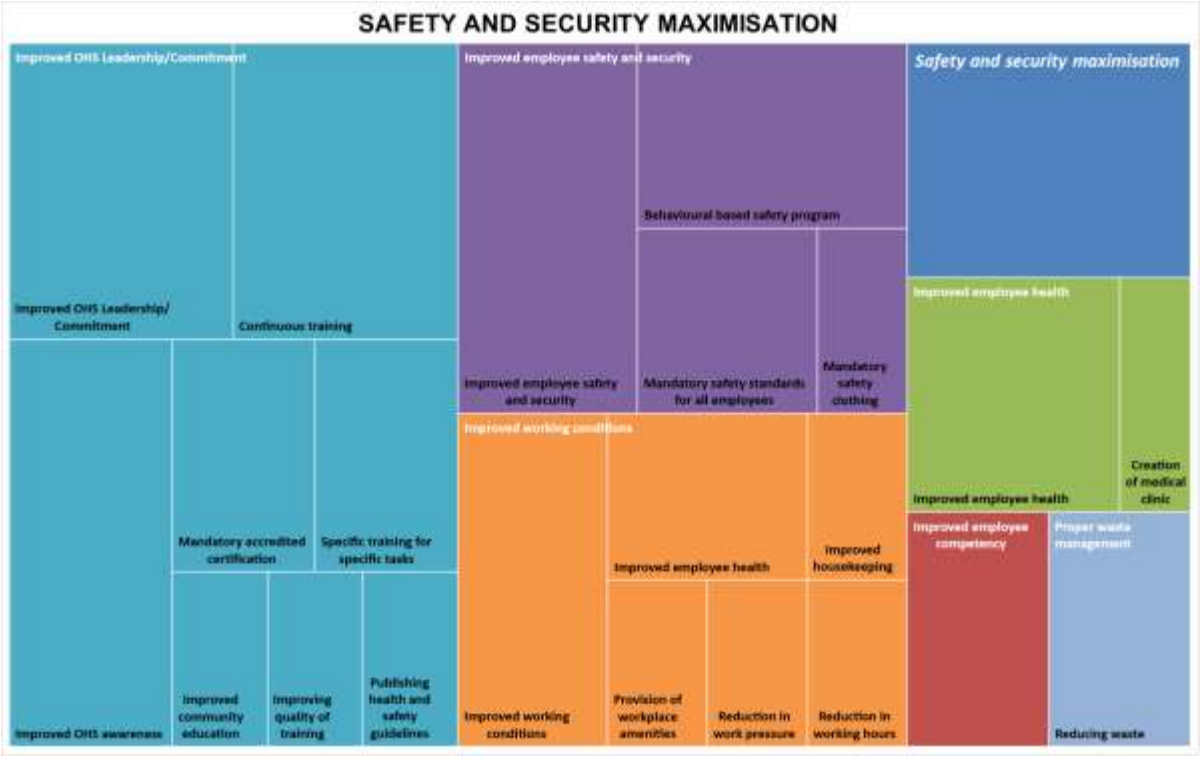
From the analysis above, the major positive theme that should be at the core of implementing the OHSMS is the maximisation of safety and security, as this had the highest number of coding references over other themes. The perceptions of the respondents on "Security" were as a result of their daily work experience and was recorded as it is, even though the security was not covered by the scope of this study, as some of the respondents' companies had Environment or Security embedded with OHS.

As mentioned above, the key theme that was found to be the best for any OHSMS implementation was the need to maximise on the safety and security of the employees. From the review, there were six sub-themes under this main theme (Figure 33), which were: improved OHS Leadership/Commitment, improved working conditions, improved employee safety and security, improved employee health, improved employee competency, proper waste management, and others.

Hohnen and Hasle (2011, pp. 1022-1029) presented that many companies are looking for safe and peaceful work environments, to secure their employees and protect their assets, for which they are investing to have "*an accountable and visible work environment standard".*

The respective hierarchy chart showing the respective coding references for each of the sub-themes is shown in Figure 33 below.

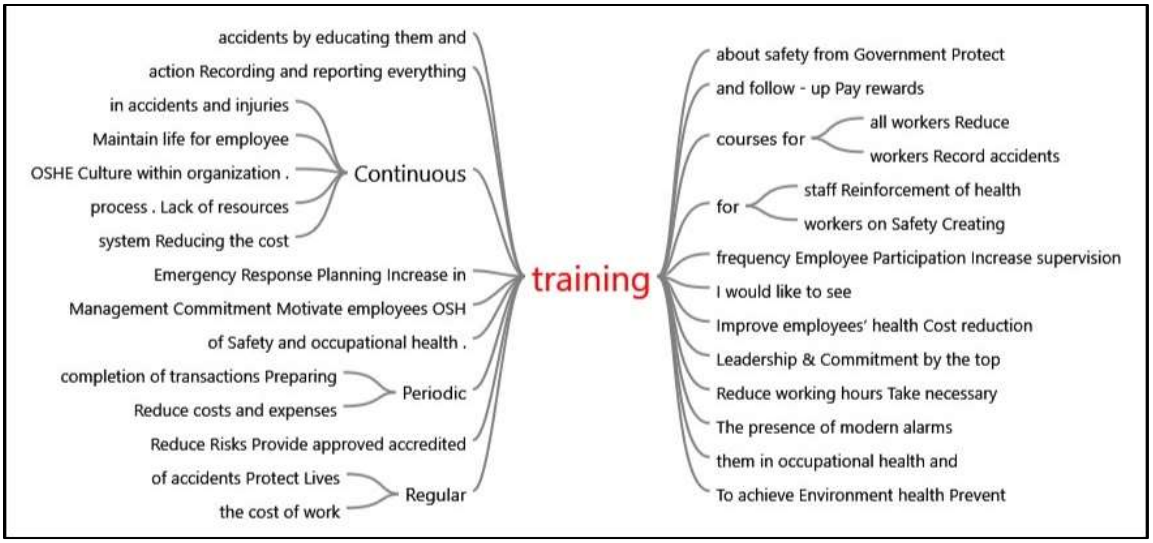
Figure 33 *Hierarchy Chart: Safety and Security Maximisation*



- **Sub-Theme 1: Improved OHS Leadership/Commitment**

Based on the findings illustrated above, the major sub-theme of improved OHS Leadership/Commitment would ensure the maximisation of safety and security. This would be best achieved through continuous employee training and by ensuring their continual participation in new training programmes, attendance in seminars, emergency evacuation trainings and other regular workshops for the employees of different levels which would increase the OHS Leadership/Commitment. The second sub-sub-theme that would ensure the improvement in OHS Leadership/Commitment was the improvement in OHS duty of care, followed by better adherence to the Health and Safety guidelines. To better establish the key theme, word tree analysis was carried out, and the results are presented in Figure 34.

Figure 34 *Word Tree: Improved OHS Leadership/Commitment – Training*



From the results, the aspect of employee training is seen as the most dominant theme on the improvement of safety and reduction of accidents among the workers. A notable aspect of training that emerged from the study was that of the mandatory OHS induction training. This was confirmed by several participants who cited on Table 19

Table 19 *Excerpts on Mandatory OHS Induction Training*

Case	Text
Case 1	All new employees to go for a mandatory orientation program
Case 34	Comprehensive OHS introduction training for new joiners
Case 37	OHS introduction training for new workers who joined the organisation

The other key aspect of training that was pointed out by the participants was a need for mandatory certification from accredited institutions as cited on Table 20.

Table 20 *Excerpts on Mandatory Certification from Accredited Institutions*

Case	Text
Case 314	I hope if there is legislation for Consultant supervision Projects Manager and resident Engineer to obtain at least IGC NEBOSH Certificate prior to Joined any Projects for improving health and safety in the workplace.
Case 315	There should be legislation obliging everyone working in this field to require an accredited certificate in the field of safety and occupational health

Overall, training was considered as the best way to ensure employees improve their OHS Leadership/Commitment, vide the remarks from many participants below on Table 21.

Table 21 *Excerpts on Employees Improve their OHS Leadership/Commitment by Training*

Case	Text
Case 52	We would like to see an increased budget for sending the employees for valuable training externally, which will create more commitment in the employees
Case 103	We try to protect our employees from the expected accidents by educating them and training them in Occupational Health and Safety
Case 126	Provide Health training and programs to the employees.

- **Sub-Theme 2: Improved Employee Safety and Security**

With respect to the second sub-theme, it emerged from the study that there was a strong need to ensure the direct safety and security of the employees, as shown below in Figure 35.

Figure 35 *Word Tree: Improved Employee Safety and Security*

Three sub-sub-themes were established from the data collected that would ensure to reflect sub-theme 2 “Improved Employee Safety and Security”. These include the mandatory personal protective equipment for all employees and as a case in point are the extracts from the participants below in Figure 36 and Table 22.

Figure 36 *Word Tree: Mandatory Personal Protective Equipment (PPE)*

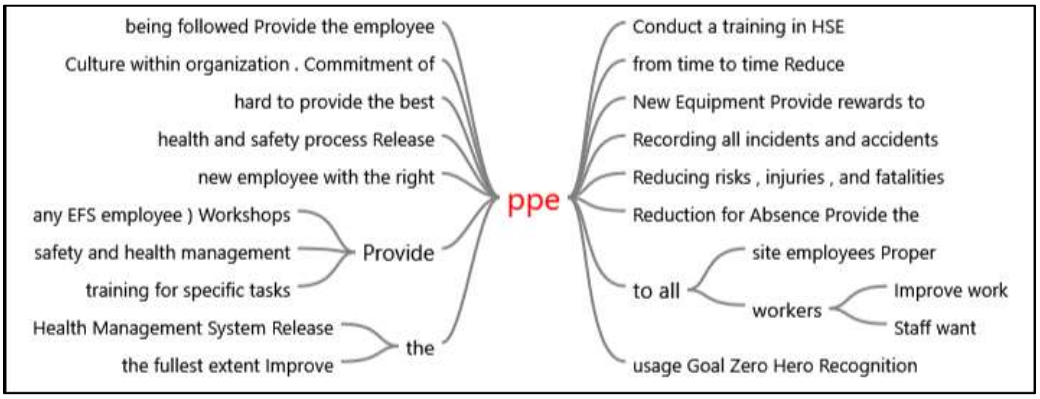


Table 22 *Excerpts on Mandatory Personal Protective Equipment (PPE)*

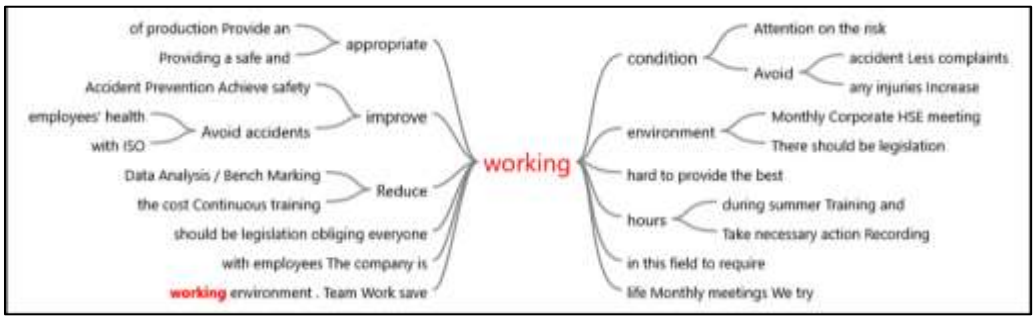
Case	Text
Case 28	The commitment of PPE usage
Case 40	Capital investment plans, e.g. to reconfigure a workplace / Machine / Equipment to manage Hazards and Risks more effectively
Case 131	The company is working hard to provide the best PPE

Apart from safety clothing, the other sub-sub-themes included the mandatory institution and implementation of safety standards, with the last being, to implement behavioural-based safety programmes.

- **Other Sub-Themes**

Other sub-themes derived from the first theme and these included improved working conditions and employee's health. For the improvement in working conditions, the participants cited the need to improve housekeeping, the provision of workplace amenities, the reduction in work pressure and the reduction in working hours, as shown below Figure 37.

Figure 37 *Word Tree: Improvement in Working Conditions*

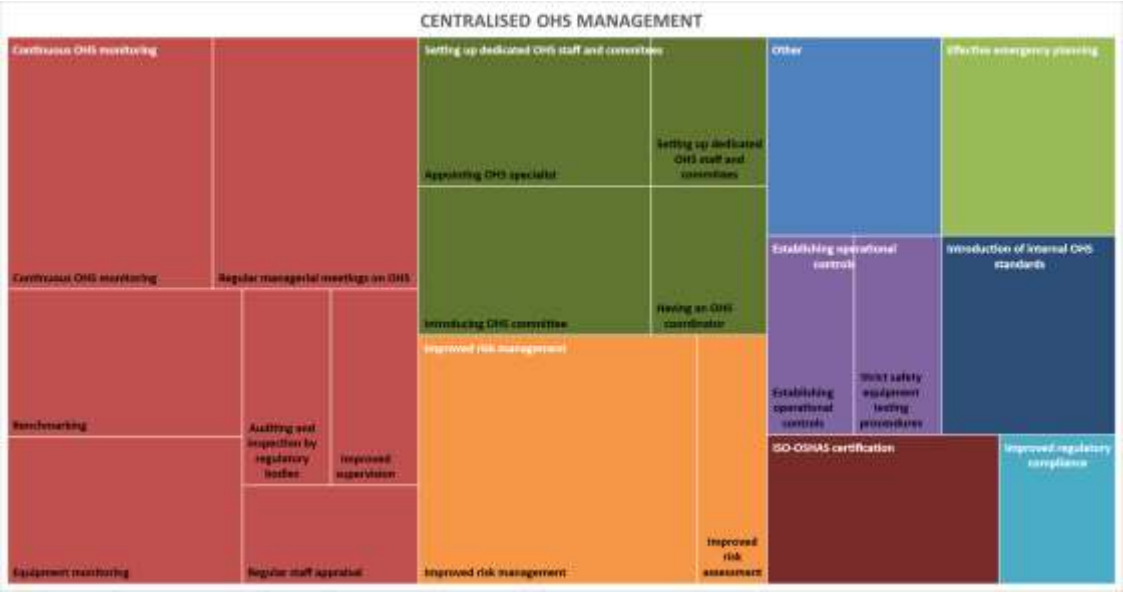


On the other hand, with respect to the improvement of employee health, it emerged that the OHSMS required the provision of medical clinics, continuous medical check-ups and the continuous vaccination of employees along with the provision of first aid.

Positive Theme 2: Centralised OHS Management

The second broader theme that the participants cited as having a strong effect on the efficacy of the OHSMS was the importance of having a centralised OHS management model. The corresponding sub-themes are presented in the hierarchy chart in Figure 38 below.

Figure 38 *Hierarchy Chart: Centralised OHS Management*

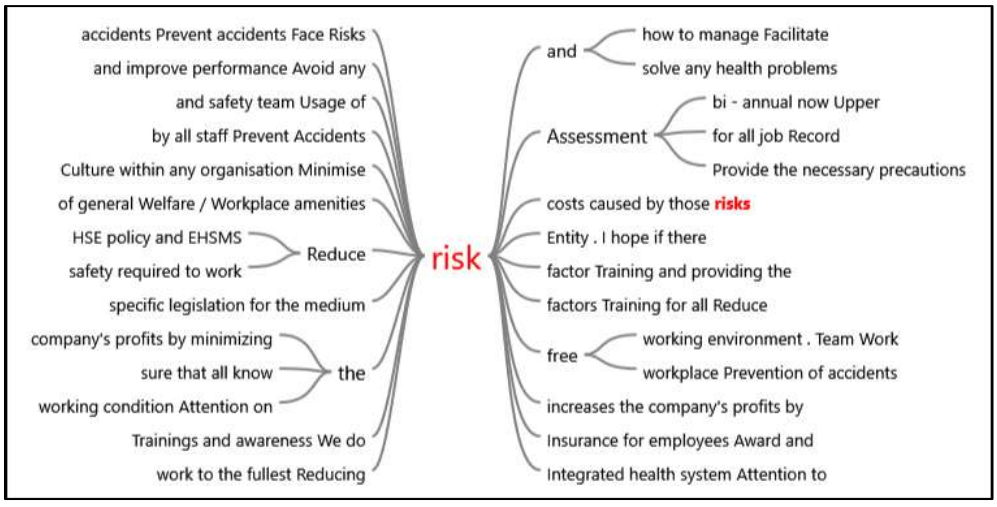


This centralised management can only be achieved from the results above by structuring OHS as a dedicated function in the company. Eight respective sub-themes characterised the centralised OHS management, and these are ordered by the count of cases by the respondents, which are continuous OHS monitoring, setting up dedicated OHS staff and committees, improved risk management, establishing operational controls, ISO-OHSAS certification, effective emergency planning, the introduction of internal OHS standards, as well as following improved regulatory compliance and other.

Kamardeen (2009) indicated in his study, that using new technologies nowadays for organisations in order to mitigate risks and to increase safety measures through monitoring the OHS performance is essential. The importance of using web-based OHS Management Systems, it is the Safety Knowledge Management System, which will work effectively to ensure a centralised management of OHS in the organisations.

The major sub-theme for the theme "Centralised OHS management" was related to the need for continuous OHS monitoring. This would be achieved through self-regulation as well as audits and inspections by regulatory bodies, benchmarking, equipment monitoring, improved supervision, regular managerial meetings on OHS as well as regular staff appraisal.

Figure 39 *Word Tree: Centralised OHS Management and Risk*



From the results, further clarified from the word tree above in Figure 39, the risk mitigation was extracted as the main aspect common among the sub-themes. In other words, the role of centralised OHS management would best serve to manage and minimise Occupational Health and Safety risks. Furthermore, based on the respondents' perception that the risk management was essential, there should be a capital investment which will facilitate profits to the organisation by avoiding the failure cost of safety as cited on Table 23 .

Table 23 *Excerpts on Centralised OHS Management and Risk*

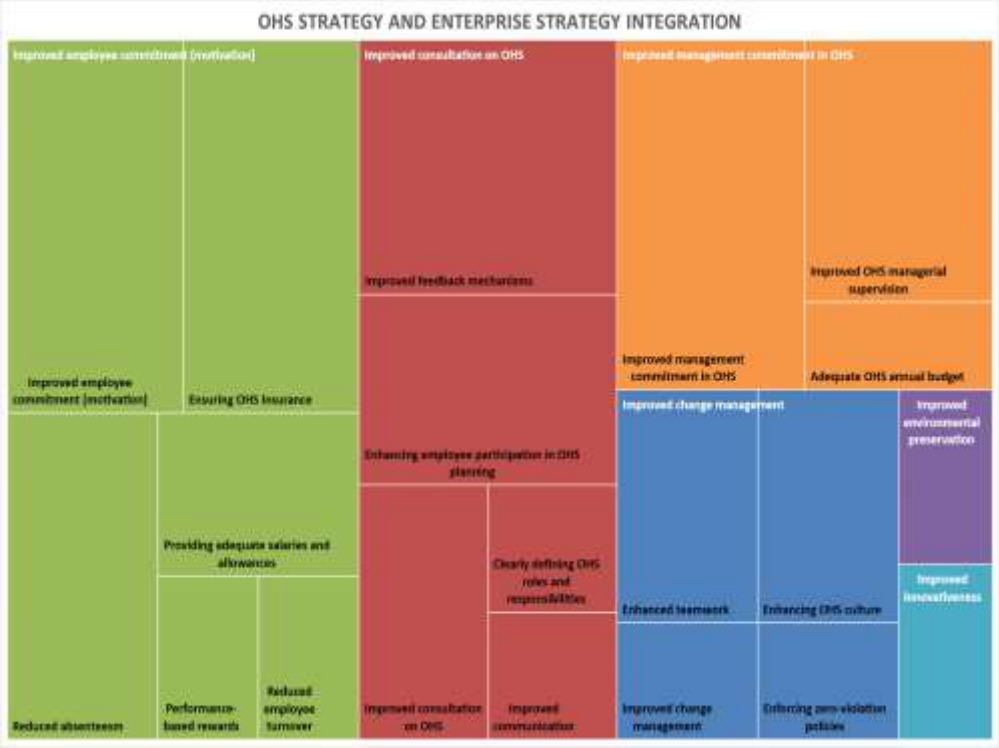
Case	Text
Case 40	Capital investment plans, e.g. to reconfigure a workplace/Machine/Equipment to manage Hazards and Risks more effectively
Case 83	Protect the human element from injuries caused by workplace risks
Case 133	Reducing risk increases the company's profits by minimising the risk costs caused by those risks

More importantly, this continuous assessment would call for a departmentalisation of such efforts. This was evident in the second sub-theme, which entailed the setting up of dedicated OHS staff and committees in the company. This is the unit that would have the mandate to exclusively deal with any OHS related issues and deal with the other sub-themes, that is, effective emergency planning, establishing operational controls, ensuring regulatory compliance, improved risk management and the introduction of internal OHS standards as well as the spearheading of ISO-OHSAS certification.

Positive Theme 3: OHS Strategy and Enterprise Strategy Integration.

The third theme that emerged from the evaluation of the positive aspects of the OHSMS was related to the importance of ensuring that the OHS strategy was well-aligned with the enterprise strategy. The respective sub-themes are presented in Figure 40.

Figure 40 *Hierarchy Chart: OHS Strategy and Enterprise Strategy Integration*



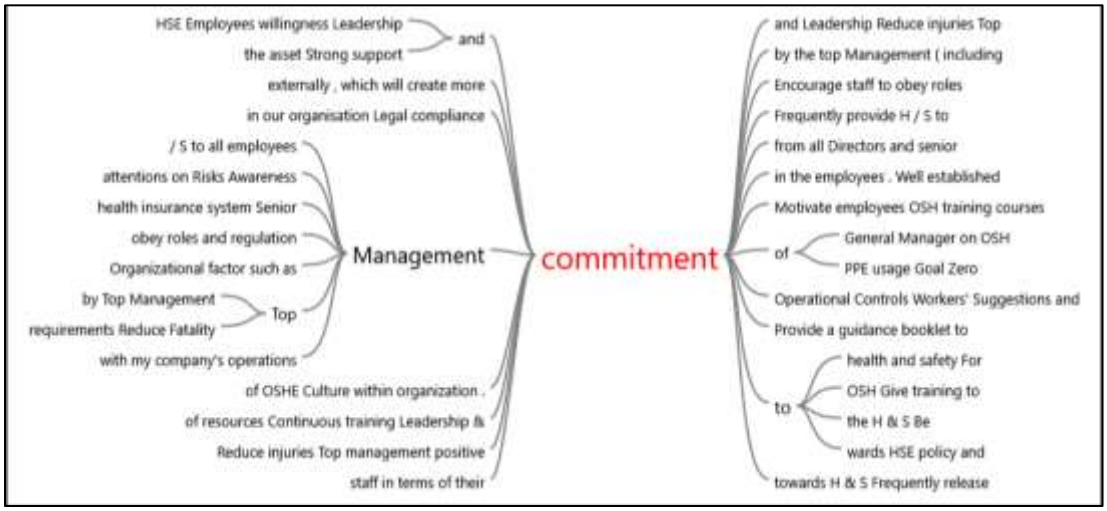
Below are the sub-themes, whose order of importance was based on the count of cases received from the respondents arranged in the descending order:

- Improved employee commitment (motivation).
- Improved consultation on OHS.
- Improved management commitment in OHS.
- Improved change management.
- Improved environmental preservation.
- Improved innovativeness.

Waring (1996, p. 4) concluded that *"Safety strategy is both a formal component of a safety management system and what actually happens in the organisation day by day".*

What is important to note from the above is that all the sub-themes pointed to the role that is played by the management in the successful implementation of OHSMS. The improvement in employee commitment (motivation) results from the management decisions (Figure 41). The improvement in the management commitment in OHS rests upon the management while the improved consultation on OHS is also at the discretion of the management. Considering this, the second sub-theme reveals the need for the management's commitment and the executive's buy-in for the OHS strategy to be integrated with the enterprise strategy. This is illustrated in the word tree below.

Figure 41 *Word Tree: Importance of Management Commitment*



Through management commitment, as shown in Figure 41, it emerged from the results that only with management commitment, OHS Strategy and Enterprise Strategy, can an OHSMS be successfully integrated. The problems affecting the poor implementation of OHSMS revolves around the issue of the budget. An adequate OHS annual budget can be guaranteed through management commitment, and the OHS capital budget can be increased. There could also be an increase in the training budget and employee allowances and incentives.

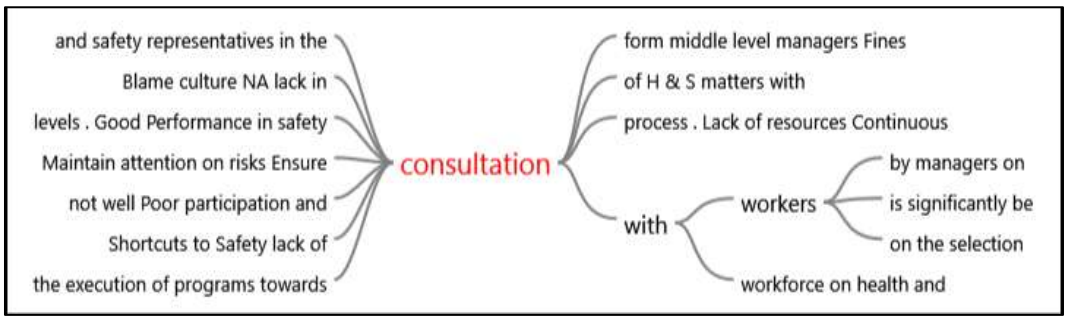
It further emerged from the findings that employees' commitment will be ensured as well if the management ensures the creation of OHS insurance, setting up a health programme, providing adequate salaries and allowances, and offering OHS performance-based rewards. These rewards for the recognition of OHS compliant employees as well as regular incentives for OHS best performers, as reflected from the respondents on Table 24.

Table 24 *Excerpts on Improved employee commitment (motivation)*

Case	Text
Case 23	Responsibilities & accountabilities of all personnel including a manager to the worker should be clearly defined
Case 24	Duties & responsibilities of OHS staff as well as their authorities to be clearly visible in the Health & Safety Manual and organisation should ensure that it is well understood to employees at all levels. Their authority to recommend actions in the event of non-compliance will be supported by top management all times.

Participants also highlighted the significance of ensuring non-managerial employees' consultation regarding OHS, as shown in Figure 42 below.

Figure 42 *Word Tree: Employee Consultation*



As shown in Figure 42, the importance of OHSMS consultation with all employees was brought out by participants from the Emirate of Abu Dhabi, and they cited the need to clearly define the responsibilities for each and every employee.

Table 25 *Excerpts on Integrated OHS System Implementation*

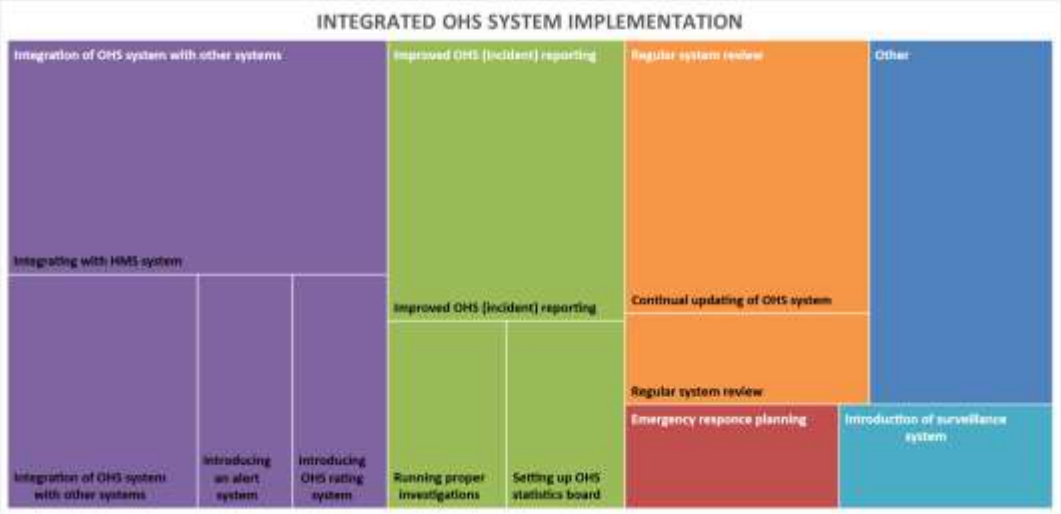
Case	Text
Case 23	Responsibilities & accountabilities of all personnel including a manager to the worker should be clearly defined
Case 24	Duties & responsibilities of OHS staff as well as their authorities to be clearly visible in the Health & Safety Manual and organisation should ensure that it is well understood to employees at all levels. Their authority to recommend actions in the event of non-compliance will be supported by top management all times.
Case 43	Employee participation is the successful key for maintaining a well-organised health& safety management system that can be with the outcome of a reduced level of accidents incidents. OHSMS should be revised with the strong emphasis of the point that the execution of programs towards consultation with workers is significantly be increased in the organisation

Ultimately, the findings show that upon the successful integration of the OHSMS strategy with the corporate strategy, is understood better by every employee, as this was confirmed by several participants who cited on Table 25. The OHSMS system should be adequately budgeted for and fully supported by the management and therefore would be fully appreciated by the employees, who would also be participating in all stages of OHS from planning to execution. Ultimately, employee motivation, morale and commitment would improve, resulting in the reduction of employee turnover and improvement in the working conditions, therefore leading to a successful and an effective implementation of the OHSMS.

Positive Theme 4: Integrated OHS System Implementation.

The fourth broad theme focused on developing an integrated OHS system that would help the OHS function in managing their operations. The respective sub-themes are presented in the hierarchy in Figure 43 below.

Figure 43 *Hierarchy Chart: Integrated OHS System Implementation*



From the illustration, there were five sub-themes extracted, and these were ordered by the count of the cases by the respondents, which are:

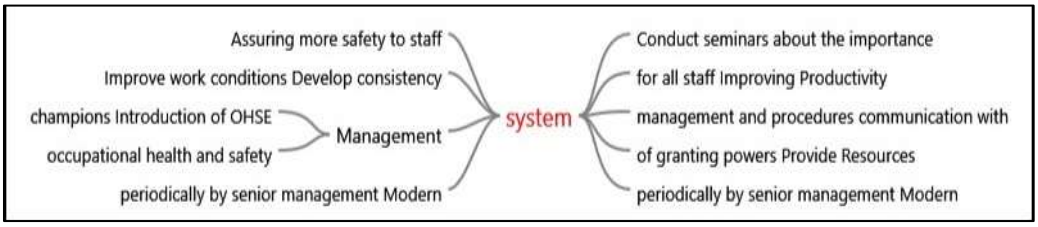
- Integration of the OHS system with other systems.
- Improved OHS (incident) reporting.
- Regular system review.
- Emergency response planning.
- Introduction to the surveillance system.
- Other.

Wilkinson and Dale (1999, pp. 5-11) presented that the integration of Occupational Health Management System and the Safety Management System under one integrated system should be with all the elements and processes in the organisation to ensure the effectiveness in the implementation of the system, in a condition for which they should share the same culture.

From the hierarchy chart, the fourth theme was to integrate the OHS system with other systems. This capability resonated well with the need to integrate OHS strategy with the corporate strategy as it will entail the integration of the system with other business functions. This would require a dedicated unit to be set up that handles OHS. This unit would use the system's capabilities to be able to keep records accurately and in real-time to ensure the correct risk estimates at any time.

In the context of this study, the research participants specified the need for the OHSMS system to be integrated with the other Management Systems such as Environment, Security, etc. (which was not available in a number of companies where the data for the study was collected). This is clear in the word tree in Figure 44 below.

Figure 44 *Word Tree: Integrated OHS System Implementation*



The second sub-theme established that the OHS system's implementation would ensure improved OHS (incident) reporting. This would, in turn, help in preventing future similar incidents from occurring. Participant stated on Table 26 below.

Table 26 *Excerpts on Integrated OHS System Implementation*

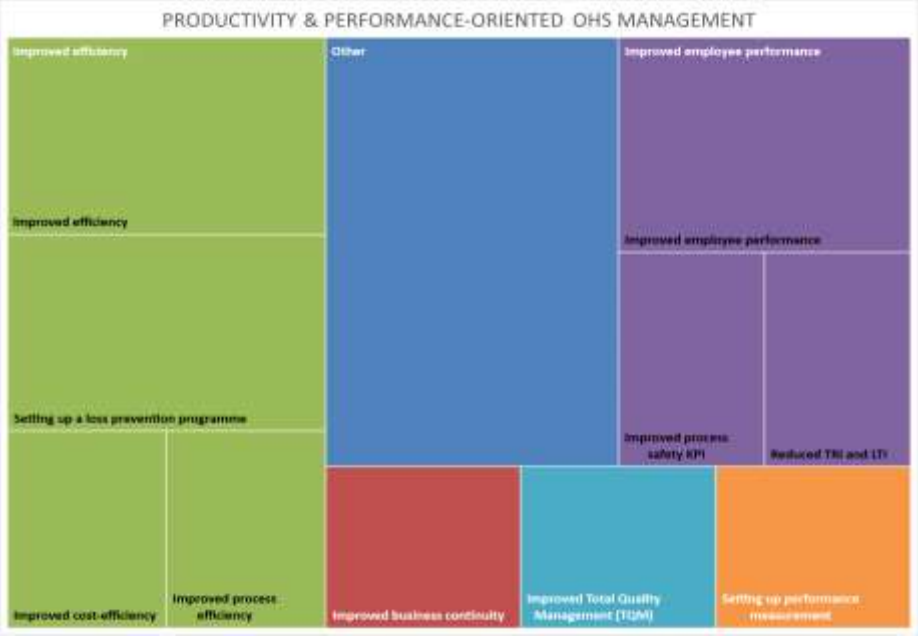
Case	Text
Case 157	Record all accidents and do the necessary action to prevent it
Case 161	Records all accidents and do the necessary to prevent the occurrence
Case 170	Record accidents and prepare awareness session about it

In light of this, it is clear that having a well-documented OHS system would serve the great purpose of facilitating the archiving and retrieval of OHS-related incident circumstances. This will help in the prevention of incidents by reviewing the system regularly.

Positive Theme 5: Productivity and Performance-Oriented OHS Management

The fifth major theme on the positive aspects that facilitate the OHSMS's efficacy was that the system was supposed to be productivity and performance oriented. The key sub-themes are presented in Figure 45.

Figure 45 *Hierarchy Chart: Productivity and Performance Oriented OHS*



There were five key sub-themes, and are in the order of the count of cases from the respondents which were improved efficiency, improved employee performance, improved business continuity, improved Total Quality Management (TQM), the setting up of performance measurement, and others. Any OHSMS system ensured that the OHSMS performance parameters are proactively planned with due consideration for the efficiency in the process and for the people, in line with Nawwas et al. (2017, pp. 3768-3769) indicated the importance of implementing the Occupational Health and Safety Management System in the organisations, as it ensures a safe work environment, It also increases employee productivity, improves their performance, and ensures product and efficiency of production lines, as well as striving to reduce incidents and injuries at

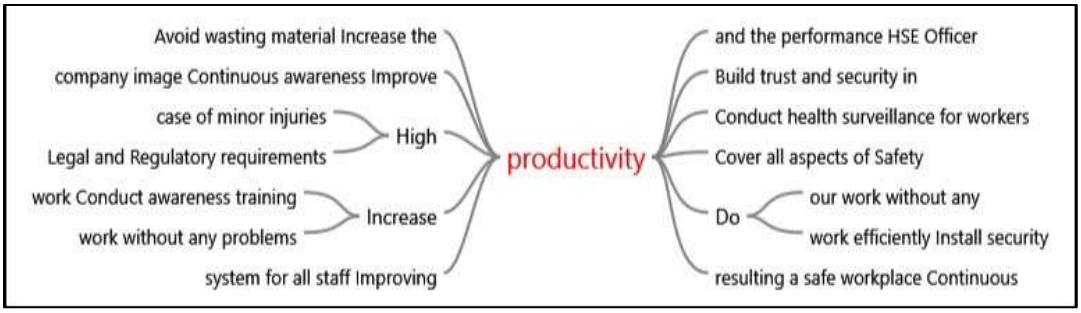
work and occupational risks and in the end protect corporate assets, this was confirmed by several participants who cited on Table 27.

Table 27 *Excerpts on Productivity and Performance-oriented OHS.*

Case	Text
Case 240	Continuous business activity and increased productivity
Case 299	High productivity resulting in a safe workplace

The corresponding word-tree is presented in Figure 46 below.

Figure 46 *Word Tree: Productivity and Performance-oriented OHS.*

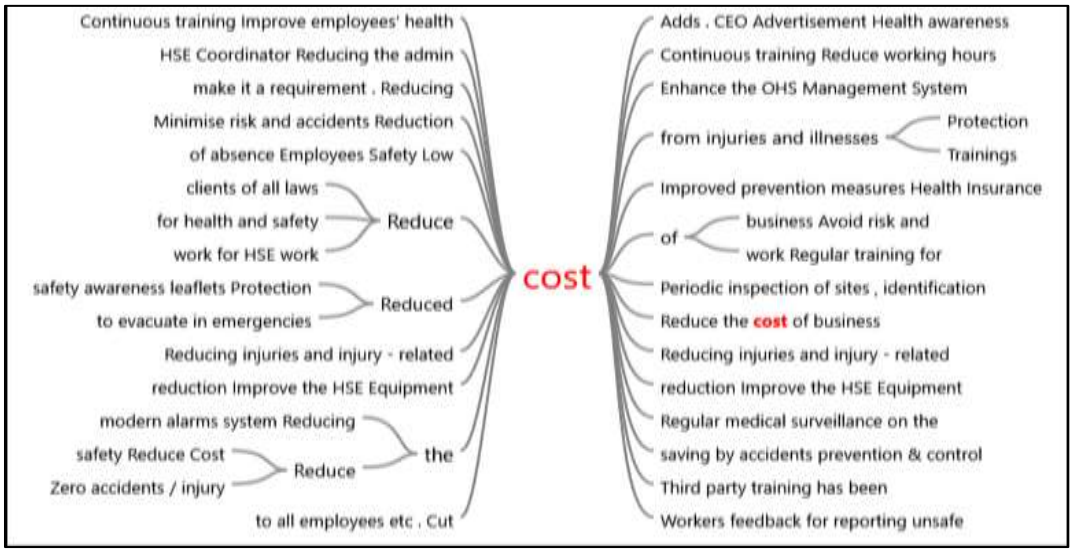


Cost is an aspect that is very important to address in the system as this emerged as one of the principal factors affecting the efficacy of OHS implementations. The data showed that this could be achieved by setting up a loss prevention programme. Through regular supervision and monitoring, the implementing company would realise net gains as a result of the reduction in medical costs from OHS incidents, as well as the reduced compensation costs. There would be an increased employee performance owing to the reduced Total Recordable Injuries (TRI) and Lost Time Injury (LTI), along with enhanced staff OHS awareness as shown in Figure 47.

Figure 47 *Word Tree: OHSMS and Performance*

From the analysis, the issue of cost reduction is evident, along with the issue of improving productivity. In other words, any OHSMS should be anchored on these two fundamentals. The cost aspect is further explored in Figure 48.

Figure 48 *Word Tree: OHSMS and Cost Efficiency*



OHS cost and performance was confirmed by several participants who cited on Table 28.

Table 28 *Excerpts on OHS Cost and performance*

Case	Text
Case 133	The imposition of fines High Reducing risk increases the company's profits by minimising the risk costs caused by those
Case 225	Continuous Increase the productivity and the performance

4.2.3.4. Summary of the Positive Themes

From the respondents, the top five positive aspects reported were: Safety and Security Maximisation, OHS Strategy and the Enterprise Strategy linkage, Centralised OHS Management, Integrated OHS system and productivity and performance oriented OHS management. Under each of these aspects, the themes and their hierarchy was represented in Figure 33, Figure 38, Figure 40, Figure 43, and Figure 45, respectively.

a) The theme "Safety and Security Maximisation" is comprised of the top three sub-themes, namely, the Improved OHS Leadership/Commitment, Improved OHS Awareness and Continuous Training.

b) The theme, "OHS Strategy and the Enterprise Strategy" is comprised of the three sub-themes, namely, Improved employee commitment, Improved management commitment and the Improved consultation on OHS.

c) The theme, "Centralised OHS Management" is comprised of the three subthemes: Improved Risk Management, Continuous OHS monitoring and Regular management meeting.

d) The theme of "the integrated OHS System" is comprised of the three sub-themes: the Integration of the OHS with the other systems improved OHS reporting and the regular system review.

e) The theme on the Productivity and Performance-oriented OHS Management is comprised of the two sub-themes, namely, Improved Efficiency, and improved employee performance, and others.

II. The Main Survey Questionnaire (Government Entities Respondents)

The survey's question number 66 asked *"What, in your opinion, should be done to improve the Health and Safety culture in the workplace?"* was formulated and designed for the government participants, out of which there were 16 respondents. All these answers are analysed using NVivo.

Thematic Analysis

According to Figure 49 and Table 29, there were four main themes (in total code count in descending order) as follows: culture and awareness, control and internal improvement, laws and implementation and strategic planning. Table 30 shows that the sub-themes frequency results indicate that culture and awareness is the most often suggested strategy by all respondents. Moreover, compliance with the legal laws and standards are the second suggested by the respondents.

Figure 49 *Main Theme*

Table 29 *Main Themes, Sub-Theme*

Main Themes	Sub-Theme
Culture and Awareness	Awareness, Culture, Motivation
Laws and Implementation	Legal obligation and Compliance
	Rewards and Punishments
Control and Internal Improvement	Training and Workshops
	Audit and Control
Strategic Planning	Budget, Goals, Policy

Table 30 *Sub-Theme and Frequency*

Sub-Theme	Sub-Theme count	% Sub-Theme
Awareness, Culture, Motivation	13	31%
Legal, Legislation, Law, Standards, and Compliance	9	21%
Training, Workshops, Courses, School and Campaign	6	14%
Budget, Goals and Policy	6	14%
Audit, Inspection and Control	4	10%
Rewards, Fines, Enforcement, and Punishments	4	10%

a. Culture and Awareness

Respondents as per Table 31 below indicated that culture and awareness is essential and is required to be included to the staff induction. Training needs to spread awareness via, training, campaigns, and courses for the employees, while others emphasised using different means such

as films, pictures, or other types of media to make the workers aware of the Health and Safety hazards in their work (Case 7). Moreover, one of the respondents even went on to describe the need for awareness in the government institutions and the OHS regulatory framework (Case 9). In addition, another individual highlighted that the main reason for the ineffective implementation of OHS within the organisations of UAE was the existence of a mixed culture of employees with different nationalities (Case 14).

Similar kinds of findings were discovered by Budhathoki et al. (2014), who concluded there was a high significance to the awareness of the Occupational Health and Safety hazards and the use of safety measures among all levels of workers.

Table 31 *Excerpts on Culture and Awareness*

Case	Related Text
Case 4	Spreading culture and the importance of Occupational Health and Safety, and the desired benefit.
Case 7	Continuing awareness of Occupational Health and Safety issues and focusing on entities leaders
Case 9	Increase awareness in government institutions
Case 13	Seminars and awareness sessions on the regulatory framework for Occupational Health and Safety
Case 13	Develop awareness programs for all groups of society (children, women and people with special needs)
Case 14	The mixed culture of the community (a mixture of nationalities and a large disparity in cultural levels) is the main obstacle to any effective implementation of the Occupational Health and Safety programs and management system in the Emirate

Word tree analysis was carried out in relation to "Culture" and "Awareness", and the results are presented in Figure 50 and Figure 51, respectively.

Figure 50 *Word Tree: Culture*

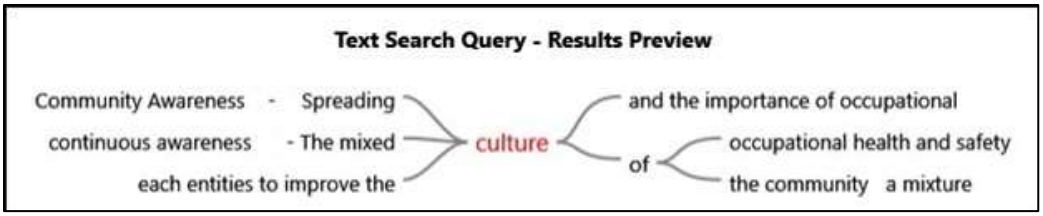
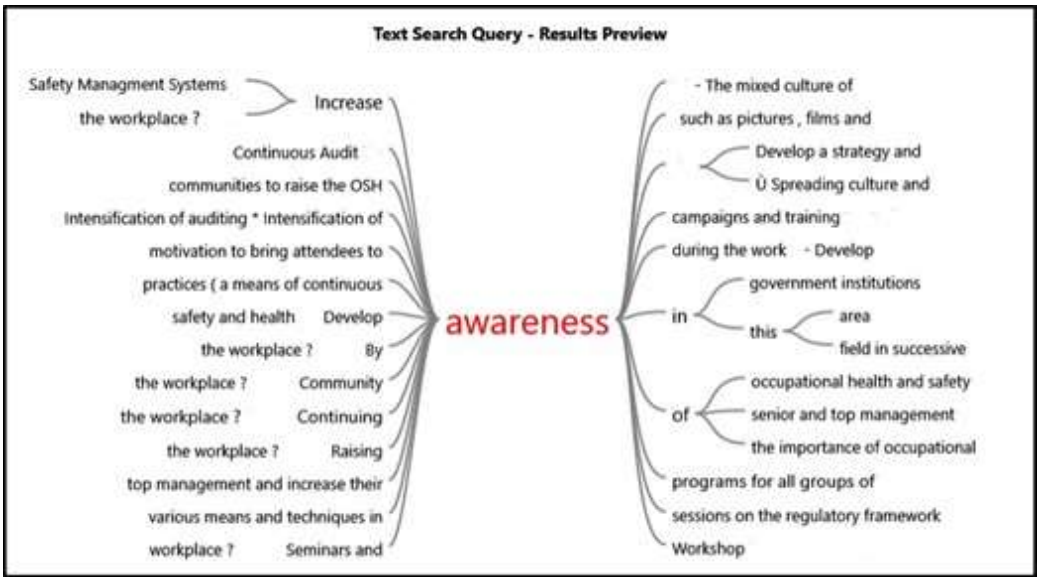


Figure 51 *Word Tree: Awareness*



b. Laws and Implementation

1. Legal Obligation and Compliance

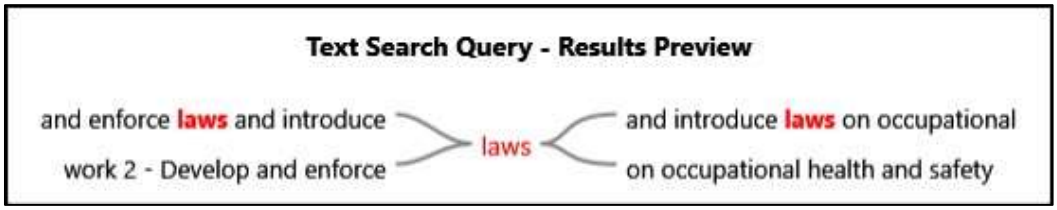
Five respondents whose answers are shown in Table 32, indicated that improvement in the OHS Culture requires the firms in the United Arab Emirates to strictly comply with the legal standards and implement all of the OHS procedures and to review periodically (Case 5). Furthermore, they also highlighted the need for modernising the legislation (Case 6), developing and adopting the national policy for the OHS management (Case 15) and complying with the federal UAE OHS Act/Law (Case 16). According to Khoja (2018), compliance with the legal standards and regulation is crucial for the companies in the GCC. She also added an effective evaluation of the employers in relation to their compliance with the laws within their organisation as demonstrated below.

Table 32 *Excerpts on Legal Obligation and Compliance*

Case	Text
Case 5	Compliance with Occupational Safety and Health standards and legislation, and the implementation, with periodic review of procedures
Case 6	Modernise the legislation with realism and professionalism
Case 8	Adoption of relevant standards
Case 15	Developing a national policy for the management of Occupational Health and Safety to unify the efforts at the state level, concepts and standards, and the development of electronic systems to provide the necessary data and statistics for the development of the field
Case 16	Also, should have federal UAE OHS Act / Law.

Word tree analysis was carried out about "Laws"; the results are illustrated in Figure 52.

Figure 52 *Word Tree: Laws*



2. Rewards and Punishments

Three of the respondents referenced in Table 33 below also spoke about the inclusion of strategies and policies related to the rewards and incentive mechanisms for evading any violation (Case 2). On the other hand, one of them indicated that the imposition of fines (Case 1) would also help in improving the Occupational Health and Safety System in the country. According to Goh (2018), this sort of approach to enhance the performance of the OHS system is highly recommended as the imposition of any kind of punishment would prevent the workers from not following any of the prescribed guidelines and safety measures, while giving rewards and incentive encourage them to increase their productivity by ensuring their own safety.

Table 33 *Excerpts on Reward and Punishment*

Case	Text
Case 1	Imposition of fines
Case 2	Activating the enforcement mechanism and violations
Case 13	Incentives and Rewards through Awards

c. Control and Internal Improvement

1. Training and Workshops

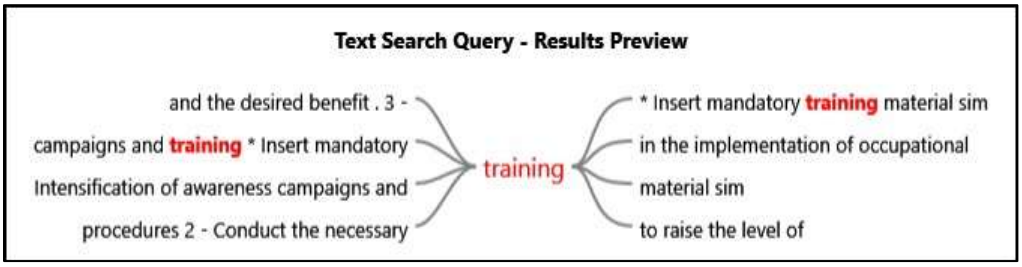
It has been identified that the most recommended item for the improvement of the Occupational Health and Safety culture in the United Arab Emirates, was the trainings and workshops. Some of the respondents as per Table 34, reflected the need for mandatory training materials (Case 1), while others reflected the continuity of such programs to enhance awareness (Case 7 and Case 9) for, not only the workers on site but also the senior and top management (Case 10) related to the firms' Occupational Health and Safety System. According to Newgass (2018), training in Occupational Health and Safety is not something outstanding, but it is now regarded as a necessary investment for all kinds of businesses. They support this statement by adding that firms are now seeing these trainings and workshops as a way for improvement in the efficiency of their establishment, as the workers at the site may feel safer and healthier, leading them to become more productive.

Table 34 *Excerpts on Training and Workshop*

Case	Text
Case 1	Intensification of awareness campaigns and training.
Case 1	Insert mandatory training material.
Case 4	Training in the implementation of Occupational Health and Safety.
Case 5	Conduct the necessary training to raise the level of Occupational Health and Safety and efficiency.
Case 7	Continuing awareness of Occupational Health and Safety issues and focusing on entities leaders.
Case 9	Conduct courses for employees on a yearly basis.
Case 10	Intensify the courses offered to senior and top management and increase their awareness of the importance of Occupational Health and Safety.
Case 16	Need to do more OHS campaign across all industry sectors and communities to raise the OHS Awareness

Word tree analysis was carried out about "Training"; the results are illustrated in Figure 53.

Figure 53 *Word Tree: Training*



2. Audit and Control

Another theme related to internal improvement was audit and control. Three of the 16 individuals who were surveyed and included in Table 35, emphasised that the supervision and inspection (Case 2), and audit and inspection of the site by the competent authorities (Case 1 and Case 2), will effectively help in controlling and preventing any sort of Health and Safety hazards.

Bigelow and Robson (2005) emphasised that the OHS auditing mainly helps in assessing the compliance and verification of conformance to the built guidelines and practices in the Occupational Health and Safety System. These audits are considered to be a highly important

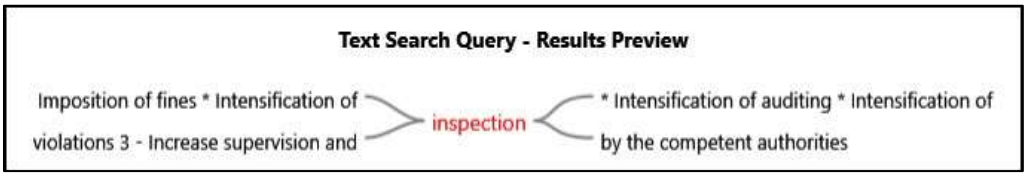
tool as they help the OHS to mature and become integrated with different modern quality initiatives, which is in line with respondent perception (Case 8).

Table 35 *Excerpts on Audit and Control*

Case	Text
Case 1	Intensification of inspection
Case 2	Increase supervision and inspection by the competent authorities
Case 8	Continuous Audit

Word tree analysis was carried out on "Inspection"; the results are presented in Figure 54.

Figure 54 *Word Tree: Inspection*



d. Strategic Planning

Under the main theme of strategic planning, sub-themes were identified as Budget, Goals and Policy. The overall findings from the text retrieval, as per Table 36, indicated that there is a need for a national policy (Case 15) related to OHS management, internal policies related to motivation (Case 7), and continuous efforts to implement the same and to control their implementation within the organisation. Moreover, one of the respondents reflected the need for setting both Health and Safety goals, while one of them highlighted the importance of setting budgets for the effective implementation of the Occupational Health and Safety Management Systems (Case 11). Quinlan et al. (2010) also depicted the need for establishing specific goals and objectives related to the Occupational Health and Safety System for setting certain expectations from the managers, workers, and supervisors for the program. Furthermore, the emphasis was also put on the problems of due to insufficient budgets for this aspect of the operation, which ultimately hinders the productivity of the companies.

Table 36 *Excerpts on Budget, Goals, Policy*

Case	Text
Case 7	The use of various means and techniques in awareness, such as pictures, films, and others, in addition to the policy of motivation to bring attendees to awareness programs
Case 11	Providing budgets to support the implementation of Occupational Health and Safety Management Systems
Case 12	Compelling entities to set Health and Safety goals and dropping these goals to senior management and executive directors
Case 15	Developing a national policy for the management of Occupational Health and Safety to unify the efforts at the state level, concepts and standards, and the development of electronic systems to provide the necessary data and statistics for the development of the field
Case 16	Should have UAE National OHS Policy and program along with Federal (National OHS Board / Committee) to follow up and monitor the implementation.

Word tree analysis was carried out about "Goals" and "Policy"; the results are presented in Figure 55 and Figure 56, respectively.

Figure 55 *Word Tree: Goals*

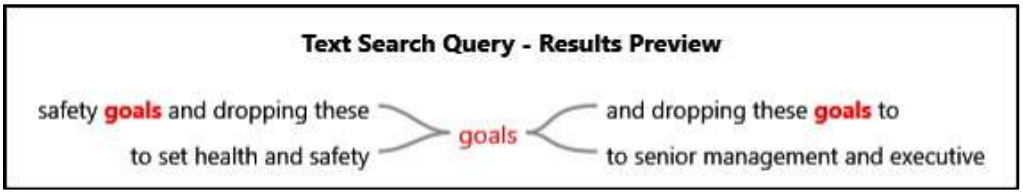
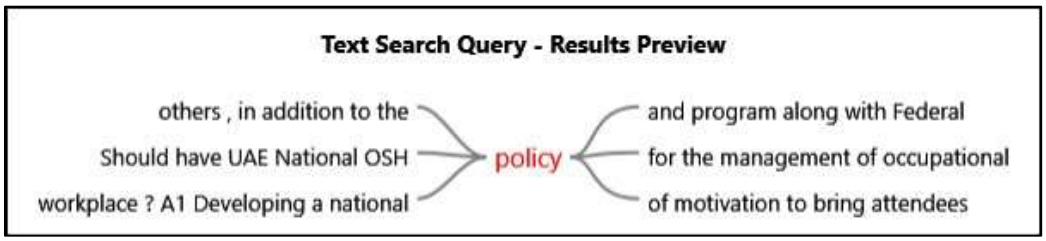


Figure 56 *Word Tree: Policy*



4.2.4. The Summary of Findings (Respondents from Government Entities)

This thematic analysis aimed to identify different recommendations for the improvement and enhancement in the OHS Culture within companies in the United Arab Emirates. As mentioned above, the findings highlighted the need for changes within different aspects of an operation for ensuring positive results. One of the respondents revealed that the most prominent obstacle in the implementation of this system is the mixed culture within the organisation, which was in line with the responses received in relation to mainly four aspects including control and internal improvement, culture and awareness, laws and implementation and strategic planning. However, more emphasis was put on the need for promoting Health and Safety awareness among the workers, managers and top-level management. Furthermore, trainings and workshops were found as an effective way of improving the culture of the OHS system in the country. Other responses from the participants of this study gave high importance to legal compliance, audit and inspection and incentives and punishment policies for ensuring effective implementation of the OHS system.

The responses obtained from the respondents from the government entities, as depicted in Table 30, had the top 3 supported sub-themes, as below:

- Awareness, culture, and motivation, 31%.
- Legal obligation and compliance 21%.

- Budget, Goals, Policy 14%.

4.2.5. Qualitative Data Analysis from Site Visit Interviews

This research involved a site interview conducted with the leaders or key professionals from 13 companies by the researcher, using a structured and pre-approved format by the Ethical Committee of Aston University (Refer to 5)). The interviews were conducted face-to-face by explaining and asking the questions.

Based on the data of 13 site visit interviews, all of these answers were analysed using NVivo, the following main themes and sub-themes were identified as per the number of codes count, shown below in Figure 57 and Table 37.

Figure 57 *Themes and Sub-Themes*

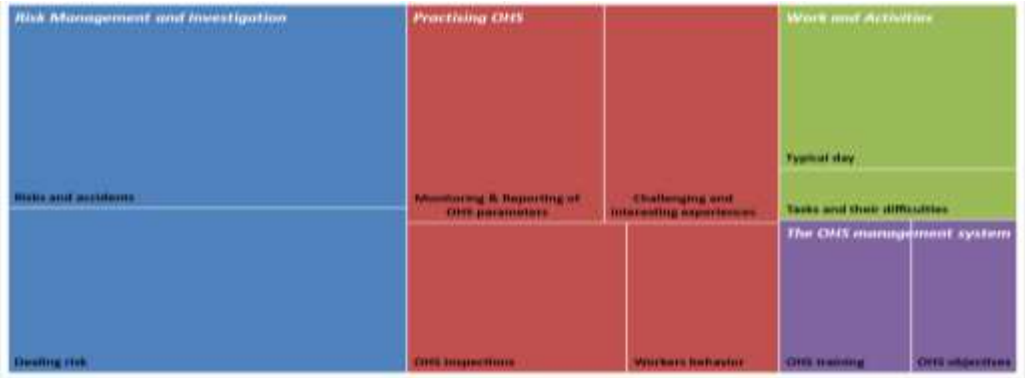


Table 37 *Main Themes and Sub-Themes*

Main themes	Sub-Themes
Risk Management and Investigation	Risks and accidents
	Dealing risk
Practising OHS	Monitoring and reporting of OHS parameters
	Challenging and interesting experiences
	OHS inspections
	Workers behaviour
Work and Activities	Tasks and their difficulties
	Typical day
The OHS Management System	OHS training
	OHS objectives

According to Table 37, a total of four main themes were identified based on the given sub-themes. The four main themes are (According to the codes count in descending order): Risk management and investigation, practising Occupational Health and Safety, work and activities, and The OHS Management System. The table reveals that risks and accidents and dealing with the risks is a major part of the discussion, followed by monitoring the OHS parameters. Table 38 below illustrates the distribution of sub-themes and cases within the interview responses.

Table 38 *Sub-Themes and Frequency*

Sub-Themes	Sub-Themes count	% Sub-Themes
Risks and accidents	121	22%
Dealing risk	98	18%
Monitoring & reporting of OHS parameters	64	12%
Typical day	58	10%
Challenging and interesting experiences	57	10%
OHS inspections	49	9%
Workers behaviour	34	6%
OHS training	30	5%
OHS objectives	24	4%
Tasks and their difficulties	18	3%

a. Risk Management and Investigation

In the Construction and the Manufacturing sectors, a greater focus on risk management and investigation is required as a number of risks are associated with the work as per Table 39, such as handling hazardous substances and chemicals. According to one of the respondents, major risks include Ergonomic Hazards and Fatigue due to frequent driving around projects (Case 3). Moreover, heavy lifting operations, chemical handling, usage of highly explosive gas cylinders, concrete cutting operations, electrocution, fire hazards, falling objects, failure of lifting equipment etc. are the major risks associated with the work. These risks may cause incidents such as falling from high scaffolding or catching fire due to welding activities (Case 6). Other forms of accidents may include collisions/toppling of vehicles since there is large vehicle movements on uneven

surfaces (Case 7). Word tree analysis was carried out on "Risk", and the results are presented in Figure 58.

Figure 58 *Word Tree: Risk*

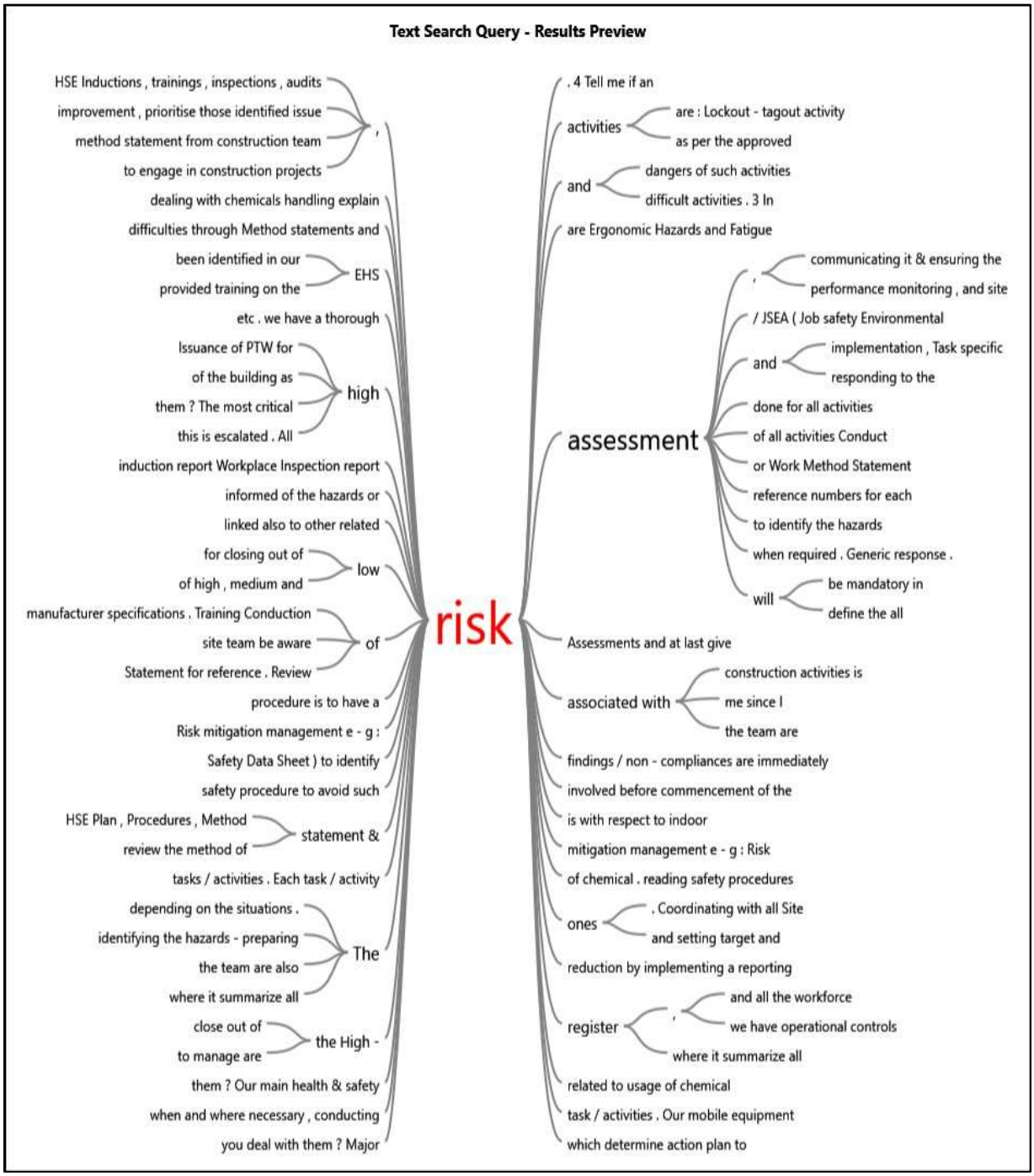


Table 39 *Excerpts on Risks and Accidents*

Case	Text
Case 3	Major Risks are Ergonomic Hazards and Fatigue due to frequent driving around each project. I mitigate the Ergonomic hazard by providing myself with a better work station which is more convenient. Taking much frequent rest during every road and site visit helps to reduce the fatigue and restlessness.
Case 6	From my point of view, we consider failing down from high scaffolding or catching fire due to welding activities works are the most risky. We do consider all safety procedure to avoid such risk.
Case 7	The risks associated with my works are collisions/toppling of vehicles due to a huge number of vehicular movement on an uneven surface. We developed site-based traffic management plan avoiding unnecessary reversing policy, speed limit and has control by signboard, required location, humped have been provided directional safety signboard are in place to avoid collisions, toppling or any vehicle accident.
Case 8	There are a number of risks associated in my workstation e-g: Excavation work, Plant and Equipment's movements, lifting operation activates and vice versa.
Case 9	There are a lot of risks in the Construction industry, but major risks are falling from a height, fire, electrocution, cave-in (excavation).
Case 11	Risks are likely to be strategic, compliance and operational risks associated within the industry.
Case 12	The most critical high-risk activities are Lockout-Tagout activity, confined space entry, working on live electricity.

For management and dealing with risks and accidents, the respondents OHS managers have highlighted the use of OHS practices and the implementation of OHS procedures at the site. It is believed that as OHS personnel, the primary role should be the implementation of an incident management procedure (Case 12). To avoid further damage or injuries, it is recommended to preserve the scene of the accident. The prerequisite for a professional incident investigation was a timely notification to the authority concerned, such as the client/sector regulatory authority (SRA) (Case 7).

Moreover, it is also essential to lead incident investigation and identify the root cause to avoid such future accidents. For ensuring the Health and Safety Management Systems (HSMS) are in place, planning and implementation of control measures are important, according to Arezes (2017). Organisations within the sector carry out continuous monitoring, inspections, regular meetings, and trainings (Case 9). The following excerpts further elaborate on how the organisations deal with risks and incidents, as presented in Table 40.

Table 40 *Excerpts on Dealing Risk*

Case	Text
Case 7	Incident/accident initial notification to be prepared and send to SRA/client and details investigation reports to be submitted within the prescribed time.
Case 9	There are a lot of risks in the Construction industry, but major risks are falling from a height, fire, electrocution, cave-in (excavation). We deal with continuous monitoring, inspections, PTW system, regular TBT, meetings and training.
Case 10	Being an OHS Professional, in the event of an accident, coordinate with ERT Lead, provide assistance to control the situation as well as assistance to legal authorities in regard to accident investigation if applicable.
Case 11	A proper study, plan and monitoring system were effectively implemented for continual improvement.
Case 12	Our team has been provided training on the EHS risk register, and all the workforce is aware of the hazards & risks in their area of work. Regular audits are conducted on specific operational control procedures.

b. Practising OHS

1. Monitoring of OHS Parameters

Pouliakas and Theodossiou (2010, pp. 15-16) presented that, in order to implement a proper preventive action to reduce the incidents and reduce the risks, a monitoring system should be applied, to ensure that all the processes have been done as per the approved procedures.

The OHS professionals could identify a number of issues relating to Health and Safety, which include noise, chemicals, occupational air quality, and fire, as per Table 41. The firms have annual monitoring of occupation noise and monitored the indoor air quality on a daily basis using specific monitoring instruments. Monitoring was also performed via a mobile app sound meter (Case 3). It was found that air quality is measured using a visual monitor.

Moreover, priority should be given to injuries (if any). For chemicals, it is found that a chemical Material Safety Data Sheet (MSDS) is useful, followed by aligning the supply chain with the Manufacturing specifications (Case 4). Training for chemicals handling is also considered as a crucial requirement.

Table 41 *Excerpts on Noise, Chemicals, Air Quality and Fire*

Case	Text
Case 3	As per most of our projects, Occupational noise and chemical inhalation are made by the main contractor, but as part of our procedure we carry out internal monitoring process by using sound meter also sometimes using Mobile app sound meter in sound measurement.
Case 4	Our organisations contracted a reputable third-party organisation that will monitor and examine our occupational air and noise exposure every six months.
Case 10	Usage of MSDS (Material Safety Data Sheet) to identify risk related to the usage of chemical and implement stipulated control measures.
Case 12	Occupational noise & indoor air quality are regularly monitored as per the schedule given in the approved environmental studies, and this is a sub-contracted activity through an approved laboratory.
Case 12	Our emergency response plan on fire will be immediately implemented.

2. Challenging and Interesting Experiences

One of the interviewees believed that the most challenging experience was to be employed by a Construction firm and ensuring the implementation of the OHS Management System. Moreover, implementing and monitoring safety onsite is also one of the most challenging parts, along with the documentation requirements (Case 4).

Furthermore, it is observed that altering the behaviour of the workforce with respect to health & safety is also a challenging job. According to an interviewee (Case 7), "*The most challenging experience is developing a positive safety culture which is still ongoing for continuous improvement*". On the other hand, the most exciting experience is working with OHS officers from various cultures, nationalities and OHS perspectives.

3. OHS Inspections

Jenson and Jenson (2003, p. 5) presented that the inspection processes are developed to help and improve the Occupational Health and Safety Management System and to ensure compliance, regardless of the site conditions.

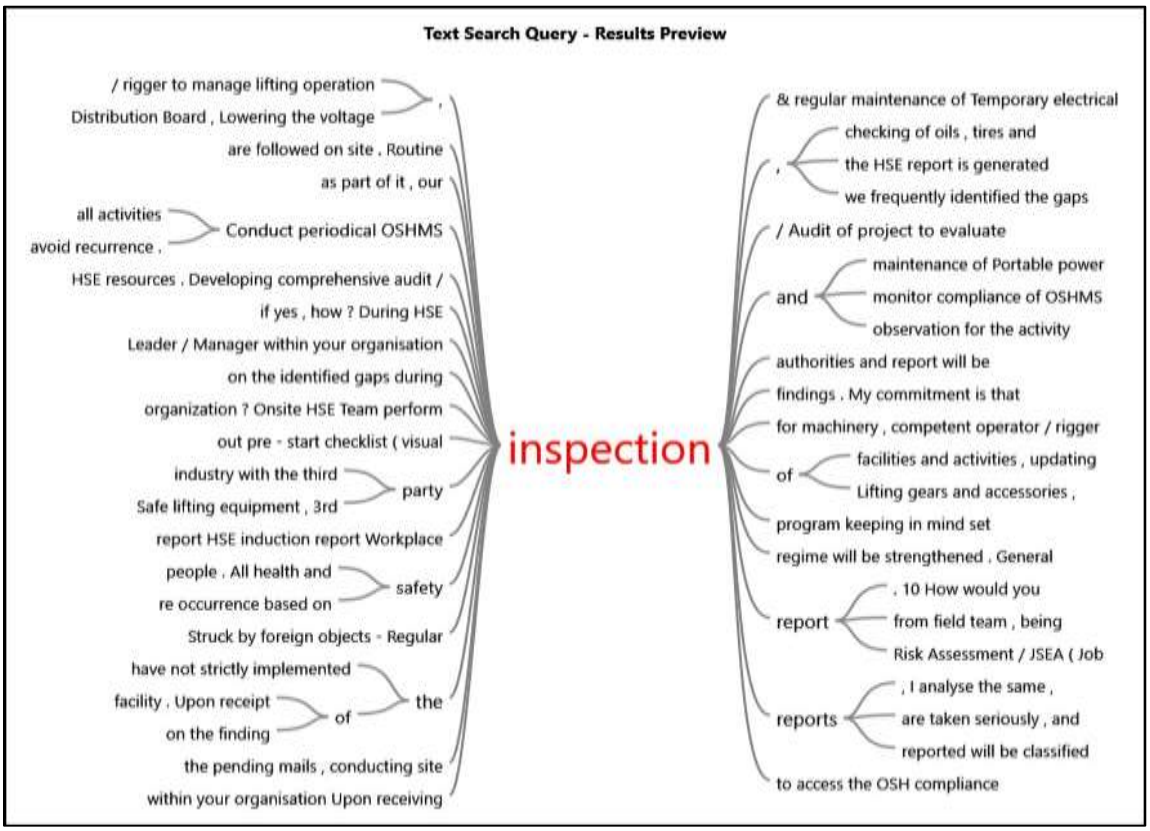
As shown in Table 42, OHS inspection reports are received by OHS personnel, and based on which, actions are taken. OHS inspections ensures corrective or preventive action to be taken with coordination with the management team. According to an interviewee, all OHS inspections reports are taken seriously and are classified based on the level of associated risks (Case 11).

Table 42 *Excerpts on OHS Inspections*

Case	Text
Case 10	Conduct periodical OHSMS Inspection/Audit of the project to evaluate the compliance status with regard to contractual requirement, local law and international standards and recommend corrective action for identified gaps.
Case 11	All OHS inspections reports are taken seriously and are classified based on the level of associated risk.
Case 13	Training is now being conducted to make our staff aware of the HS commitments, and as part of it, our inspection regime will be strengthened.

Word tree analysis was carried out in "Inspections", and the results are presented in Figure 59.

Figure 59 *Word Tree: Inspections*



4. Workers Behaviour

While implementing OHS systems and practices, OHS professionals need to understand workforce behaviour and acceptability of change. Al-Shehri (2015) studied the impact on the behaviours of employees with regards to safety, and he emphasised that safety training is essential for changing the behaviour of individuals. As recorded in Table 43, respondents revealed that they experienced complacency in their sites and had to persuade workers to use PPEs. For this purpose, OHS professionals demonstrate correct PPE usage to prevent inhalation (Case 10). It was also found that some workers are more comfortable than others in a stressful environment and avoid the use of safety equipment's or PPE. One of the respondents explained that OHS needed to ensure workers have their full PPE to avoid the chance of a major incident. OHS professionals and managers are committed to maintaining a safe environment for the workforce (Case 2). To this end, they conducted OHS training that displayed videos/pictures

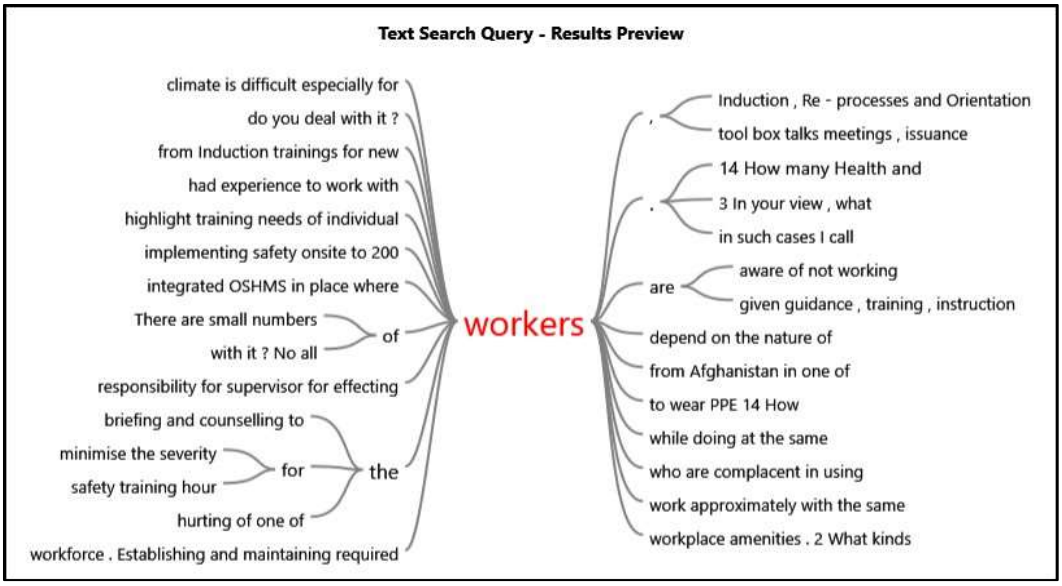
related to the possible outcome/result for being complacent in the use of PPE and safety equipment's.

Table 43 *Excerpts on Workers' Behaviour*

Case	Text
Case 2	We are committed to maintain a safe environment for our people. All Health and Safety inspection reports are taken seriously, and compliance of the reports are done.
Case 10	Engineering control being implemented e.g. using LEV (local exhaust ventilation), to suppress or prevent the accumulation of fumes, fibres or dust arising from work activity at the project site. Implementation of correct PPE usage to prevent inhalation. Occupational Air quality is monitored on a regular basis by using measurement tools.

Word tree analysis was carried out in "Workers", and the results are illustrated in Figure 60.

Figure 60 *Word Tree: Workers*



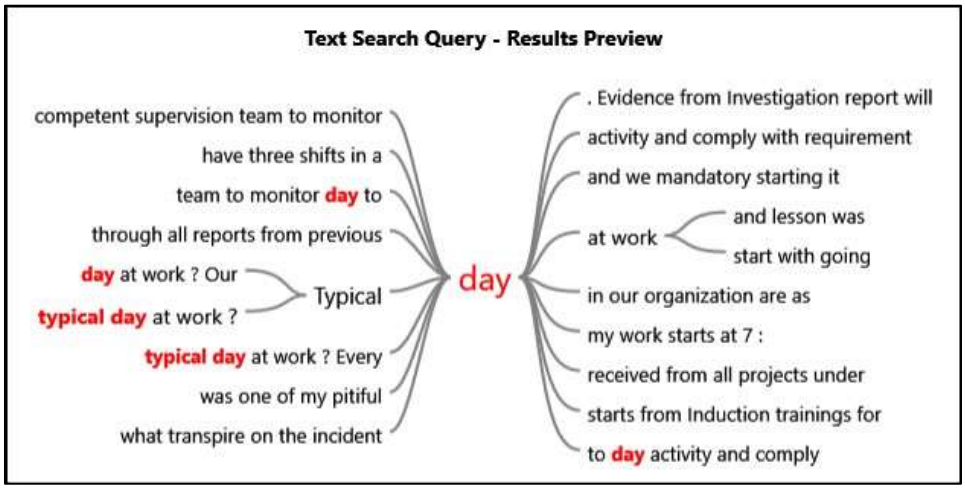
c. Work and Activities

This section analyses the typical day at work of the respondents and the kind of tasks/activities that are perceived as difficult. According to one of the respondents, the typical day at work included inductions related to Health and Safety, trainings, inspections, risk assessments, audits, performance monitoring, and site studies. It is also observed that a typical day at work involved project reporting and following up with the concerned site management team. One of the respondents claimed that as a major precast manufacturer in Abu Dhabi's Emirate, their daily production activities are clearly defined and identified (Case 1). Moreover, risk assessment and Occupational Health and Safety compliance are also important daily activities performed at a site within the Construction and the Manufacturing sectors in the United Arab Emirates. Table 44 presents some of the excerpts on a typical day at work.

Table 44 *Excerpts on a Typical Day at Work*

Case	Text
Case 1	We one of the major precast manufacturers in Abu Dhabi, and all our daily production activities are clearly identified, and expert team are assigned very section to perform the task.
Case 7	My typical workday is to review the method of statement & risk assessment, and responding to the pending emails, conducting site inspection to access the OHS compliance status.
Case 9	Our typical day starts from Induction training for new workers, toolbox talks meetings, issuance of permits for different activities like hot work permit, confined space permit, working at height permit, lifting permit etc., monitoring and site inspections, make follow up the daily checklists, submitting daily site safety reports to the Project Manager.

Figure 61 *Word Tree: Typical Day*



Word tree analysis was carried out in “Typical day”, and the results are illustrated in Figure 61.

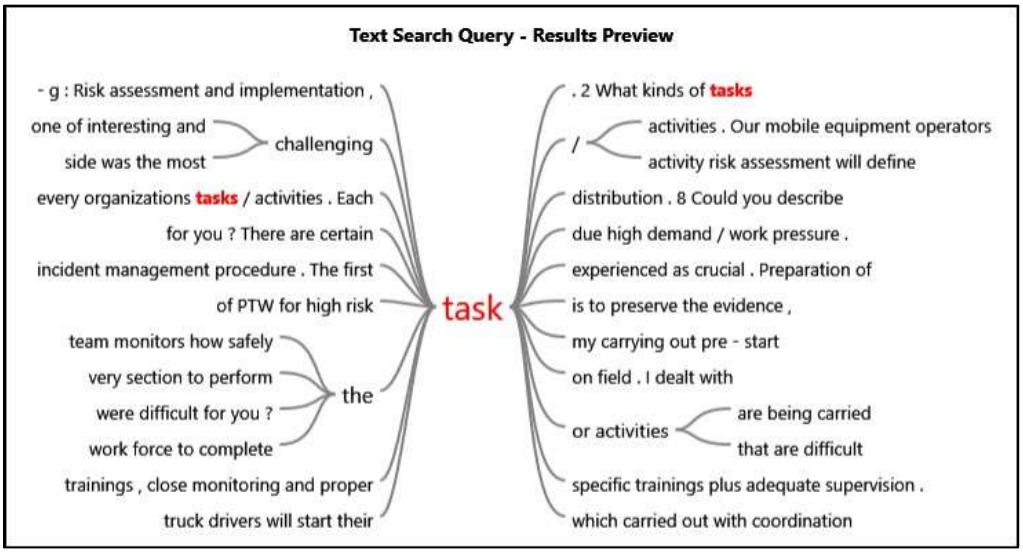
With respect to tasks and their difficulties as presented in Table 45, various activities are listed, including installation works, welding activities, handling of chemicals, manual handling of hazardous substances, excavation work, plant and equipment movements, and lifting operation activities. In this context, respondents also believed that activities related to influencing human behaviour were also considered as difficult (Case 11). In addition to these activities and tasks, managing both production and safety was regarded as the most challenging task in the field. Traditionally, the implementation of Occupational Health and Safety (OHS) procedures at sites were considered as challenging since it requires detailed understanding and awareness of associated risks according to Singh et al. (1999).

Table 45 *Excerpts on Tasks and Their Difficulties*

Case	Text
Case 2	Handling of chemicals, hot works, manual handling, hazardous substances etc. we have a thorough risk assessment done for all activities, routine and non-routine as well with Safe operation Procedures.
Case 5	Working in a hot climate is difficult especially for workers
Case 6	We mark all activities and installation works carried at air wells of the building as high risk and challenging activities.
Case 11	The tasks which I feel difficult were Reducing the human error and influencing the behaviour of the workforce and analysing the performance influencing factors.
Case 12	Nothing difficult but some EHS implementation tasks are challenging.

Word tree analysis was carried out in “Task”, and the results are presented in Figure 62.

Figure 62 *Word Tree: Task*



d. The OHS Management System

1. OHS Training

Occupational Health and Safety training is important for the successful and effective implementation of the OHS Management System, according to O'Connor et al. (2005). Workers in the sector are generally provided with safety signages and awareness trainings (Case 10). The organisations ensure OHS compliance by conducting regular trainings and awareness sessions. The trainings raise the significance of compliance with OHS arrangements/safe work practices among workers (Case 10). According to one of the respondents, each worker in the organisation undergoes OHS training for 8 hours/week and 96 hours/year (Case 3). It was also found that the training hours spent per worker are equal to 1.5 hours/week (Case 4). It shows that, within the sector, organisations are ensuring compliance with OHS provisions through OHS training.

OHS capability development is regarded as an important tool in implementing OHS practices and provisions within organisations. It is observed that the implementation of the system on-site is straightforward and convenient when using the OHS Management System. It helps in identifying and reducing risks, hazards, and deficiencies in the management system (Case 10). It is defined as a combination of sharing of information and knowledge to support decision-making. One of the interviewees reveals that they follow an OHS Management System as per OSHAD SF (Case 2). The following excerpts in Table 46 describe the OHS training hours and the experience of the interviewees with the OHS Management System.

Table 46 *Excerpts on OHS Training*

Case	Text
Case 2	We follow HS Management system as per OSHAD SF.
Case 3	In my Organisation each worker undergoes HSE training for 8hours per week and 96 hours per year.
Case 4	Training hours spent per worker – 1.5 hours/week; Total training hours spent per month – 110 hours
Case 7	Every employee should get training minimum of 5 to 10% training of the total hours they worked.
Case 9	The number of OHS training hours undertaken for the total to date: 332.5 Hrs.
Case 10	Implementation of the OHS Management System in our organisation has helped us to manage Health and Safety by involving management leadership, employee participation, clear delegation of roles & responsibility in the context of Health & safety.
Case 10	A small investment in improving safety planning and training can result in huge cost savings in the future, and due to continual training, campaign, safety culture of the organisation changed in due course.

Figure 63 *Word Tree: Training*

Word tree analysis was carried out in “Training”, and the results are presented in Figure 63.

2. OHS Objectives

According to the research participants, organisations needed to implement a sound OHS policy with an aim of achieving the safety goals and objectives of the organisation (Case 7). The implementation of OHS provisions helped in identifying various risks and hazards, such as

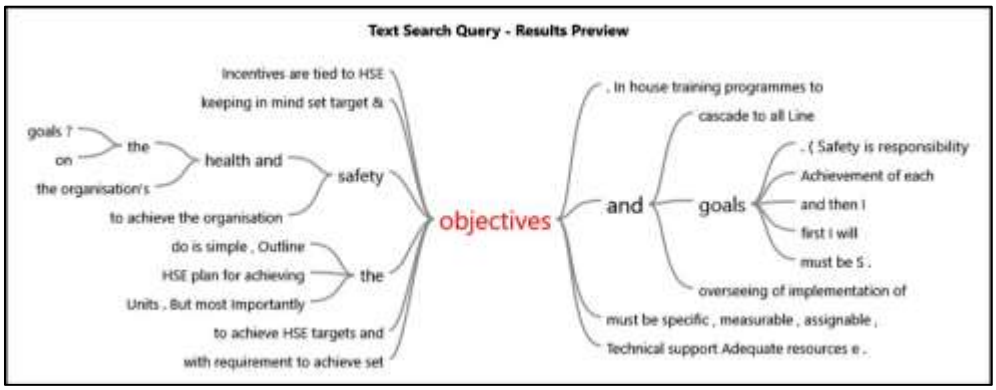
management system deficiencies, and helped in avoiding and mitigating such risks (Case 4). However, according to the research participants, it was challenging to effectively implement and communicate OHS procedures due to the presence of diverse nationalities at the site. The OHS reporting in the Construction and the Manufacturing sectors may include a report to OSHAD regarding the OHS performance, monthly reporting to the top management, and monthly reporting to the corporate EHS division (Case 12). Waring (1996) presented that organisations are using the Health and Safety objectives, to link it with the main business objectives of the organisation. Organisations monitor each unit's balance scorecard periodically to ensure that their objectives and the targets are met. The study identified OHS objectives and the ways to achieve those objectives as per Table 47. It is observed that on-site, effective implementation, teamwork and continuous monitoring are significant ways to reach OHS objectives. However, these objectives must be SMART (specific, measurable, achievable, realistic and timely) (Case 4). The organisation's safety goals and objectives could be achieved to facilitate the OHS policy's effective implementation. For doing this, organisations are required to have adequate resources and a competent supervision team to comply with requirements and monitor day to day activities.

Table 47 *Excerpts on OHS Objectives*

Case	Text
Case 3	The Objectives and Goals must be SMART(Specific, Measurable, Achievable, Realistic and Timely) and to an ALARP (As Low as Reasonably Practicable).
Case 4	The organisation tasks/activities involved different risks and varies time to time, depending on the situations. The risk associated with the team are also the risk associated with me since I worked with them. The organisation procedure is to have a risk register where it summarises all the risk assessment reference numbers for each and every organisation's tasks/activities. Each task/activity risk assessment will define all controls or mitigations for the identified hazards and risks and also linked to other related risk assessment or Work Method Statement for reference. Review of the risk assessment will be mandatory in case of a change in process, equipment, people, the material used and/or bi-annual review.
Case 4	The Health and Safety objectives must be specific, measurable, assignable, realistic and time-related.
Case 7	By implementing the Health and Safety policy of that organisation will lead me to achieve the organisation safety objectives and goals.
Case 9	To reach the organisation's Health and Safety objectives and goals first I will communicate and trained the execution team on the Health and Safety objectives and goals, and then I will follow company OHS plan for achieving the objectives and goals.
Case 12	We have three levels of reporting: 1. Reporting to OSHAD on our OHS performance – once every quarter 2. Monthly reporting to the top management in our Abu Dhabi factory 3. Monthly reporting to the Corporate EHS division All key reporting parameters are recorded and reported, and these include dashboards, comparisons, trend analysis etc.

Word tree analysis was carried out in "Objectives", and the results are presented in Figure 64.

Figure 64 *Word Tree: Objectives*



4.2.6. The Summary of the Site Interview

The above thematic analysis explored and evaluated a number of themes related to OHSMS. It was found that in the Construction and the Manufacturing sectors, a great focus on risk management was required due to a higher rate of incidents. These risks could be prevented, mitigated, or managed by implementing OHS practices and procedures through teamwork and continuous monitoring. Moreover, OHS training and the use of the OHS Management Systems was also crucial. The responses obtained from the site interviews, as depicted in Table 38 had the top 3 supported sub-themes, as below:

- Risks and accidents – 22%.
- Dealing with the risks – 18%.
- Monitoring and reporting of OHS parameters – 12%.

4.2.7. Qualitative Data Analysis from Online Community Engagement.

The online community engagement aimed to evaluate the respondents' OHS perceptions from the online community of OHS professionals and practitioners. These were participating from online platforms such as LinkedIn, WhatsApp, etc. The outcome of the online community survey which supported the idea of the unification of the Occupational Health and Safety System in UAE

and understood the benefits of the same with respect to its overall ability to add value within the system as a whole. For this purpose, thematic coding and analysis were used as the principal methodology. Furthermore, the responses from 32 participants, who shared suggestions and opinions related to the unification of the overall Occupational Health and Safety System in the UAE, were coded and divided into different themes.

Thematic Analysis

With the inclusion of 32 cases within the qualitative analysis software NVivo, the main themes are indicated in Table 48 (They are listed in sequential order according to the count of the code). It can be seen in the hierarchy chart of the themes and sub-themes (Figure 65) that were reported by the respondents. There are two themes extracted from all the responses. The first theme related to the responses of people who liked and supported the idea of a unified OHS system. The most prominent responses relate to the unification of the laws, standards, and regulation of the OHS system with 45% sub-themes found. At the same time, the second theme includes responses explicitly from the participants who disagreed with the concept of a unified system in the UAE.

Table 48 *Main Themes and Sub-Themes*

Main Themes	Sub-Themes
Agreement with Unified OHS	Regulation and legislation
	Processes and operations
	System and management
	Control and audit
	Other
Disagreement with Unified OHS	Complexity and Conflicts

Figure 65 *Themes and Sub-Themes*

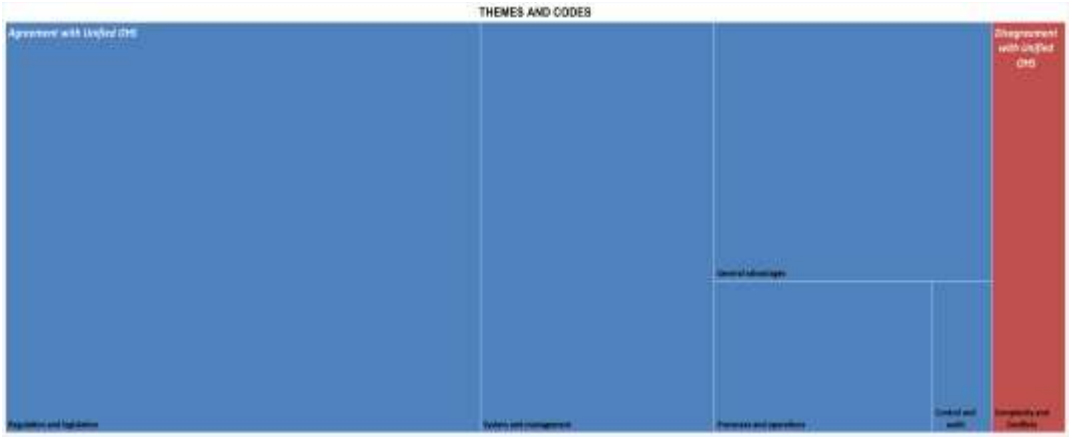


Table 49 indicate the representation of all the sub-themes and all the frequency.

Table 49 *Sub-Themes and Frequency*

Sub-Themes	Sub-Themes count	% Sub-Themes
Regulation and legislation	65	45%
System and management	32	22%
Other	24	16%
Processes and operations	11	8%
Complexity and Conflicts	10	7%
Control and audit	3	2%

The sub-themes within the study's main themes presented in Figure 65 are regulation and legislation, processes and operations, system and management, control and audit, and other general lists of advantages highlighted by the respondents under the agreement theme. Complexity and conflicts are placed under the disagreement theme.

4.2.7.1. Agreement with Unified OHS

Most of the respondents supported the unification of the Occupational Health and Safety Management System of UAE.

a. Regulation and Legislation

The most discussed and supported sub-themes are related to the regulations, standards and legislations as presented in Table 50. According to different participants, the unification of OHS standards (Case 3) and legislative and regulatory mechanism (Case 5 and Case 6) is highly feasible in relation to the United Arab Emirates, similar to previous research findings by Shibani et al. (2013).

Most of the respondents also indicated the reasons to support their opinions. Some reflected that this might improve the entities within the system and help in cost reduction (Case 5, Case 15 and Case 20), requalifying the workforce (Case 3), investigating incidents (Case 19) and eliminating risks (Case 20). Others put emphasis on constructing a unified OHS legislation system to ensure helping for the OHS community as a whole (Case 22) with the successful deployment of Federal OHS expectations like National Qualification Authority (NQA) OHS qualifications, OHSMS national standard (NCEMA).

Table 50 *Excerpts on Regulations and Legislations*

Case	Text
Case 3	My view on this issue, is the need for the availability of an independent Occupational Health and Safety authority at a federal level, working on a unified Occupational Health and Safety Management System, which within its responsibility is to monitor and evaluate the organisations and support the implementation of the Occupational Safety and Health requirements through accrediting and certifying training centres and requalifying specialised manpower.
Case 5	Unifying legislative and regulatory mechanisms at the state level is required, which helps entities and companies in the application, compatibility and cost reduction, considering differences between sectors from the perspective of application and type of risk.
Case 6	One more important thing for unification is that by the help of regulatory framework, all backwards (in OHS perspective only) Emirates like RAK and Fujairah can be aligned in the same row of compliance. As OSHA for USA and HSE for the UK, we can have OSHAD for UAE.
Case 13	Yes, sir, this can be Sector-based Federal and State level framework but must be in line to avoid any contradiction or overlapping.
Case 14	A strict law must exist to enforce the Health and Safety Management System in the United Arab Emirates and be under special supervision and supported from the government to control all the activities that require the presence of specialists in the field of Health and Safety in general

Case 14	A strong regulatory framework should exist officially, and periodic inspections are to be carried out by specialists to ensure the safety of employees and everyone in the workplace.
Case 15	the unification of the Occupational Health and Safety Management System in all parts of the country is very feasible, which will contribute to raising the commitment of enterprises to legislation, as many facilities have branches across the country, the unification of mechanisms and organisational legislation reduces the effort, time and cost of commitment to legislation, and thus will contribute to raising the level of enterprise commitment,
Case 19	the ministry that is responsible for issuing legislation, planning and following up on all causes of accidents in all government ministries, and it has a primary role which is setting preventive measures and investigating accidents.
Case 20	Unification of the main objectives, legislations, and systems as a whole is important to reduce costs and efforts and of course eliminate risks and protects lives and assets
Case 21	Yes if the OHS regulatory framework has been properly designed
Case 22	We need to have one regulatory framework system for all Emirates and businesses which will help for elevating OHS Culture in the working community,
Case 28	the legal and regulatory authorities will have a single unified framework, and it will inculcate a better sense of responsibility and accountability amongst companies and will enable them to comply without having any excuses.
Case 32	Australia……are currently going through a harmonisation process to align all states with the same OHS legislation. I do not claim to be an authority on the reasoning behind the transitioning but would advise maybe to have a look at the history for the reasons behind the harmonisation within Australia which may assist in your research

Word tree analysis was carried out for “Regulatory” and “Legal”, and the results are illustrated in Figure 66 and Figure 67, respectively.

Figure 66 *Word Tree: Regulatory*

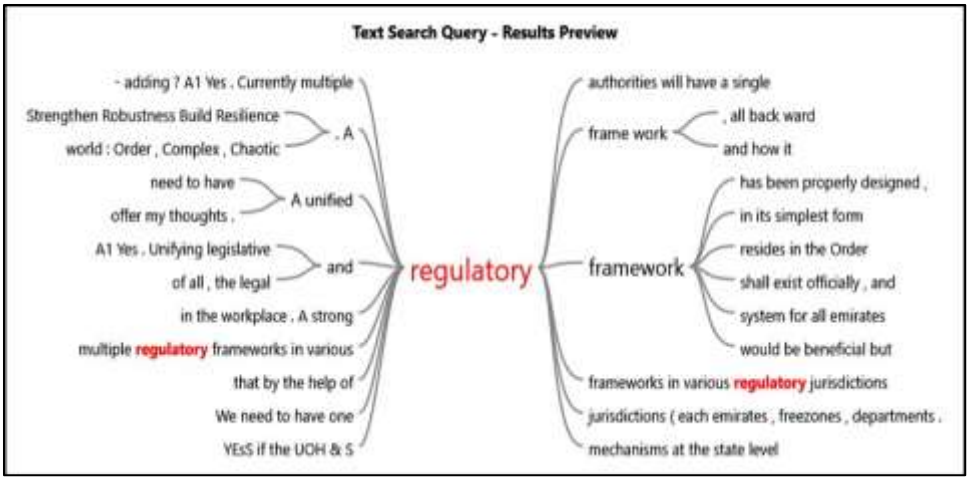
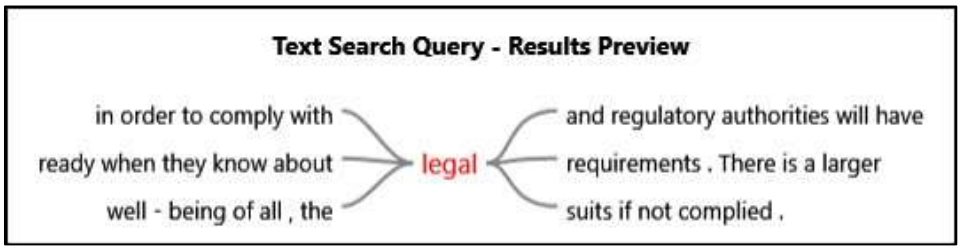


Figure 67 *Word Tree: Legal*



b. System and Management

Six out of the 32 respondents reflected that the unified OHS system is highly feasible for the United Arab Emirates due to several reasons, as presented in Table 51. One of them put a strong emphasis on the benefit of unifying the system at the federal level by mainly reflecting upon the disadvantages of not having a unified system, or due to having a system which is divided within different systems that creates a burden on companies which in turn leads to conflicts (Case 16). On the other hand, others supported the idea by suggesting a unified system and frameworks across all sectors and entities which will ensure their effective management (Case 7). One of the respondents further implied the inclusion of proper OHS transport management for the unified system to work even more effectively (Case 18). Moreover, another one added that the unified system must not also be overlooked in terms of performance management and safety measures, for it to be more effective in the United Arab Emirates. He further reflected that only one party

must be made responsible for collecting data and issuing statistics and recommendations for the causes of accidents in the country (Case 19). Last of all, one of the respondents showed concerns related to the duplication problems with the diversified system and hence supporting the unification of the systems which could, in turn, help inefficient utilisation of the resources (Case 23). These findings follow previous research findings that advocate for the implementation of a unified OHS framework, according to Wu and Chi (2015) and Mehmood et al. (2018).

Table 51 *Excerpts on System and Management*

Case	Text
Case 7	Since all Emirates in UAE, the standard should be integrated and applicable to all organisation in the UAE. OSHAD System Framework can be unified for all. Also, we need to ensure that all companies are registered and equipped with registered practitioners. The excuse or exemption of small-scale industries or some medium scale industries from OSHAD System Framework should not be permitted. OSHAD should have a Marketing or consultation team to visit entities and make aware the top management for its significance ….
Case 16	Yes, it is true, I strongly support the existence of a unified and effective system at a federal level. The existence of several systems, if similar in some respects, increases the financial and administrative burdens on companies. It can also lead to conflicting actions or steps taken by companies in order to comply with legal requirements. There is a larger variety of concerns that require a different platform to highlight.
Case 18	OHS & SM Systems in Business Sectors would be failing if it did not include OHS Transport Management that ALL Business Sectors need.
Case 19	It should not be dispersed or overlooked for performance measurement indicators of safety
Case 19	There must be one party that is responsible for collecting data and issuing statistics and recommendations for the causes of accidents in the country, generally speaking, and not as an individual company or organisation. safety that comes from peace, and it must be supported primarily from the head of the country
Case 23	Of course, just because it will develop better synergy with all the industries and sectors without duplication. Moreover, the entities will also feel confident as it will help them utilise their resources in a more effective manner. Such an initiative will also address one of the key components of KAIZEN (Standardisation), which is indispensable for continual improvement.

Word tree analysis was carried out for “System” and “Management”, and the results are presented in Figure 68 and Figure 69, respectively.

Figure 68 *Word Tree: System*

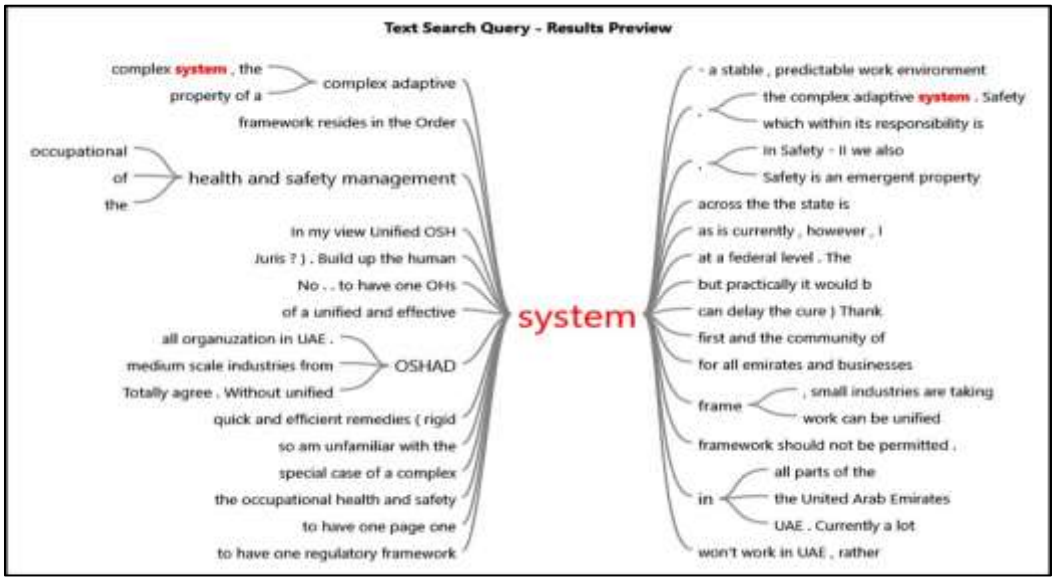
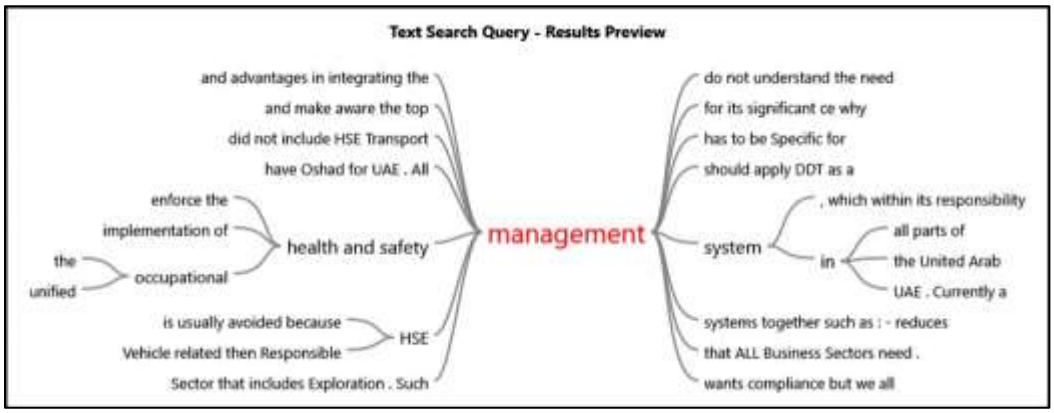


Figure 69 *Word Tree: Management*



c. Process and Operations

Mengolini and Debarberis (2008) proposed in his study *"It proposes a specific process-view approach to effectiveness evaluation of organisational and safety culture indicators by means of a multi-level system in which safety processes and staff involvement in defining improvement activities are central*", processes are built in the organisations based on the needs of the operational goals which are set by the managers according to the employees' responsibilities.

In the case of the processes and operations within the systems, as presented in Table 52, the participants offered mixed reviews. While some of them recommended the or the harmonisation

of the OHS processes, others gave different opinions. One of them particularly highlighted their support towards the unification of only the common processes (Case 26) while another one suggested the unification by sector (Case 11) or industries (Case 8). In contrast, only one of the respondents supported the concept of having flexible processes for certain systems and operations depending on the severity, nature and risk of the environment (Case 20).

Table 52 *Excerpts on Processes and Operations*

Case	Text
Case 1	Build up the human system first and the community of practice around it before thinking about standards. I am new to complexity, but the way you articulated it made it very simple to understand and whilst merging and fine-tuning some of the initial ideas presented in this thread you advance a new agenda on safety.
Case 8	Without a unified OSHAD system frame, small industries are taking Health and safety as a grant.
Case 11	Unified as per the sector, Yes !!
Case 20	However, some processes require slight flexibility depending on their nature, the severity with respect to risk and the surrounding environment. Yes, I agree with unifying regulations in general but taking into consideration that some special process needs among different sectors;
Case 26	the common procedures can be unified.
Case 32	We are currently going through a harmonisation process to align all states with the same OHS legislation.

Word tree analysis was carried out for “Process” and “Mechanisms”, and the results are presented in Figure 70 and Figure 71, respectively.

Figure 70 *Word Tree: Process*

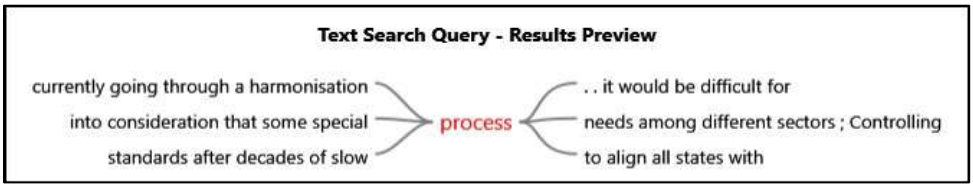
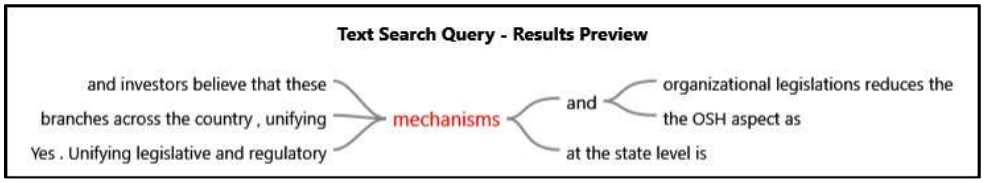


Figure 71 *Word Tree: Mechanisms*



d. Control and Audit

In the case of control and audit needs, as in Table 53, two of the total number of participants supported the concept of unification just in cases where control and audit check-ups of the unified system have been ensured.

Table 53 *Excerpts on Control and Audit*

Case	Text
Case 14	supported by the government to control all the activities that require the presence of specialists in the field of Health and Safety in general
Case 20	Controlling measures need regular check-ups/audit and quick and efficient remedies (the rigid system can delay the cure)

e. General Advantages

There were some of the other respondents, as in Table 54, who were asked to give their opinion on how the Integrated Management System benefited the OHS system in the United Arab Emirates. One of the respondents emphasised the attainment of safety goals irrespective of the cultural diversity of different systems existing in United Arab Emirates (Case 24). Others agreed on the value-added benefits and admired the UAE OHS authorities' efforts in standardising and collaborating to unify the existing system (Case 25). In addition, other benefits of the system

highlighted by one of the interviewees (Case 27) were cost and risk reduction, profitability, avoidance of duplications and conflicting responsibility, creation of consistency, facilitation of training & development, formalising the informal systems and ownership.

Table 54 *Excerpts on General Advantages*

Case	Text
Case 24	Yes, Safety standard should be attained regardless of cultural differences, since all Emirates joins together to make up the UAE, it is then of important to be governed by one Safety goal.
Case 25	Yes, Agree It will add value, empowerment and support towards effective implementation of HSMS in UAE. Currently, a lot of efforts being done by different authorities as OSHAD, DM, NCEMA, MOHRE, Health Authorities, etc. to standardise will help collaborating all efforts.
Case 27	reduces duplication and therefore costs -balances conflicting objectives -reduces risks and increases profitability -eliminates conflicting responsibilities & relationships -formalises informal systems -harmonises and optimises practices -creates consistency -improves communication -facilitates training & development -Ownership (applies to all) -etc.
Case 29	Yes, certainly it will bring a lot of benefits if it is unified across all Emirates. All the best.
Case 31	Yes, of course. The unification of the systems has a huge variety of benefits.

4.2.7.2. Disagreement with Unified OHS

Very few, five out of the 32 interviewees were observed to have disagreed with having a unified OHS system within the country.

Complexity and Conflicts

For supporting the concept of not having a unified system, the respondents in Table 55 listed a number of reasons. One of them supported the idea of building up a human system and community first, then advancing to merging and tuning the safety agendas (Case 1). Similarly,

another one said that the unification of the OHS system was beneficial but not self-sufficient. He added that a unified system under a single regulatory framework would make it more inclined to be a bureaucratic. Moreover, one of them highlighted the problems and issues in the current diversified setup of the whole system across United Arab Emirates, along with a different process for the resources allocation, which might make it highly challenging to bring all of them on one page (Case 10 and Case 22). Battmann and Klumb (1993) presented cases of conflicts between high level and low level of safety commitments and how it can affect the implementation of the OHS Management System in the organisations.

The perception was about the unified system's inability to assure resilience against the OHS failures and emergencies, as: “The regulatory framework is robust; however, it does not provide assurance for the resilience against OHS emergencies and failures” (Case 2).

Some participants were sceptical about the unified OHS Management System's efficacy, considering its diversity. As cited below, one of the participants remarked: “It is impossible to have a unified OHSMS across UAE, as there are multiple nationalities working and the OHS maturity between the Emirates is uneven, with some Emirates have advanced, and some are lagging in the OHS awareness, regulations and governance” (Case 10).

Another reason for not agreeing to the unified OHSMS was the geographical spread and the diversification of sectors, which made one of the participants state: “Unified OHS system won’t work in UAE, rather it should be sector-specific across UAE. However, the common procedures can be unified.” (Case 26).

Table 55 *Excerpts on Problems and Issues*

Case	Text
Case 1	Apologies - I do not agree. Gary Wong is a specialist in these matters (Quid Juris?). Build up the human system first and the community of practice around it before thinking about standards. I am new to complexity, but the way you articulated it made it very simple to understand and whilst merging and fine-tuning some of the initial ideas presented in this thread you advance a new agenda on safety. This may be critical to what the researcher wants to accomplish long-term.
Case 2	I'd like to offer my thoughts. A unified regulatory framework would be beneficial but not sufficient. A regulatory framework in its simplest form helps to strengthen robustness. Don't make it bureaucratic and unwieldy in size as an attempt to build resilience.
Case 10	No ... to have one OHs system across the state is the best and idealistically amazing concept yet it is NO cause each Emirate economic and social set up is different, the migrate workforce ratio is different, the industrial set up is different, allocation of resources would differ. Moreover, some states have reached to a standard level and incorporated standards after decades of the slow process ... it would be difficult for less developed states to catch up with other states. Theoretically, it would be easy for companies to have one page one system, but practically it would b difficult. Even in one state, u have many standards or requirements let say Dubai have requirements of DP World, Free Zone, Nakheel, DM, etc. let states adopt what in reality they can.
Case 22	Currently, multiple regulatory frameworks in various regulatory jurisdictions (each Emirate, free zones, departments...) are not interlinked; hence those entities operating in multiple Emirates/jurisdictions have to be vigilant on complying different requirements on the same topic when they move from one jurisdiction to another within the country.
Case 26	In my view the Unified OSH system won't work in UAE, rather it should be sector-specific across UAE. However, common procedures can be unified.

Word tree analysis was carried out for “Complex” and “Conflicting”, and the results are presented in Figure 72 and Figure 73, respectively.

Figure 72 *Word Tree: Complex*

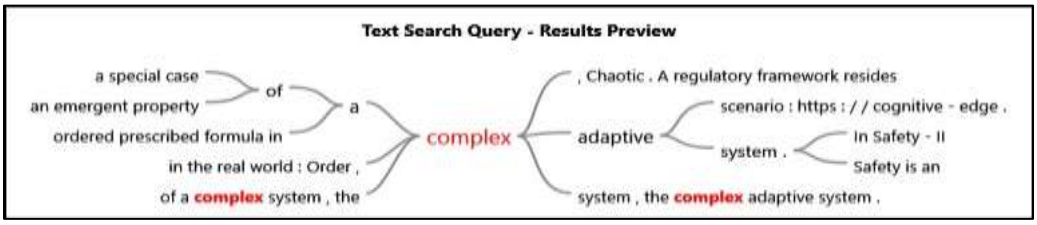
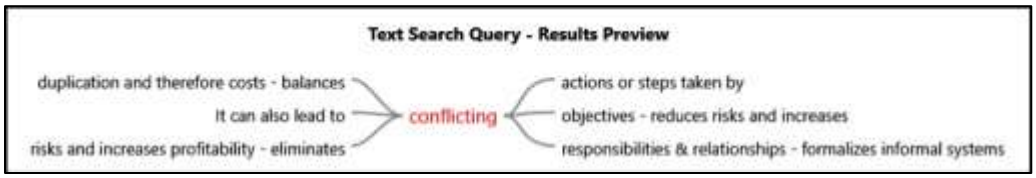


Figure 73 *Word Tree: Conflicting*



4.2.8. The Summary of the Online Community Engagement

Based on the findings mentioned above, it has been concluded that the unification of the OHS system across the United Arab Emirates is highly feasible and recommended by 27 out of 32 survey participants.

Out of those respondents who favoured the unification of the OHS system across the United Arab Emirates, the top 3 supported sub-themes, as elaborated in Table 49 were as follows:

- Regulation and Legislation (45%).
- System and Management (22%).
- General advantages (16%).

4.3. Quantitative Data Analysis

A survey questionnaire was designed as agreed in the “Research Proposal” to cover a statistically significant number of companies from both the Construction as well as the Manufacturing sectors

within all the seven Emirates in the United Arab Emirates, including the Emirate of Abu Dhabi and the other Emirates. It was used for the survey, as detailed below:

A total of 312 entities were approached out of which 200 entities provided an adequate response. Two hundred respondents were covered in the survey (Refer to 3.16.3), of which 100 were from the Manufacturing sector and 100 were from the Construction sector. All participants had signed the consent form before participating in the survey (Refer to the Consent Form, 2)).

Occupational Health and Safety performance statistical data were collected from the Construction and the Manufacturing sectors. The data included the statistics that were related to Occupational Health and Safety that were gathered from the main study participants which were selected for the research and who had completed the questionnaire. The Construction and the Manufacturing were the only sectors in the United Arab Emirates that had implemented a variety of Occupational Health and Safety, and risk mitigation measures, and thus, the statistics were selected from these two sectors.

4.3.1. Descriptive Statistics

a. Organisation Type

In reference to 3.16 and Table 10, this research had a total eligible sample size of 200 entities distributed equally based on the location and the sectors, as per the study sample.

Question 1 of the survey questionnaire, asked the participants about the type of their organisation, and the responses were as follows:

Table 56 *The Number of Organisations Participating, by Location*

	Construction	Manufacturing
Abu Dhabi	40	60
Other Emirates	60	40

Figure 74 *The Percentage of the Construction Organisations Participating, by Location*

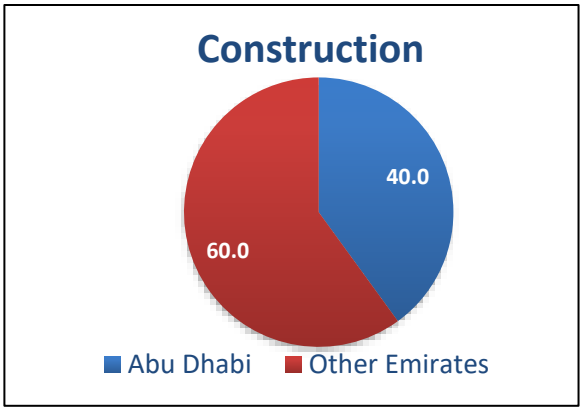
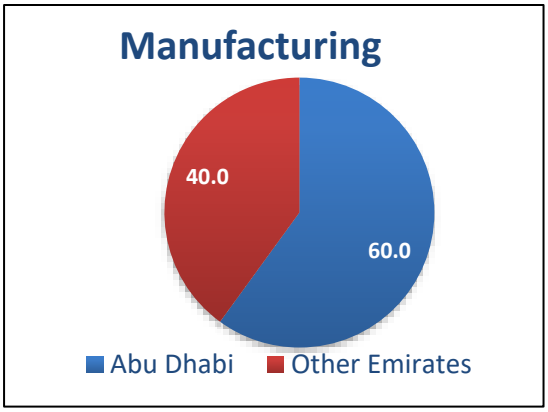


Figure 75 *The Percentage of the Manufacturing Organisations Participating, by Location*



In Table 56, Figure 74 and Figure 75, we find that the Emirate of Abu Dhabi had 40% of its respondents from the Construction sector and 60% of respondents were from the Manufacturing sector. Also, 60% of respondents from other Emirates belonged to the Construction sector, and the remaining 40% were from the Manufacturing sector. We noticed from the total respondents related to the Construction sector, 40% were from the Emirate of Abu Dhabi, and 60% were from other Emirates. Similarly, 60% of the respondents belonging to the Manufacturing industry were from the Emirate of Abu Dhabi. The remaining 40% of the Manufacturing sector respondents were from the other Emirates.

b. Distribution of Establishments According to Organisation Size

Question 8 of the survey questionnaire, asked the participants about the size of the organisation, and respondents to the survey were categorised by the entity's size according to the workforce in three different categories as shown in Table 57. The organisations who participated according to the sector are presented in Table 58.

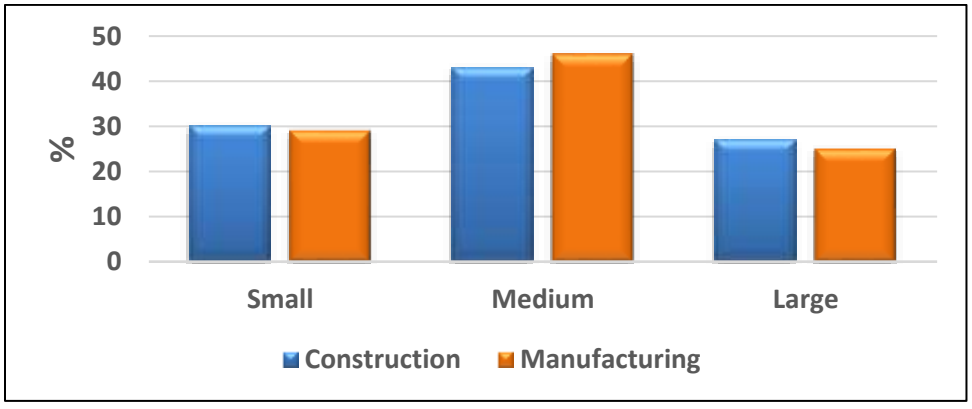
Table 57 *Size Scale According to Employees*

Size of the entity	*Number of employees*
Small	less than 49 employees
Medium	from 50-499 employees
Large	above than 500

Table 58 *Size of Organisations Participating by Sector*

	Construction	**Manufacturing**
Small	30	29
Medium	43	46
Large	27	25

Figure 76 *Percentage of Size-wise Organisations Participating by Sector*



The size of the organisations, according to the sector, are explained in the above Figure 76. 43% of Construction sector respondents were from medium companies, 30% were from small companies, and 27% were from large companies. When we look at the Manufacturing sector, the top most contributors were the medium companies 46%, with the next segment of small companies as 29% and the large companies were the last in the list with 25%.

A common feature can be noted. In both sectors, medium companies responded most, followed by the small companies, and the large company respondents were relatively the least, as per the Table 58, in all the United Arab Emirates, as per Table 59.

Table 59 *Size of Organisations Participated by Location*

	Abu Dhabi	Other Emirates
Small	26	33
Medium	42	47
Large	32	20

Figure 77 *Percentage of Size-wise Organisations Participating by Location*

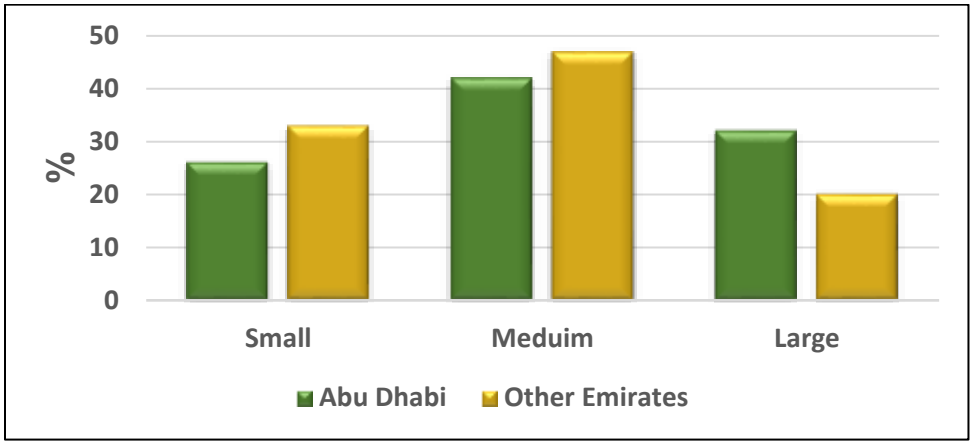


Figure 77 and Table 60, representing the distribution of small, medium and large companies who responded to this research survey, show the company locations. It can be noted that the respondents from both the Emirate of Abu Dhabi and other Emirates share common features,

such as most of the respondents are from the medium scale, followed by the small scale and the last scale in the category is the large companies.

Table 60 *Size-wise of Organisations in Percentages by Sector*

Row Labels	Construction	Manufacturing	Grand Total
Abu Dhabi	40	60	100
Small	13	13	26
Medium	13	29	42
Large	14	18	32
Other Emirates	60	40	100
Small	17	16	33
Medium	30	17	47
Large	13	7	20
Grand Total	100	100	200

Figure 78 *Size-wise Percentage of Construction Sector Organisations by Location*

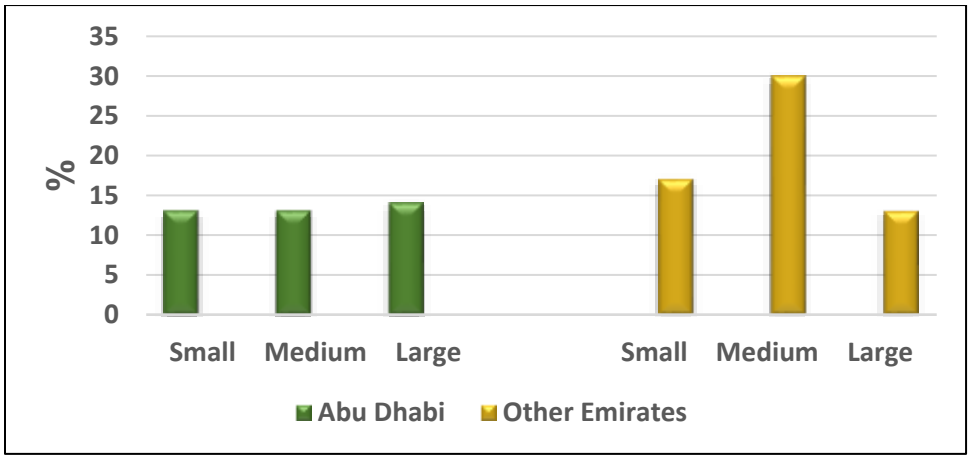
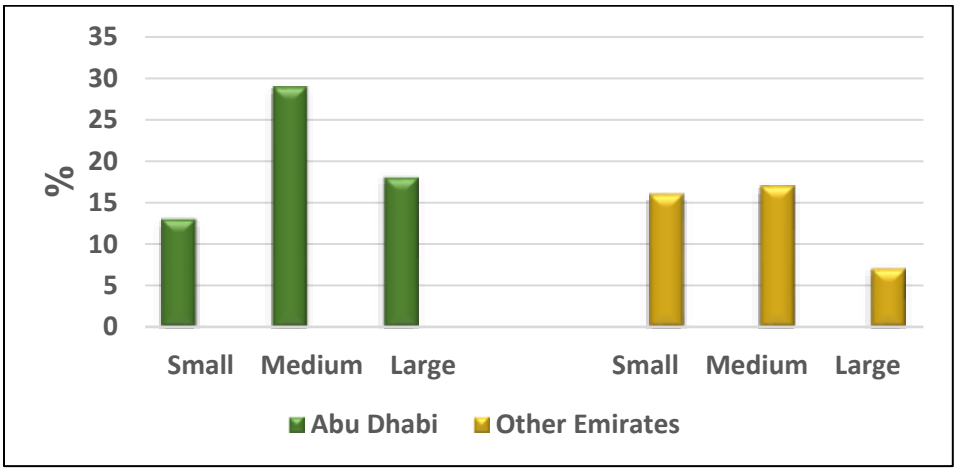


Figure 79 *Size-wise Percentage of Manufacturing Sector Organisations by Location*



The above Figure 78 and Figure 79 depict the distribution of the small, medium and large companies, in the two major sectors of the Emirate of Abu Dhabi and the other Emirates.

In the Construction sector, medium companies as per Table 60, 60% of the respondents were located in the other Emirates, while 40% of those who responded were from the Emirate of Abu Dhabi.

43% of the small Construction companies were from the Emirate of Abu Dhabi, and 57% of those who responded were from small Construction companies from the other Emirates.

52% of the respondents were from the large Construction companies located in the Emirate of Abu Dhabi, while large companies' response from the other Emirates was 48%.

While reviewing the small Manufacturing companies, a representation of 55% was from the other Emirates while 45% were from the Emirate of Abu Dhabi.

63% of the medium Manufacturing companies were from the Emirate of Abu Dhabi, while 37% of the same category respondents were from the other Emirates.

As far as the large Manufacturing companies are concerned, 72% responded from the Emirate of Abu Dhabi, and 28% of the responses were from the other Emirates.

After analysing the above figures, it can be noted that the participation of medium and small scale companies was more from the other Emirates for the Construction sector, whereas those of the large and medium companies were more from the Emirate of Abu Dhabi, for the Manufacturing sector.

c. Age.

Question 2 of the survey questionnaire, asked the participants about their age, and the age groups are listed in ascending order in Table 61 and Table 62Table 62.

Table 61 *Age in Percentage of Respondents by Location*

	Abu Dhabi	Other Emirates
Less than 21 years	1	2
21 - 30	30	27
31 - 40	39	35
41 - 50	21	28
51 - 60	7	6
More than 60 years	2	2

Figure 80 *Age in Percentage by Location*

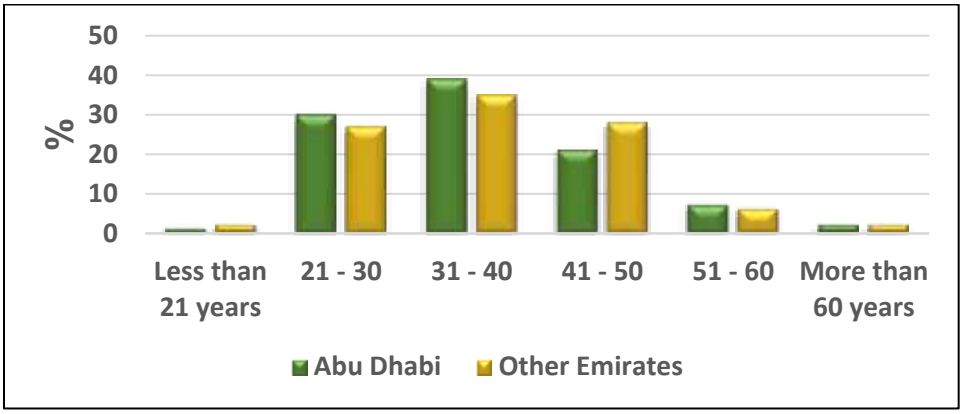


Figure 80 illustrates employees' age groups from different locations who responded to the research survey. 1% of the respondents from Abu Dhabi were young employees.

2% of the other Emirates respondents were also young, with no significant difference from Abu Dhabi respondents. Another noticeable feature to be noted is that, the primary age group of most respondents from the Emirate of Abu Dhabi, as well as from the other Emirates was 31-40. Also, both the Emirate of Abu Dhabi and the other Emirates had precisely the same figure of 90% of their total respondents from the ages ranging between 21 and 50 years old.

Table 62 *Age in Percentage by Sector*

	Construction	Manufacturing
Less than 21 years	**1**	**2**
21 - 30	**29**	**29**
31 - 40	**42**	**33**
41 - 50	**21**	**27**
51 - 60	**5**	**7**
More than 60 years	**2**	**2**

Figure 81 *Age in Percentage by Sector*

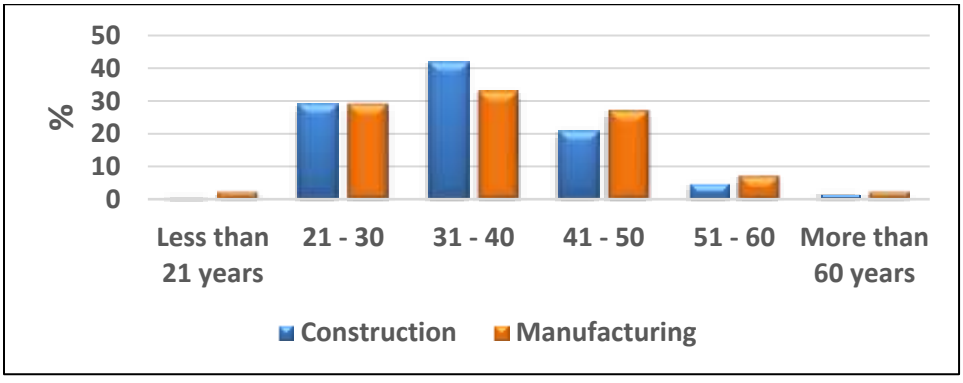


Figure 81 illustrates the respondents' age groups from the two identified sectors, Construction and Manufacturing, respectively. The primary age of most of the respondents from the Construction sector was 21-40 (71%), similar to the dominant age group from the Manufacturing sector of 21-40 (62%).

d. Level of Education.

Question 5 of the survey questionnaire asked the participants about their education level, and the responses were as follows in Table 63:

Table 63 *Level of Education by Sector*

	Construction	Manufacturing
High School	13	19
Bachelor's Degree	73	53
Master's Degree	9	21
PhD Degree	1	0
Other, please specify	4	7

Figure 82 *Level of Education by Sector*

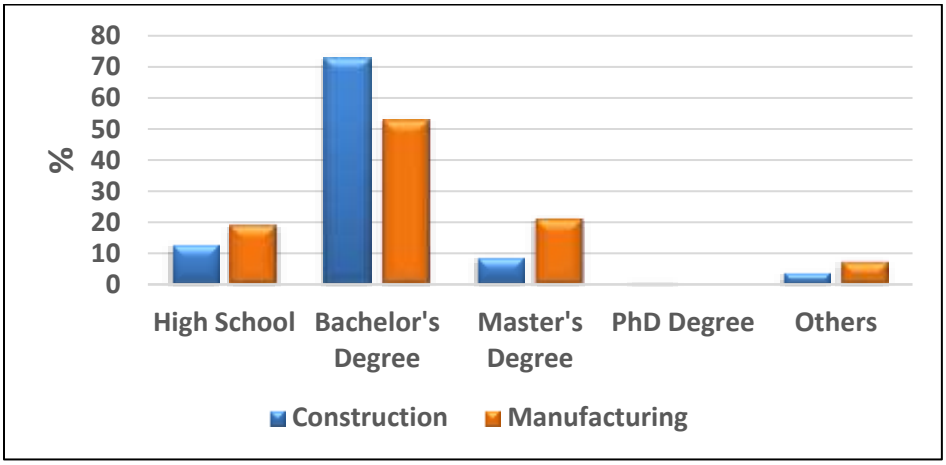
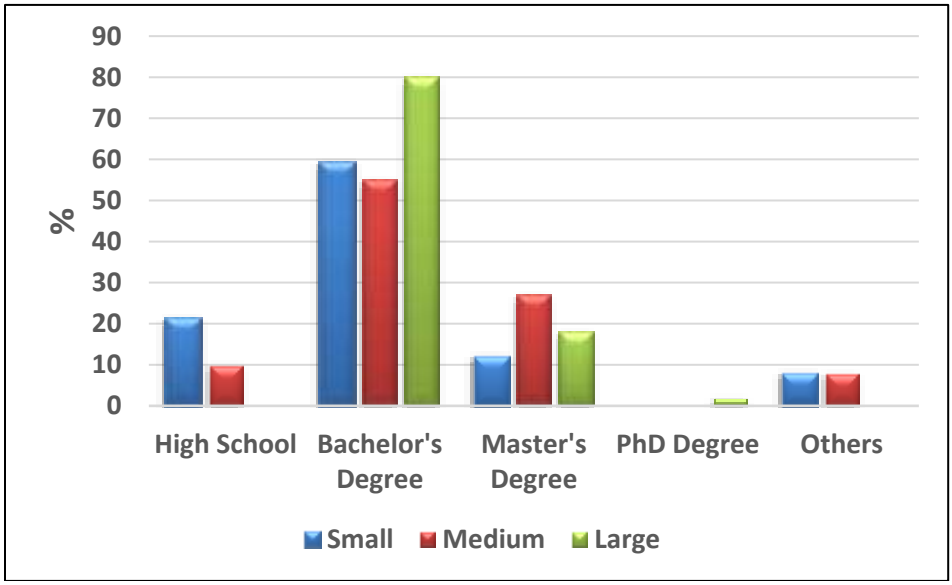


Figure 82

Table 64 *Level of Education by Entity Sizes*

Level of Education	Size		
	Small	Medium	Large
High School	21	10	0
Bachelor's degree	59	55	80
Master's Degree	12	27	18
PhD Degree	0	0	2
Others	8	8	0

Figure 83 *Level of Education by Entity Sizes*



As per the above Table 64 and Figure 83, it is evident that the highest percentage of level of education for all sizes of entities is the bachelor's degree. Medium and Large-sized entities have more with master's degrees than high school education and the Small-sized entities have more with high school education than the other entity sizes.

Figure 82 explains the respondents' academic background based on the chosen sector. The type of academic qualifications is listed in an ascending order. The Construction sector poses a prestigious figure of 83% of respondents who have at least a bachelor's degree or more. 13% of

respondents from the Construction sector were just school graduates. It indicates that most of the employees from the Construction sector are educated and with the professional skillsets required by the local bodies to manage Health and Safety at work, as there are about 170 various legislations, orders, guidelines, and regulations covering Health and Safety in the United Arab Emirates according to Turley (2010).

In the Manufacturing sector, 19% of respondents were just school graduates with the remaining population of 81% have earned at the least, a bachelor's degree. In the bachelor's degree holders, the respondents from the Construction sector were 20% more than that of the Manufacturing sector (73% and 53% respectively). This is in contrary to the specialised masters degree graduation, where the Manufacturing sector posed a superior figure of 21% against the 9% of the Construction respondents, but this is not statistically significant, as the analysis below shows:

Table 65 *ANOVA Test: Level of Education – Construction*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.500	1	1.500	1.642	0.203
Within Groups	89.500	98	0.913		
Total	91.000	99			

From Table 65, in "Level of education - Construction", one way, an ANOVA test conducted in order to compare the level of education in the Construction sector, and the result showed that there is no statistical significance with a value of sig.= 0.203.

Table 66 *ANOVA Test: Level of Education – Manufacturing*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.002	1	0.002	0.002	0.964
Within Groups	99.388	98	1.014		
Total	99.390	99			

From Table 66, in “Level of education - Manufacturing”, one way, an ANOVA test conducted in order to compare the level of education in the Manufacturing sector, and the result showed that there is no statistical significance with a value of sig.= 0.964.

Table 67 *Level of Education by Location*

	Abu Dhabi	Other Emirates
High School	15	17
Bachelor's Degree	63	65
Master's Degree	17	12
PhD Degree	1	0
Other	4	6

Figure 84 *Level of Education by Location*

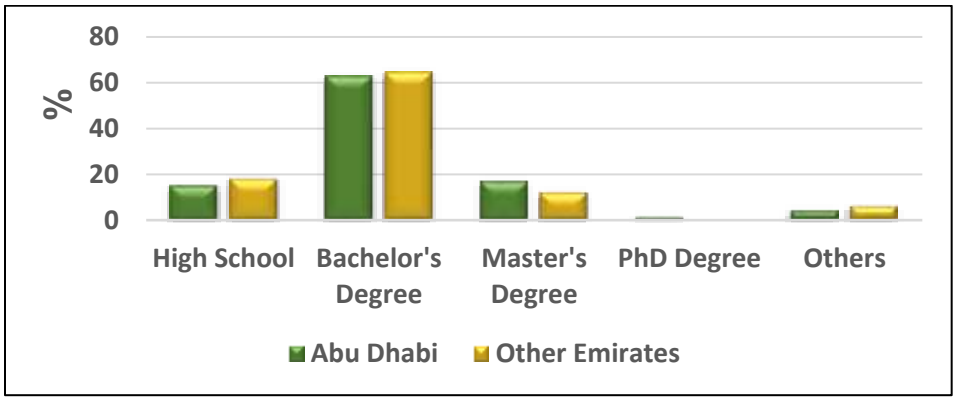


Table 67 and Figure 84 depict the respondents' academic education level from the Emirate of Abu Dhabi and the other Emirates. The types of academic qualifications are listed in ascending order. The respondents from the Emirate of Abu Dhabi revealed almost the same level of performance, with 62% having at least a bachelor's degree, and 15% as school graduates. The other Emirates respondents had almost the same level of bachelor's degree 64%, such that 76% of respondents were at least bachelor's degree holders, and only 17% were school graduates. Respondents who had only a bachelor's degree are more prevalent in the other Emirates (64%) than in Abu Dhabi (62%). In contrast, more master's degree holders are in the Emirate of Abu Dhabi (17%) compared with other Emirates (12%).

e. OHS Professional Membership

Question 6 of the survey questionnaire, asked the participants about their OHS Professional membership, and the responses were as follows:

Figure 85 *Abu Dhabi Construction Participants who Answered Q 6 Related to "OHS Professional Membership."*

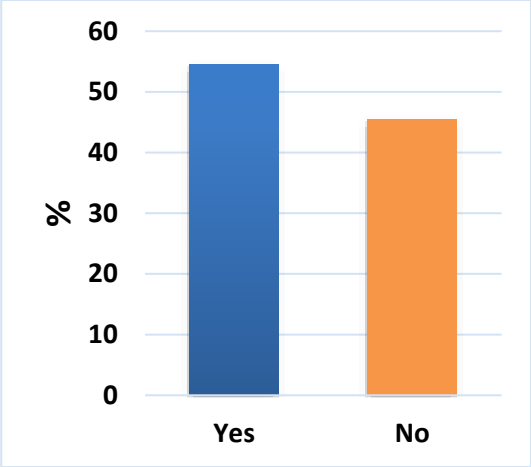


Figure 86 *Abu Dhabi Manufacturing Participants who Answered Q 6 Related to "OHS Professional Membership."*

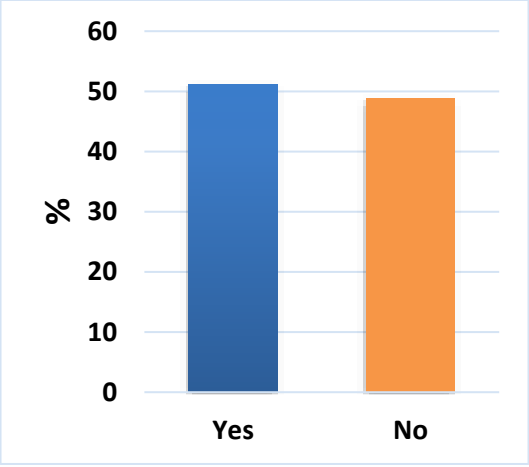


Figure 87 *Other Emirates Construction Participants who Answered Q 6 Related to "OHS Professional Membership."*

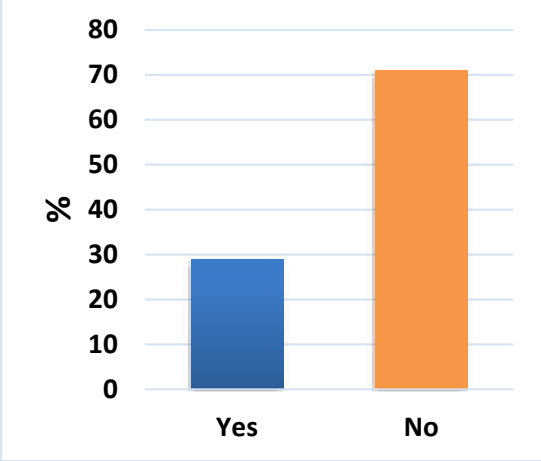


Figure 88 *Other Emirates Manufacturing Participants who Answered Q 6 Related to "OHS Professional Membership."*

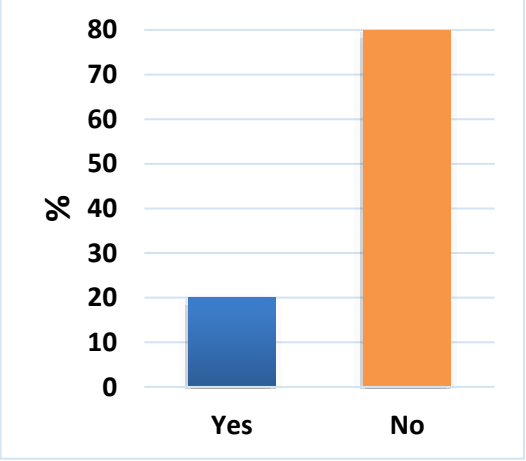


Figure 89 *Percentage of OHS Professional Memberships with Respect to Size of Entity*

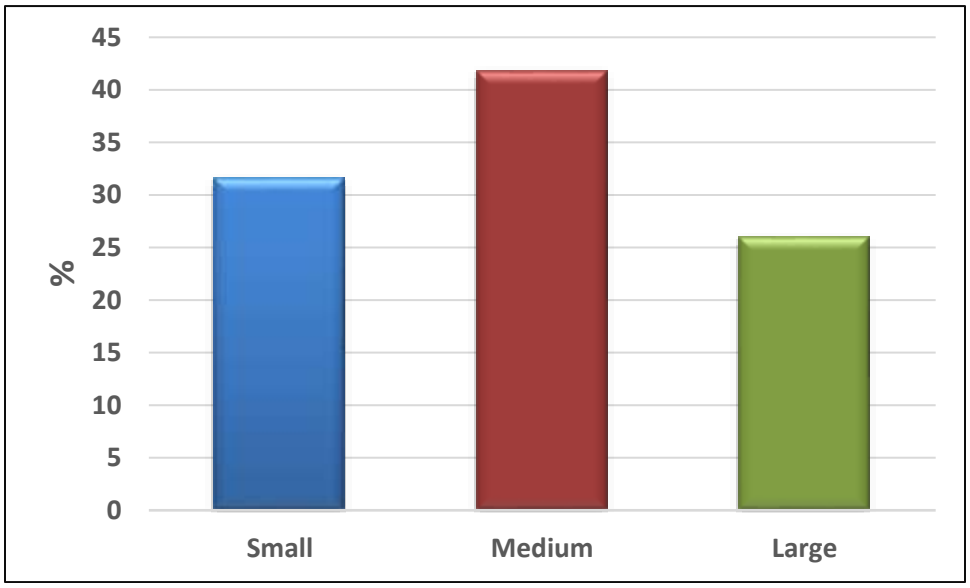


Table 68 *Percentage of OHS Professional Memberships with Respect to Size of Entity*

Company size	Percentage of OHS Professional Memberships
Small	32
Medium	42
Large	26

As per the above Figure 89 and Table 68, it is evident that the Medium-sized entities had the highest percentage of OHS Professional Memberships, where 42% of the Medium-sized entities had OHS Professional Memberships, followed by the Small-sized entities at 32%. The Large-sized companies had the least percentage of OHS Professional Memberships throughout the United Arab Emirates at only 26%.

Figure 85, Figure 86, Figure 87, and Figure 88 show the respondents to the survey were checked for their professional memberships related to OHS. 55% of the respondents from the Emirate of Abu Dhabi belonging to the Construction sector had some OHS related memberships. 51% of the

Manufacturing sector respondents from the Emirate of Abu Dhabi had OHS memberships. Among the other Emirates respondents, 29% of the Construction sector companies had memberships, and 20% of the Manufacturing companies had OHS related memberships.

Table 69 *OHS Professional Membership*

	Construction		Manufacturing	
	Abu Dhabi	Other Emirates	Abu Dhabi	Other Emirates
OSHAD	14	-	12	-
IOSH	12	3	8	3
Civil Defence	6	-	6	1
OSHA, NEBOSH	3	7	1	1
IIRSM	3	1	2	3
ISO	2	-	4	-
NSC	1	1	-	-
Others	1	-	2	-

Figure 90 *OHS Professional Membership in the Construction Sector, in the Emirate of Abu Dhabi*

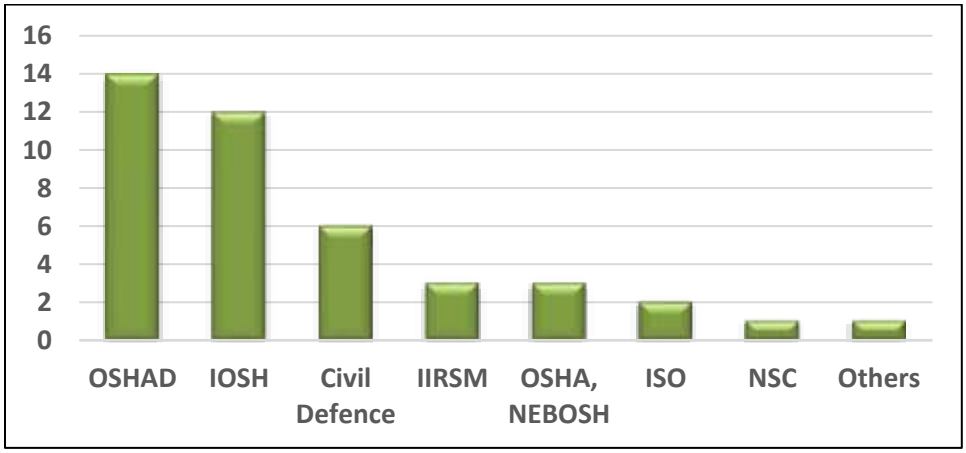


Figure 91 *OHS Professional Membership in the Construction Sector, in the Other Emirates*

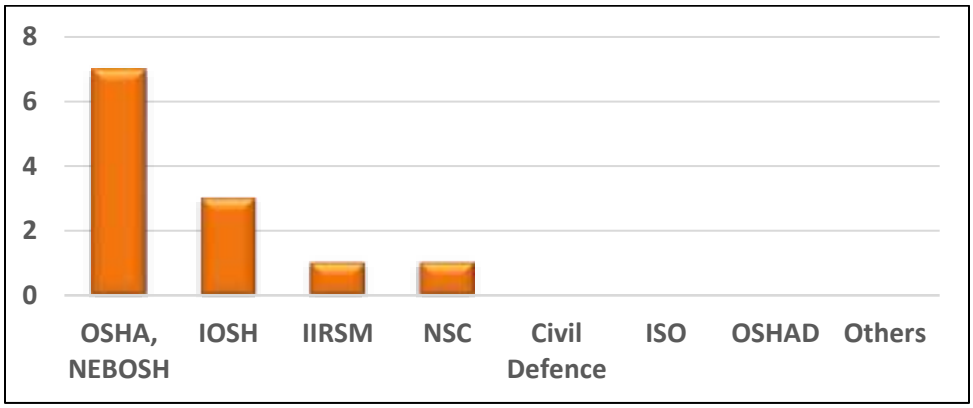


Figure 92 *OHS Professional Membership in the Manufacturing Sector, in the Emirate of Abu Dhabi*

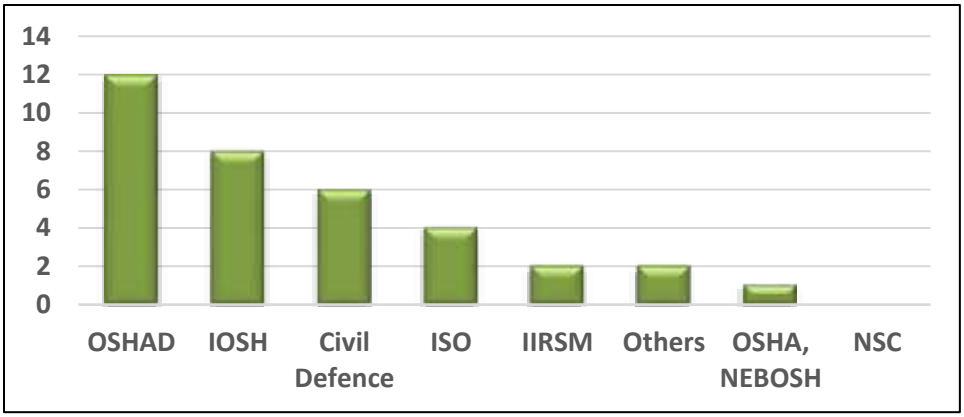


Figure 93 *OHS Professional Membership in the Manufacturing Sector, in the Other Emirates*

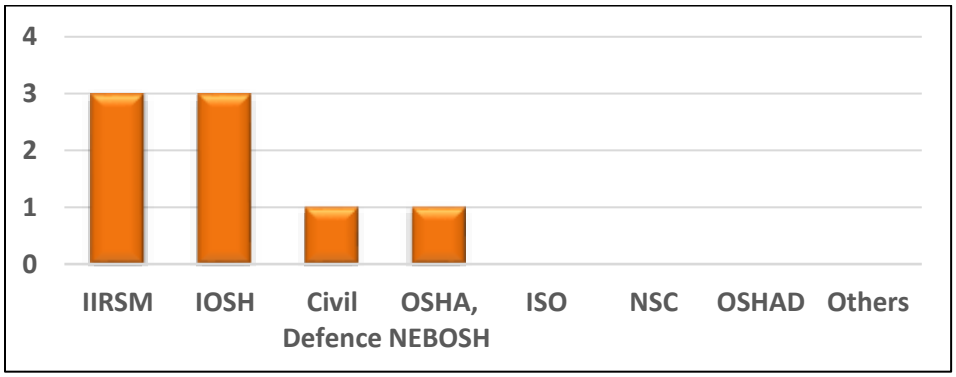


Table 69 above shows the count of OHS professional membership in descending order. The most popular credentials from the Emirate of Abu Dhabi were the OSHAD registration, the IOSH memberships and civil defence registration, which are the same for both the Construction and the Manufacturing sectors within Abu Dhabi as per Figure 90 and Figure 92. In the Construction sector

of the Emirate of Abu Dhabi, OSHA and NEBOSH credentials were the most frequent. For the respondents from the other Emirates in the Manufacturing sector as per Figure 93, the most frequent OHS credentials were IOSH and IIRSM.

From the above, it is clear that regardless of the sectors, the respondents from the Emirate of Abu Dhabi had both international and local memberships and registrations. The other Emirates respondents were dependent on international credentials, as there were no local frameworks available for OHS membership or registrations. For example, the IOSH qualified professionals were primarily from the Emirate of Abu Dhabi (77%), which was due to the registration and continuous professional development requirements of the OSHAD SF element five in competency management requirements.

f. OHS Qualification

Question 7 of the survey questionnaire asked the participants about their OHS qualification level, and the responses were as follows:

Figure 94 *Abu Dhabi Construction Participants who Answered Q 7 Related to "OHS Qualification."*

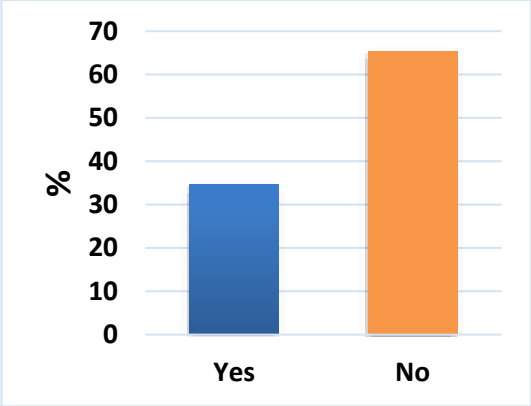


Figure 95 *Abu Dhabi Manufacturing Participants who Answered Q 7 Related to "OHS Qualification."*

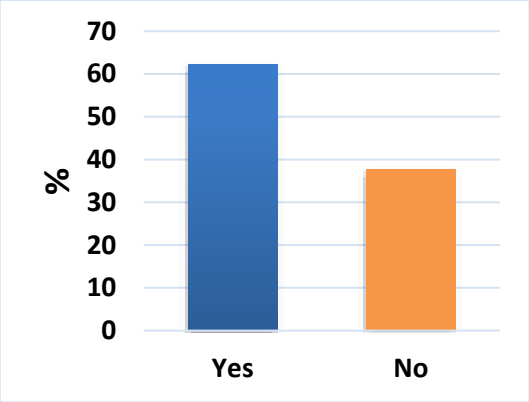


Figure 96 *Other Emirates Construction Participants who Answered Q 7 Related to "OHS Qualification."*

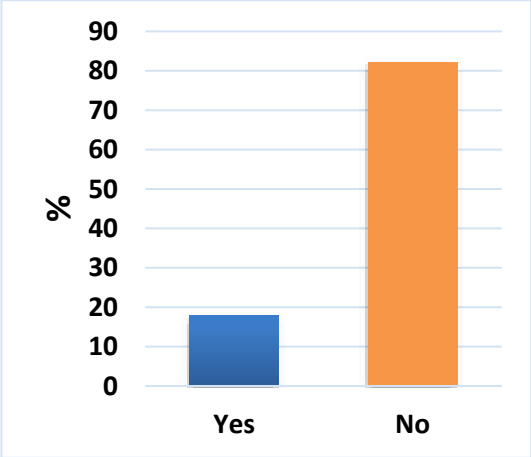


Figure 97 *Other Emirates Manufacturing Participants who Answered Q 7 Related to "OHS Qualification."*

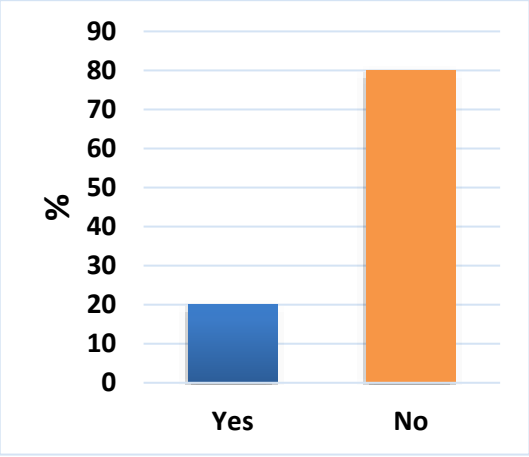


Figure 98 *Percentage of OHS Qualifications by Size of Entity*

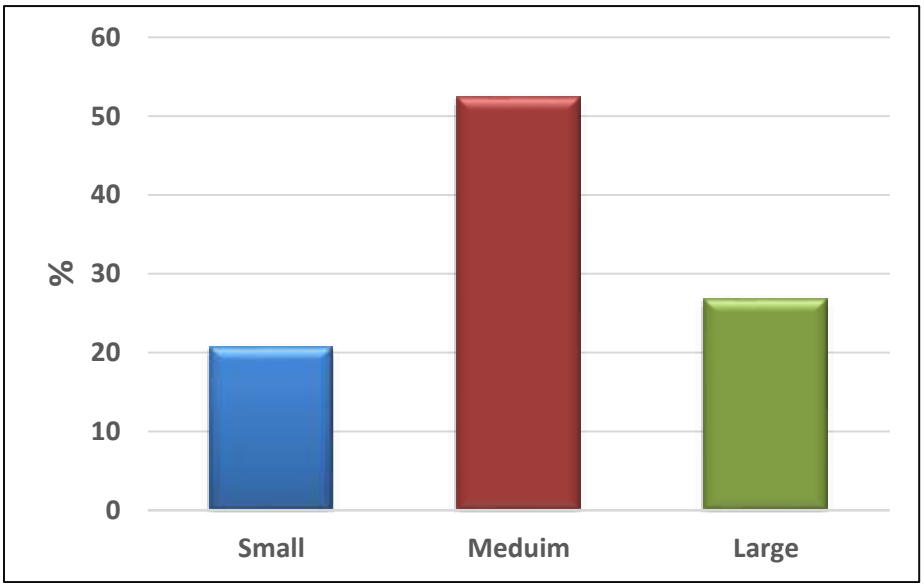


Table 70 *Percentage of OHS Qualifications by Size of Entity*

Company size	Percentage of Entities Obtaining OHS Qualifications
Small	21
Medium	52
Large	27

As per the above Figure 98 and Table 70, the highest percentage of OHS Qualifications belonged to the Medium-sized entities, as there were 52% of the participants from the Medium-sized entities with OHS Qualifications, followed by the Large-sized entities at 27%. The Small-sized companies had the lowest percentage of OHS Qualifications throughout the United Arab Emirates standing at 21%.

Figure 94, Figure 95, Figure 96 and Figure 97 illustrate the respondents' qualification. 35% of the Abu Dhabi Construction respondents had OHS qualifications, while the remaining 65% did not.

Vide Figure 95, 62% of the Manufacturing respondents from the Emirate of Abu Dhabi had OHS qualifications, while 38% did not.

Vide Figure 96, 18% of the Construction respondents from the other Emirates had OHS qualifications, while 82% of them did not.

Vide Figure 97, 20% of the other Emirates' Manufacturing respondents had OHS qualifications, while 80% of them did not.

This indicated that the OHS professionals' influence on the effectiveness of OHSMS was better in the Manufacturing entities located in the Emirate of Abu Dhabi than the Construction companies located in the same (Abu Dhabi) Emirate. A similar trend can be observed in the OHS qualified professionals from other Emirates, out of which, 20% are from the Manufacturing sector and 18% are from the Construction sector. Thus, regardless of the emirates (the Emirate of Abu Dhabi and the other Emirates), the Manufacturing sector employed the most figures of the qualified OHS professionals.

Table 71 *OHS Qualifications.*

	Construction		**Manufacturing**	
	Abu Dhabi	Other Emirates	Abu Dhabi	Other Emirates
NEBOSH IGC	12	-	9	5
NEBOSH IOSH	7	1	8	2
Diploma	5	5	12	1
ISO	3	-	5	-
NVQ	1	1	-	-
Master	1	-	1	-
BSc	-	1	4	-
Others	-	1	2	3
OSHAD	-	-	6	1

Figure 99 *OHS Qualification in the Construction Sector in the Emirate of Abu Dhabi*

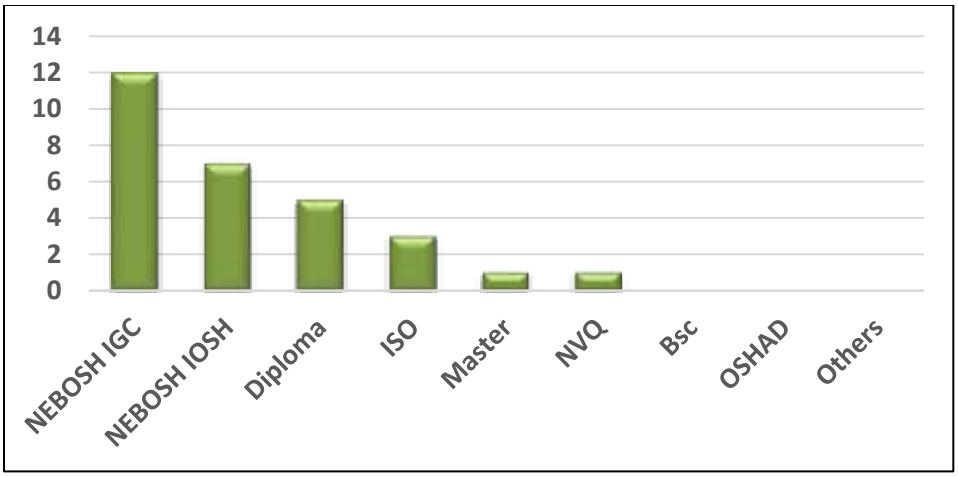


Figure 100 *OHS Qualifications in the Construction Sector in the Other Emirates*

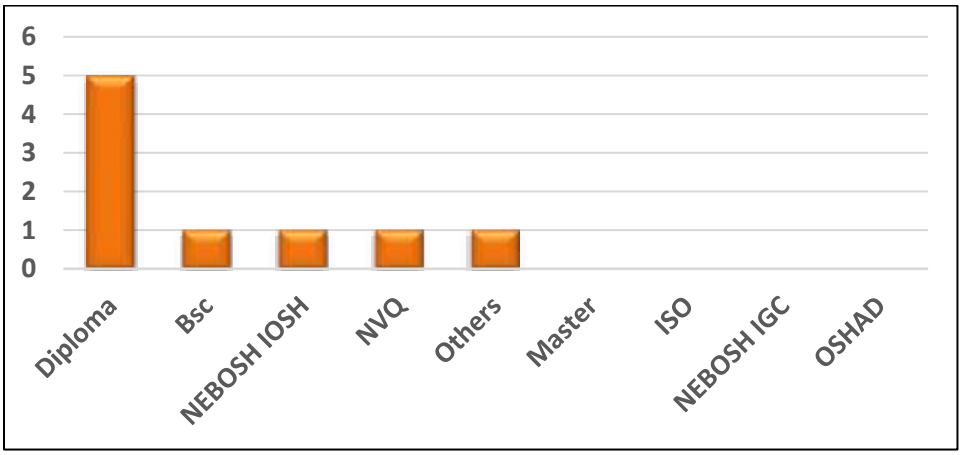


Figure 101 *OHS Qualification in the Manufacturing Sector in the Emirate of Abu Dhabi*

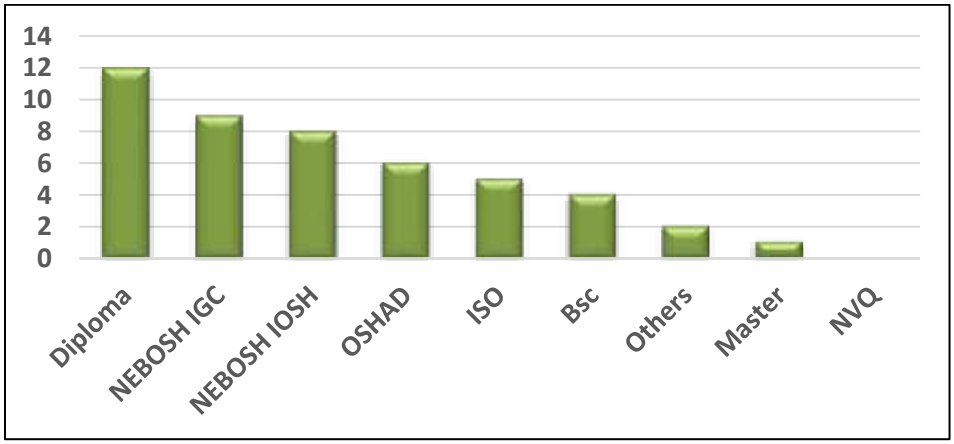


Figure 102 *OHS Qualifications in the Manufacturing Sector in the Other Emirates*

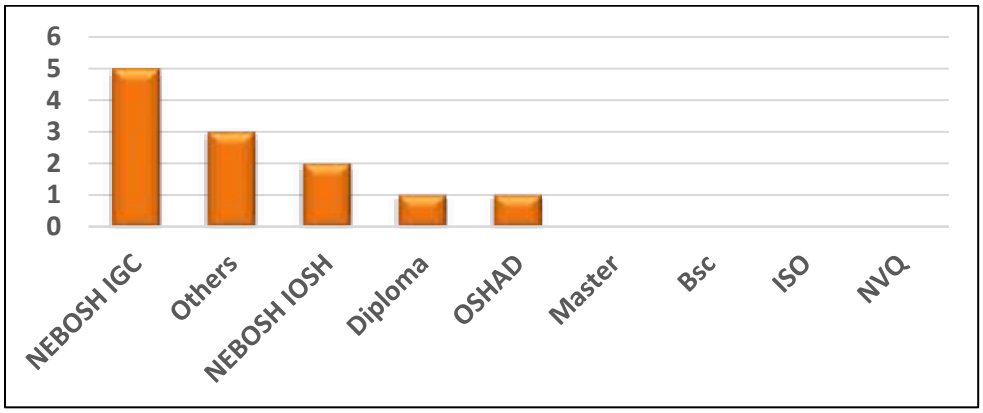


Table 71 shows the count of OHS qualifications in descending order. Figure 99 shows that the most popular qualifications in the Construction sector from the Emirate of Abu Dhabi were the NEBOSH IGC, NEBOSH IOSH and OHS diplomas, which are the same qualifications for both the Construction and the Manufacturing sectors within the Emirate of Abu Dhabi. For the other Emirates respondents shown in Figure 100, the most frequent OHS qualifications were OHS diplomas.

From the above, it is clear that regardless of the sectors, the respondents from the Emirate of Abu Dhabi have a variety of OHS qualifications ranging from Diplomas, IOSH and NEBOSH related ones, as these are the minimum competency criteria required to become an OSHAD registered practitioner through Qudorat, which is the OHS professional registration scheme in the Emirate of Abu Dhabi for recognising competent OHS practitioners as well as auditors. In the case of the other Emirates, we were able to see a comparatively smaller number of respondents who had diplomas and NEBOSH IGC. From the above, we can identify that both sectors in the Emirate of Abu Dhabi are comparatively more enriched in terms of OHS qualifications and skillsets.

Figure 101 and Figure 102, compare the key OHS qualifications in the Manufacturing sector, between the respondents from the Emirate of Abu Dhabi and those from the other Emirates.

Abu Dhabi Emirate's respondents had a variety of OHS qualifications ranging from Diplomas, IOSH and NEBOSH related ones, as these are minimum competency criteria required to become an OSHAD registered practitioner through Qudorat, which is the OHS professional registration scheme in the Emirate of Abu Dhabi for recognising the competent OHS practitioners as well as Auditors. The OHS staff from the other emirates did not have comprehensive qualifications in comparison with those from the Emirate of Abu Dhabi.

g. Level of Education of the Head of Health and Safety Department

Question 14 of the survey questionnaire, asked the participants about the level of education of their Health and Safety Departments' Heads. The level of academic qualifications are listed in ascending order, and the responses are shown in Table 72:

Table 72 *Level of Education for the Health and Safety Department Heads*

	Abu Dhabi	Other Emirates
High School	5	6
Bachelor's Degree	60	60
Master's Degree	27	9
PhD Degree	1	0
Others	7	25

Figure 103 *Level of Education for the Health and Safety Department Heads by Location*

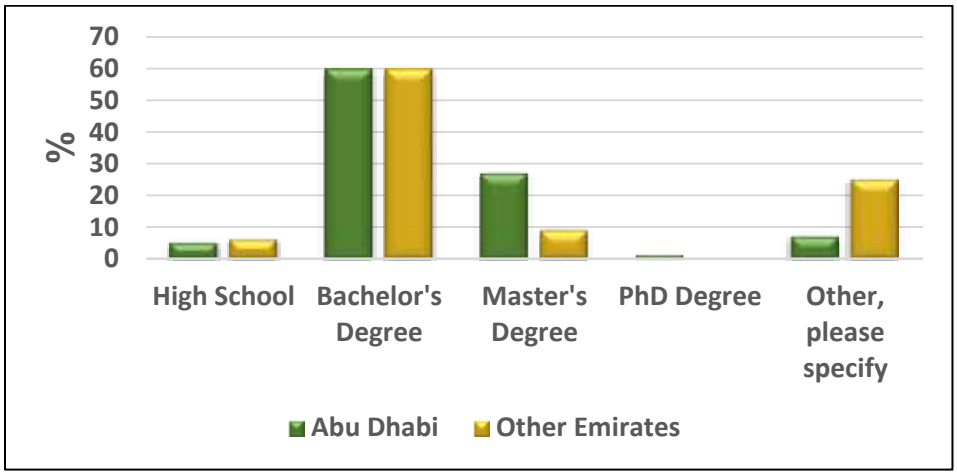
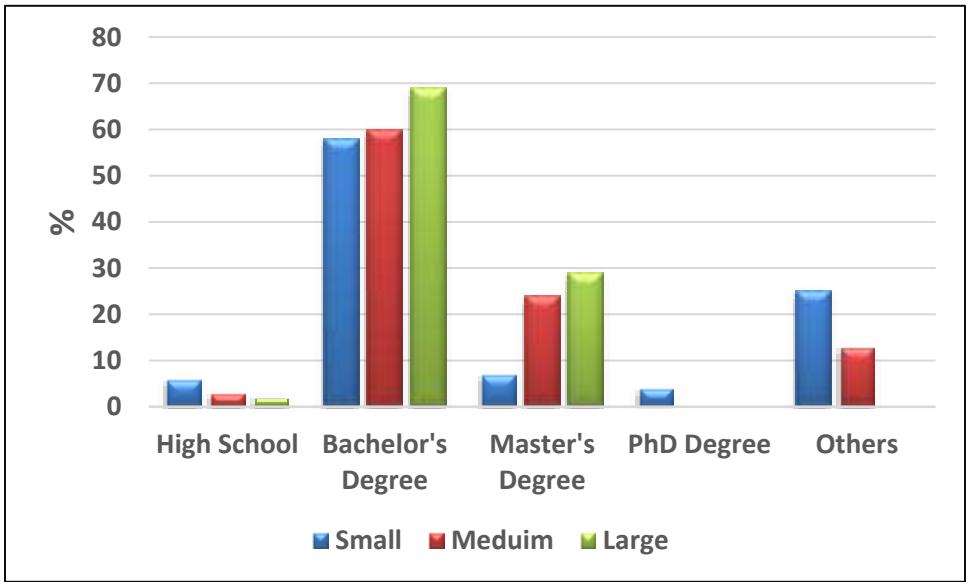


Table 73 *Level of Education of the Heads of Health and Safety Departments according to entity size*

	Small	Medium	Large
High School	6	3	2
Bachelor's Degree	58	60	69
Master's Degree	7	24	29
PhD Degree	4	0	0
Others	25	13	0

Figure 104 *Level of Education of the Heads of Health and Safety Departments according to entity size*



As per the above Table 73 and Figure 104, the most frequent level of education obtained by the heads of health and Safety departments for all sizes of entities is the bachelor's degree. Followed by the master's degree. The least common level of education is the PhD degree.

The above Figure 103 reveals the level of education held by the heads of the HSE Departments, analysed by the relative Emirates. The respondents from the Emirate of Abu Dhabi indicated higher academic qualifications, with 88% having at least a bachelor's degree and just 5% as school graduates. 69% of the other Emirates respondents were at least bachelor's degree holders, and only 6% were school graduates. Respondents who have only the bachelor's degree are the same in both the other Emirates and the Emirate of Abu Dhabi, which is 60%, whereas there are more master's degree holders in the Emirate of Abu Dhabi 27% against other Emirates 9%.

Table 74 *Level of Education for the Health and Safety Department Heads by Sector*

	Construction	Manufacturing
High School	7	3
Bachelor's Degree	75	46
Master's Degree	11	23
PhD Degree	1	0
Others	6	28

Figure 105 *Level of Education of the Head of Health and Safety Department by Sector*

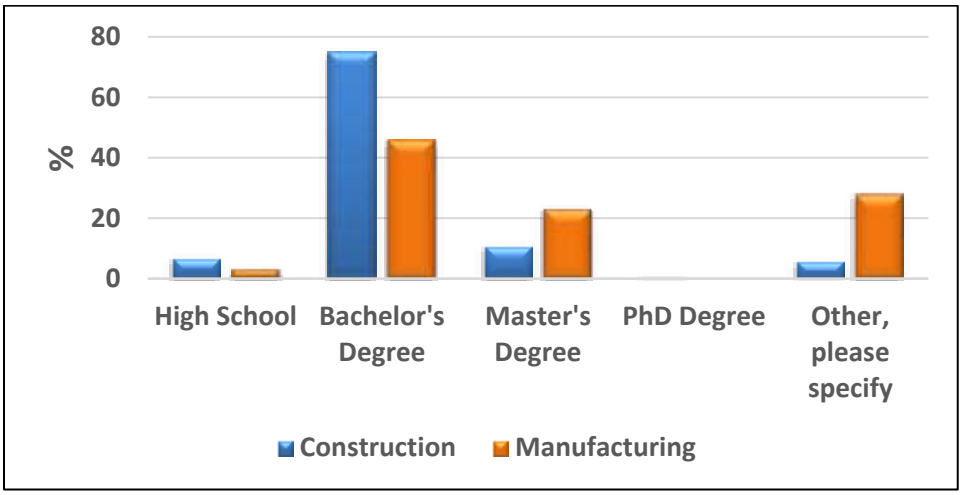


Table 75 *ANOVA Test: Level of Education of the Head of Health and Safety Department – Construction*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.759	1	5.759	0.118	0.732
Within Groups	4724.019	97	48.701		
Total	4729.778	98			

From Table 75 “Level of education of the head of Health and Safety Department – Construction”, the ANOVA test was conducted in order to compare the level of education of the heads of Health and Safety Department, and the result showed that there is no statistical significance with a value of sig.= 0.732.

Table 76 *ANOVA Test: Level of Education of the Head of Health and Safety Department – Manufacturing*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.036	1	1.036	0.533	0.467
Within Groups	190.274	98	1.942		
Total	191.310	99			

From Table 76, in “Level of education of the head of Health and Safety Department – Manufacturing”, the ANOVA test was conducted in order to compare the level of education of the heads of Health and Safety Department, and the result showed that there is no statistical significance with a value of sig.= 0.467.

Table 74 and Figure 105 explain the OHS department heads' academic background based on the chosen sector. 7% of the OHS Heads from the Construction sector were just school graduates. It indicates that most of the OHS heads from the Construction sector are educated and knowledgeable enough to manage the Health and Safety at work. In the Manufacturing sector, 3% of HSE heads were just school graduates with the remaining population of 97% have earned at least a bachelor’s degree. In the case of the bachelor’s degree holders, the respondents from the Construction sector were relatively superior with 29% more than the Manufacturing sector’s 46%. This is contrary to the specialised master’s degree graduation, where the Manufacturing sector posted a figure of 23% against the 11% of the Construction sector OHS heads, and this is not statistically significant, as shown in the analysis above.

Vide the above Figure 103, 25% of OHS heads from the other Emirates, and vide Figure 105, 28% of the OHS heads from the Manufacturing sector did not have any formal education as listed in Table 74, which was included in “Others” which means those formal qualifications which are not addressed in the survey such as diplomas.

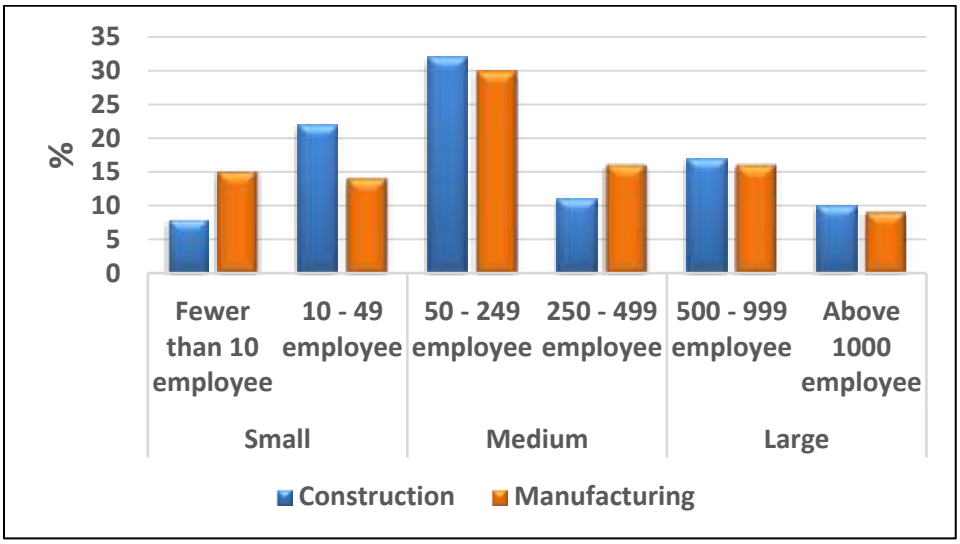
h. The Number of Employees within the Organisation

Question 8 of the survey questionnaire asked the participants about the number of employees within their organisations, and the responses are shown in Table 77:

Table 77 *Organisation Size by Sector*

Size	Range of Employees	Construction	Manufacturing
Small	Fewer than 10	8	15
	10 - 49	22	14
Medium	50 - 249	32	30
	250 - 499	11	16
Large	500 - 999	17	16
	Above 1000	10	9

Figure 106 *The Percentage of Organisation Size by Sector*



The above, Figure 106, reveals the composition of employee size according to the two sectors. The Construction sector organisations were mostly in the range of 50-249 employees (32%), 10-49 employees (22%) and 500-999 employees (17%). The Manufacturing sector respondents were mostly divided into three sizes of organisation, such as 50-249 employees (30%) and both 250-499 employees and 500-999 employees (16%). Among the Construction companies, 30% had only 1-49 employees (small companies), 43% of companies were medium-sized, having 50-499 employees, and 27% of the respondents were large companies having more than 500 employees. Among the Manufacturing companies, 29% had 1-49 employees (small companies), 46% of companies are classified as medium-sized with 50-499 employees and 25% of the respondents were large companies having more than 500 employees. A common characteristic to be noted among both the sectors is that the workforce is the highest in medium companies, followed by small companies, making large companies as the last category.

Figure 107 *The Percentage of Organisation Size by Sector in the Other Emirates*

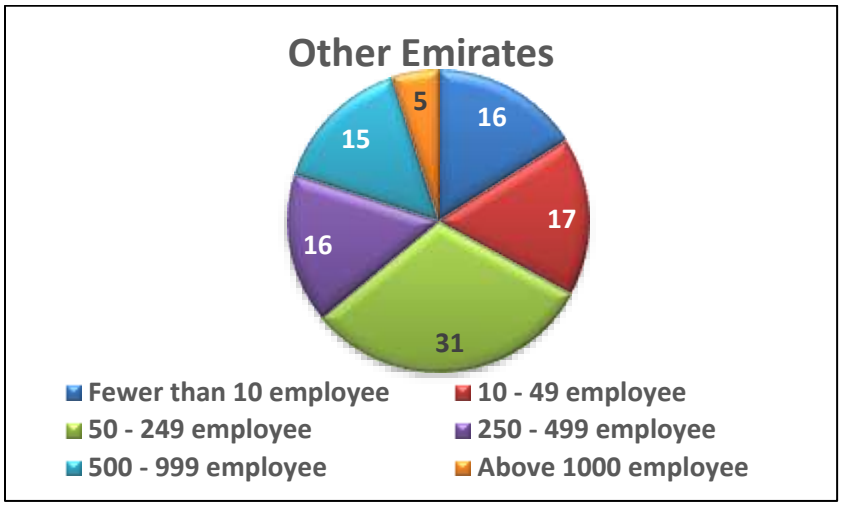
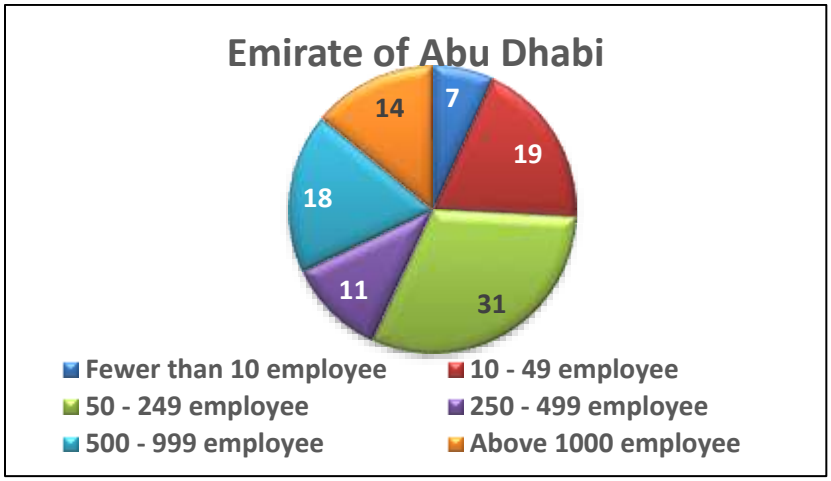


Figure 108 *The Percentage of Organisation Size by Sector in the Emirate of Abu Dhabi*



According to the Emirates, the above, Figure 107 and Figure 108 reveal the composition of employee size. The Emirate of Abu Dhabi respondents were mostly from organisations with 50-249 employees at 31% 10-49 employees at 19% and 500-999 employees at 18%. The other Emirates respondents were mostly in organisations with 50-249 employees at 31%, 10-49 employees at 17%, and both segments of 250-499 and 500-999 employees at 16% each.

Among the companies in the Emirate of Abu Dhabi, 26% had 1-49 employees (small companies), 42% of companies were medium-sized with 50-499 employees, and the remaining 32% of the

respondents were from large companies with more than 500 employees. Among the other Emirates companies, 33% had 1-49 employees (small companies), 47% of the companies were medium-sized with 50-499 employees, and 20% of the respondents were from large companies with more than 500 employees. A common characteristic to be noted was that the number of the workforce is the highest in medium companies from the Emirate of Abu Dhabi and the other Emirates.

i. Emirati vs Expatriate

Question 9 of the survey questionnaire, asked the participants about the percentage of Emirati nationals compared to the percentage of expatriate employees within their organisations, and the responses were as per Table 78.

Table 78 *The Percentage of Emirati Employees in the Organisations*

	Construction		**Manufacturing**	
	Abu Dhabi	Other Emirates	Abu Dhabi	Other Emirates
<5	76	88	63	86
5.1-10	17	7	24	10
10.1-20	7	5	6	4
>20	0	0	6	0

Figure 109 *The Percentage of Emirati Employees in the Organisations*

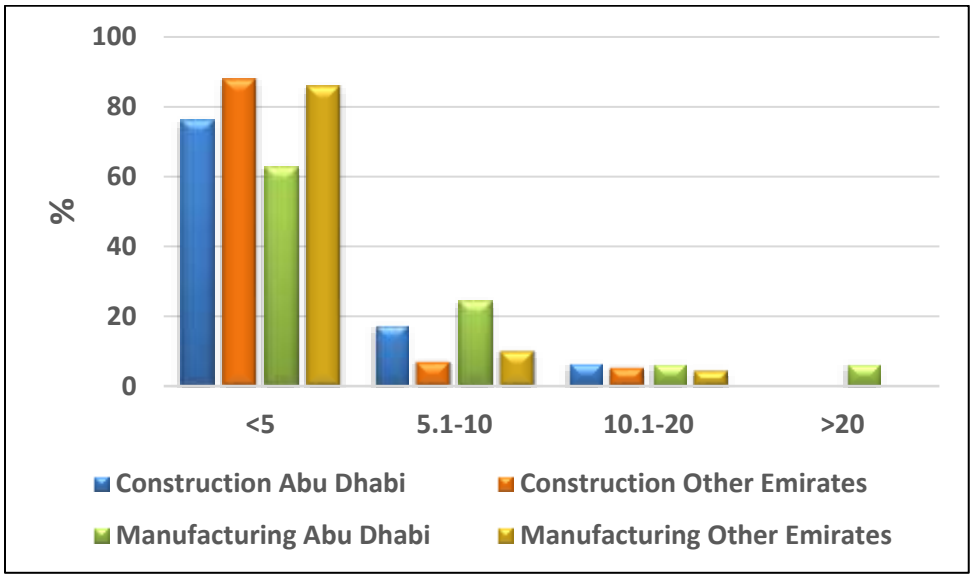
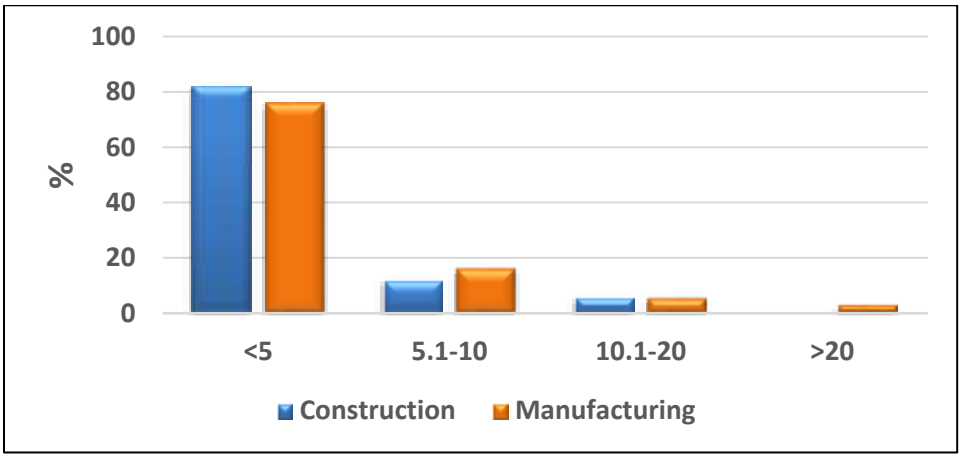


Figure 110 *The Percentage of Emirati Employees in the Organisations by Sector*



The above Figure 109 and Figure 110, show the distribution of the Emiratis employed in the companies belonging to the Construction and the Manufacturing sectors in the Emirate of Abu Dhabi as well as in the other Emirates.

a. 76% of the Construction companies in the Emirate of Abu Dhabi had less than 5% Emiratis. The same trend of less than 5% of Emiratis is revealed in a larger proportion of 88% of the Construction companies from the other Emirates. 63% of the Manufacturing companies from the Emirate of Abu Dhabi had less than 5% of Emiratis as their

employees, which was superseded by 86% of the Manufacturing companies from other Emirates having the same level of (<5%) Emirati employment.

b. 17% of the Construction companies in the Emirate of Abu Dhabi had employed 5.1–10% Emiratis. However, Construction companies from the other Emirates employing Emiratis were 7%, which was less than half of that of Abu Dhabi. 24% of Manufacturing companies in the Emirate of Abu Dhabi employed 5.1–10% Emiratis, while 10% of the Manufacturing companies from other Emirates maintained the same 5.1–10% Emirati employment, which is less than half of that of Abu Dhabi.

c. 7% of the Construction companies from the Emirate of Abu Dhabi had employed 10.1–20% as Emiratis. 5% of the same sector of Construction companies from other Emirates had 10.1–20% of Emiratis employment. 6% of the Manufacturing companies from the Emirate of Abu Dhabi had 10.1–20% Emirati's employment. 4% of the same sector of Manufacturing companies from other Emirates had 10.1–20% of Emirati employment.

j. Nationalities and Languages

Question 10 asked the participants about the nationalities of employees within their organisations, and the responses were as follows: The total number of nationalities among the employees in the surveyed organisations was 46.

Figure 111 *The Percentage of Arabic/Non-Arabic Speaking Employees*

Figure 112 *The Percentage of the Nationalities of Employees*

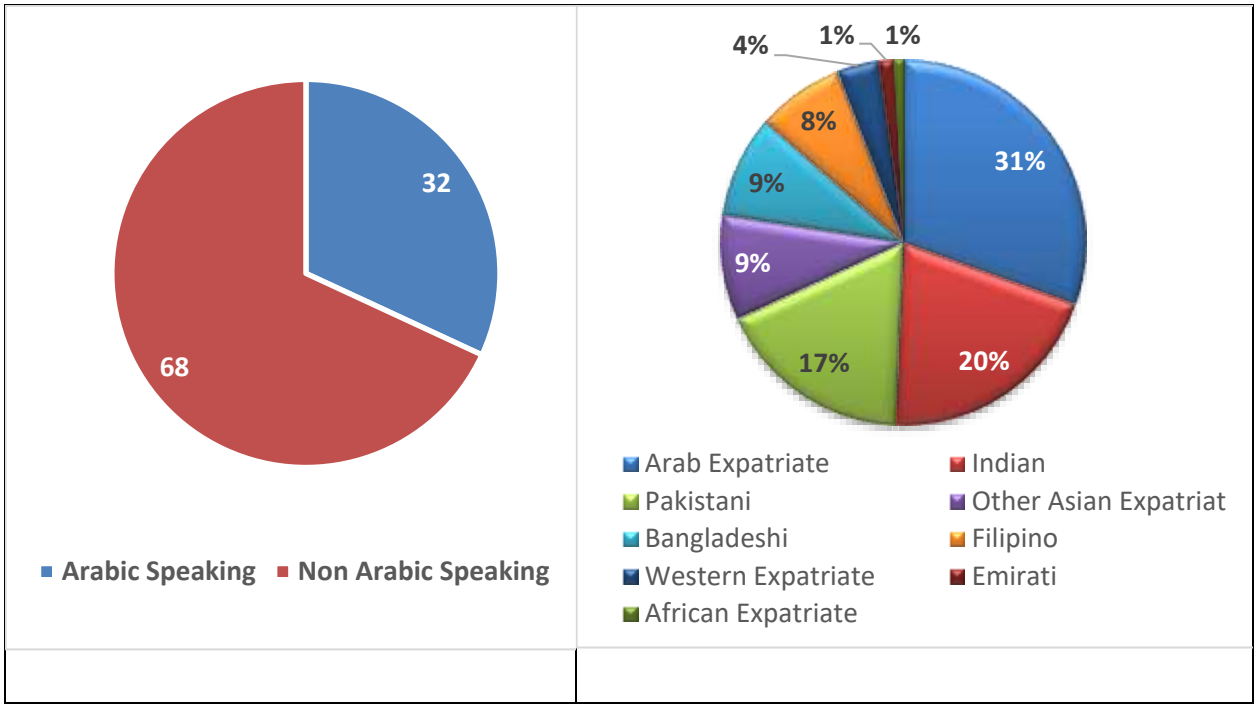


Figure 111 above illustrates the expatriate employees' overall distribution by language and ethnicity. 68% of the expatriates were not Arabic speakers as they were from the non-Arabic speaking South Asian countries such as India, Pakistan, Bangladesh which amounted to the majority (46%) of the non Arabic speaking proportion. However, in Figure 112, we can notice that the top 3 categories of expatriates employed are, the Arab Expatriates 31%, Indian 20%, and Pakistani 17%. Altogether the top 3 nationalities formed more than 67% of the employment. Hence their safety behaviour would have a strong influence on the companies' safety culture across the work sectors in the United Arab Emirates.

As far as the Emirati employment is concerned, a marginal 1% of the employees are Emiratis. Considering the Emiratis were mostly in the governing positions (Leadership and Strategic cadres), it indicates that the OHSMS lacked the adequate supervision in the work sectors in the United Arab Emirates.

I. The Manufacturing Sector in the Emirate of Abu Dhabi

The employees amongst the surveyed organisations in the Manufacturing sector in the Emirate of Abu Dhabi included 34 nationalities.

Figure 113 illustrates the employees' distribution in the Manufacturing sector from the Emirate of Abu Dhabi, by language and ethnicity. 67% expatriates were non-Arabic speaking as they were coming from a non-native Arabic speaking country such as India, Pakistan, and Bangladesh. 33% of the employees were Arabic speakers. From Figure 114, we noticed the top 3 categories of expatriates employed in the Manufacturing sector of the Emirate of Abu Dhabi were the Arab Expatriates 30%, Indian 19% and Pakistani 17%. Altogether the top 3 constitute more than 66% of employment. Hence, their safety behaviour would have a strong influence on the Manufacturing companies' safety culture, in the Emirate of Abu Dhabi.

Figure 113 *The Percentage of Arabic/Non-Arabic Speaking Employees in the Manufacturing Sector in the Emirate of Abu Dhabi*

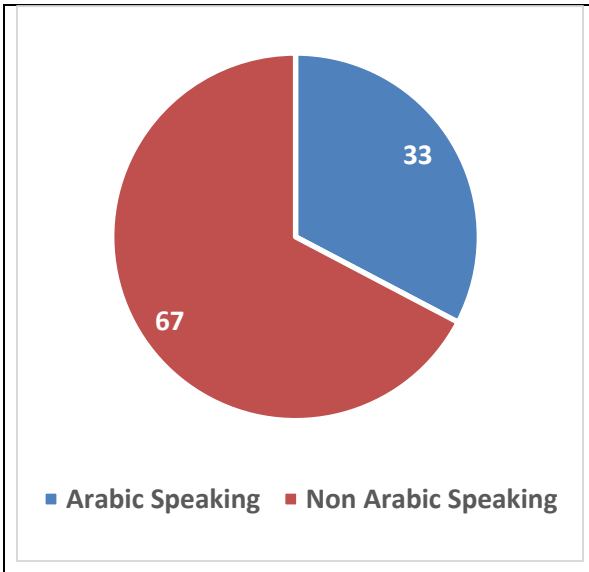
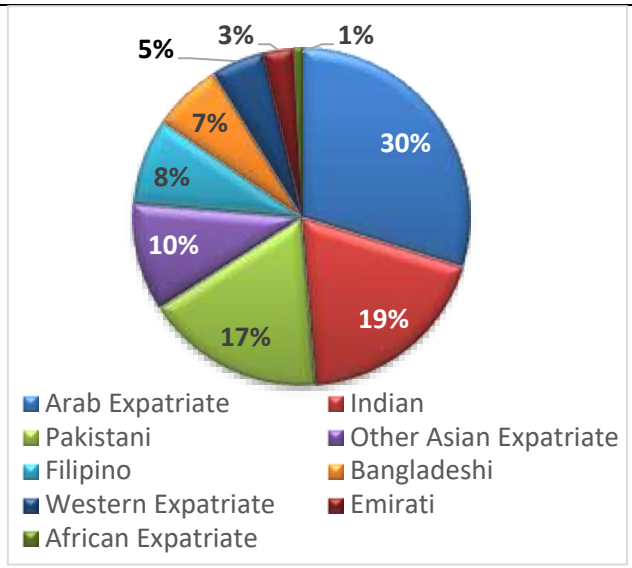


Figure 114 *The Percentage of the Nationalities of Employees in the Manufacturing Sector in the Emirate of Abu Dhabi*



II. The Manufacturing Sector in the Other Emirates

The employees on the surveyed organisations in the other Emirates Manufacturing sector included 23 nationalities.

The employees were distributed among the Manufacturing companies across the other Emirates based on different nationalities. This trend can be understood by reviewing the above Figure 115, where 79% of the employees were not Arabic speakers, as they are from non-native Arabic speaking countries such as India, Pakistan and Bangladesh. 21% of the employees were Arabic speakers. In Figure 116 the top 3 categories of expatriates employed in the Manufacturing sector of the Emirate of Abu Dhabi were Indian 24%, Arab Expatriates 19%, and Pakistani 17%. Together, the top 3 constituted more than 60% of employment. Hence, their safety behaviour will have a strong influence on the Manufacturing companies' safety culture from the other Emirates.

Figure 115 *The Percentage of Arabic/Non-Arabic Speaking Employees in the Manufacturing Sector from the Other Emirates*

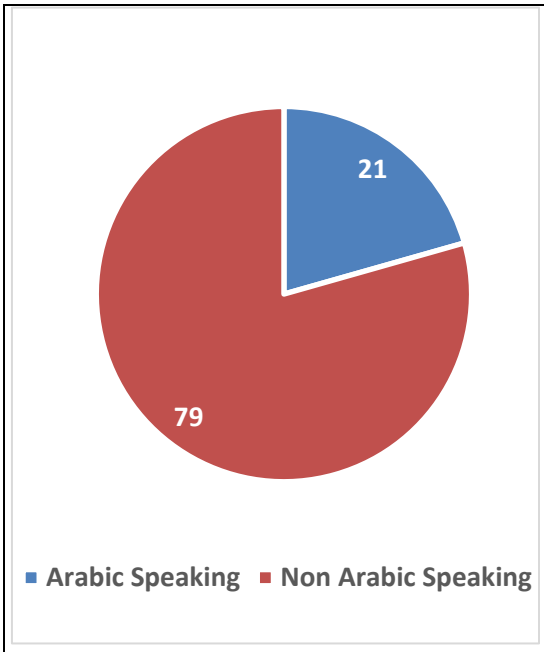
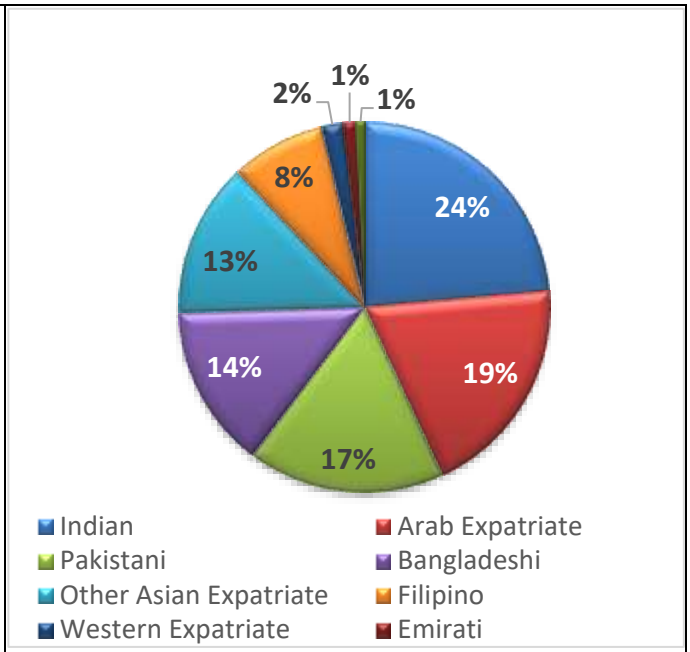


Figure 116 *The Percentage of the Nationalities of Employees in the Manufacturing Sector from the Other Emirates*



III. The Construction Sector in the Emirate of Abu Dhabi

The employees from the surveyed organisations in the Construction sector of the Emirates of Abu Dhabi represented 32 nationalities, reflecting the multinational work environment of the United Arab Emirates.

Figure 117, as above, explains how the employees are distributed according to their nationalities across the Construction companies situated in the Emirate of Abu Dhabi. 63% of the employees are not Arabic speakers, 37% of the employees are Arabic speakers. In Figure 118 the top 3 categories of the expatriates employed in the Construction sector of the Emirate of Abu Dhabi are the Arab expatriates 36%, Indian 18% and Pakistani 17%. Together the top 3 constitute more than 71% of the employees. Hence their safety behaviour will have a strong influence on the Construction companies' safety culture, in the Emirate of Abu Dhabi.

Figure 117 *The Percentage of Arabic/Non-Arabic Speaking Employees in the Construction Sector in the Emirate of Abu Dhabi*

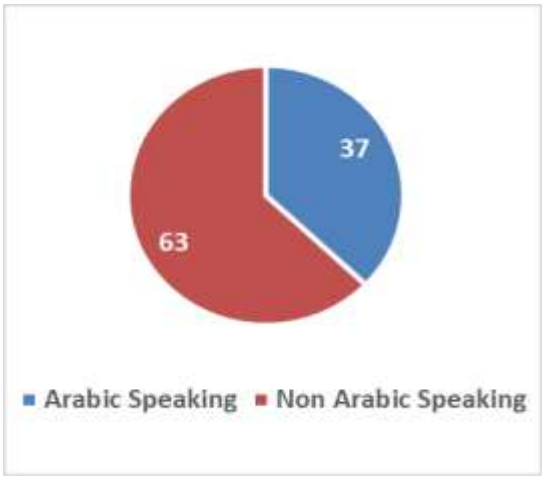
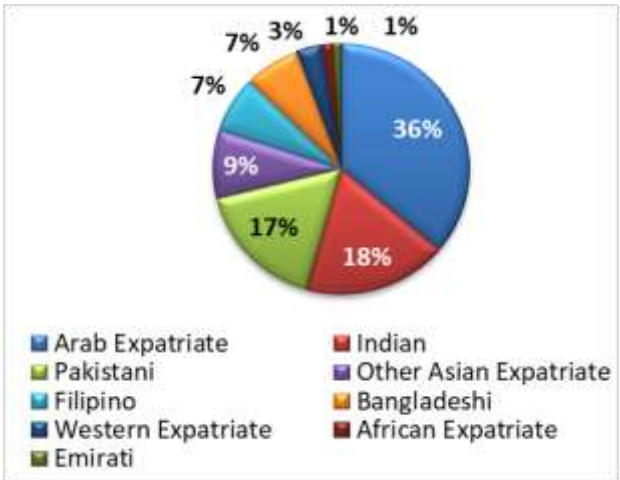


Figure 118 *The Percentage of the Nationalities of Employees in the Construction Sector in the Emirate of Abu Dhabi*



A salient observation on the above depiction is that, unlike the other Emirates, only 1% of the employees within the Abu Dhabi Construction companies were Emiratis, which indicates the weightage of the expatriates employees' influence on the OHS Culture of the Abu Dhabi Construction companies.

IV. The Construction Sector in the Other Emirates

The employees in the surveyed construction sector organisations in the other Emirates represented 24 nationalities.

The above Figure 119 illustrates the distribution of the employees in the Construction sectors of the other Emirates, by language and ethnicity. 66% of the employees were not Arabic speakers, 34% of the employees were Arabic speakers. Figure 120 shows that the top 3 categories of the expatriates employed in the Construction sector of the other Emirates were the Arab expatriates 34%, Indian 22% and Pakistani 19%. Together the top 3 constituted more than 75% of employees. Hence their safety behaviour will have a strong influence on the construction companies' safety culture in the other Emirates.

Figure 119 *The Percentage of Arabic/Non-Arabic Speaking Employees in the Construction Sector from the Other Emirates*

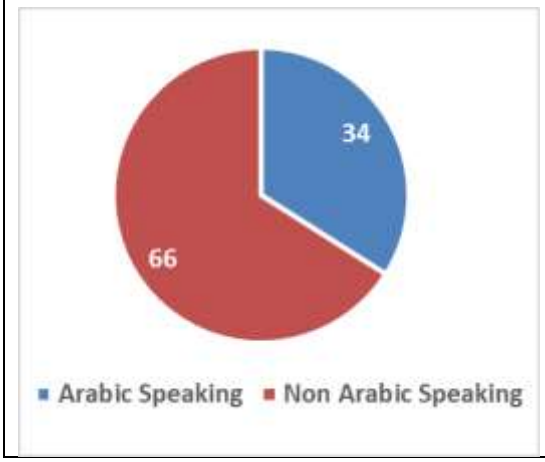
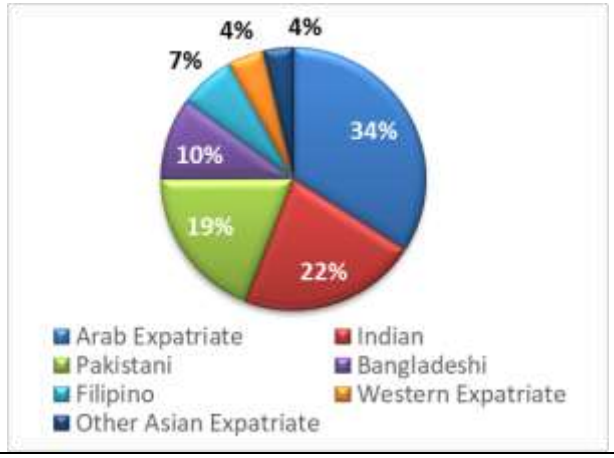


Figure 120 *The Percentage of the Nationalities of Employees in the Construction Sector from the Other Emirates*



1% of the overall employees (OHS & Non-OHS) in the United Arab Emirates were found to be Emiratis Figure 112. In the Emirate of Abu Dhabi, 3% of the Manufacturing employees were Emiratis (see Figure 114), and 2% of the Construction sector employees were Emiratis (see Figure 118). On the other hand, and in the case of the other Emirates, 1% of the Manufacturing sector employees (see Figure 116) and 0% of the Construction sector employees (see Figure 120) were Emiratis.

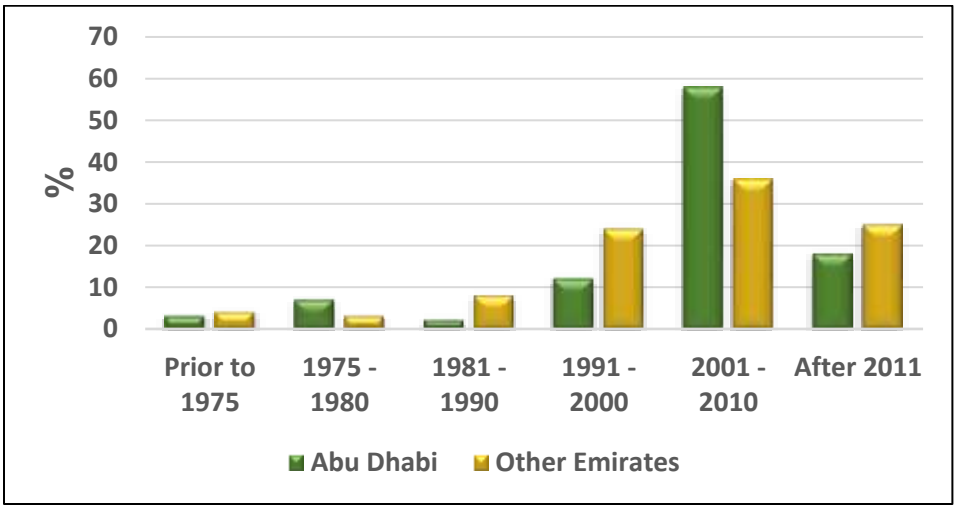
k. Year of Establishment

Question 15 of the survey questionnaire asked the participants about the year their organisation was established, and the responses were as Table 79:

Table 79 *Year of the Establishment of Entities*

	Abu Dhabi	**Other Emirates**
Prior to 1975	3	4
1975 - 1980	7	3
1981 - 1990	2	8
1991 - 2000	12	24
2001 - 2010	58	36
After 2011	18	25

Figure 121 *Year of the Establishment of Entities by Location*



The above Figure 121 reveals the responding organisations' tenure since they were established. 58% of the companies from Abu Dhabi were established during 2001-2010, 18% of them were established after 2011, thus indicating that out of the overall total of the Abu Dhabi based companies responding to the survey, 76% of them were less than 20 years old. Similarly, 36% of the other Emirates' responding companies were established during 2001-2010, and 25% of them were established after 2011, hence totalling an overall figure of 61% of the responding companies from the other Emirates are less than 20 years old.

Figure 122 *Years of Establishment of the Entities by their Size*

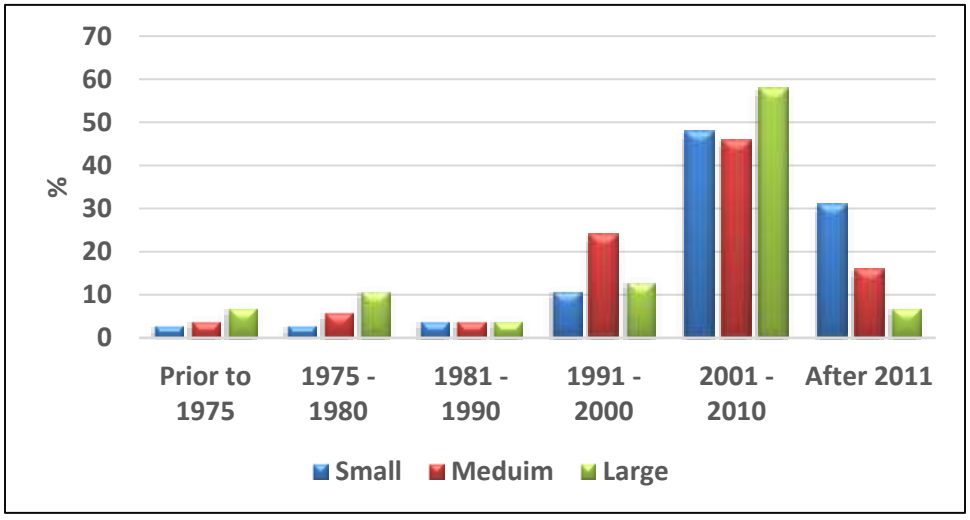


Table 80 *Percentage of Entities' Establishment According to the Years Range's with Relation to Size*

Years' Ranges	Small	Medium	Large
Prior to 1975	3	4	7
1975–1980	3	6	11
1981–1990	4	4	4
1991–2000	11	24	13
2001–2010	48	46	58
After 2011	31	16	7

As per the above Figure 122 and Table 80, the highest percentage of established Large-sized entities was in the year range of 2001-2010, which is also the same for the Small and Medium-sized entities. A drop is demonstrated in the establishment of Large and Medium-sized entities after the year 2011, in comparison to the Small-sized entities.

I. Health and Safety Performance Records

Question 18 of the survey questionnaire, asked the participants a Yes or No question: "Does your company have Health and Safety performance records?" The responses were as depicted in Table 81 and Table 82 below:

Table 81 *The Percentage of Health and Safety Performance Records Availability by Location*

	Abu Dhabi	Other Emirates
No	37	44
Yes	63	56

Figure 123 *The Percentage of Health and Safety Performance Records Availability by Location*

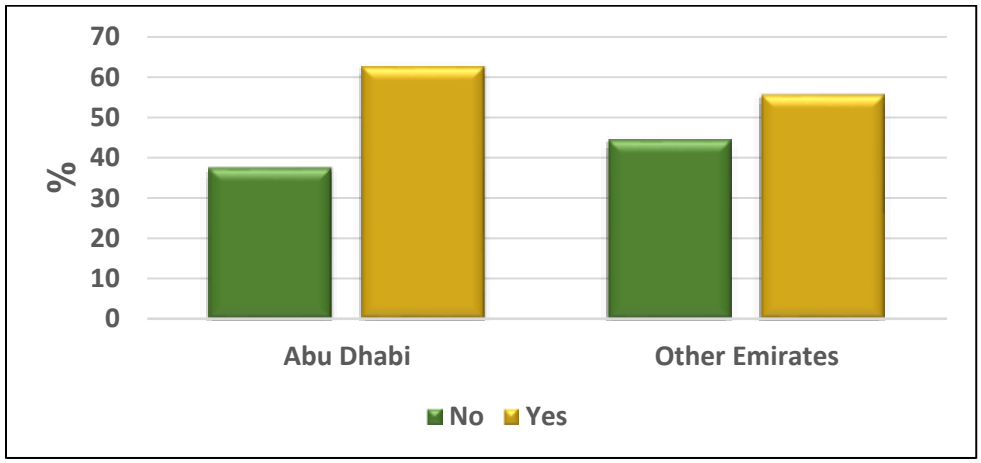


Table 82 *The Percentage of Health and Safety Performance Records Availability by Sector*

	Construction	Manufacturing
No	41	46
Yes	59	54

Figure 124 *The Percentage of Health and Safety Performance Records Availability by Sector*

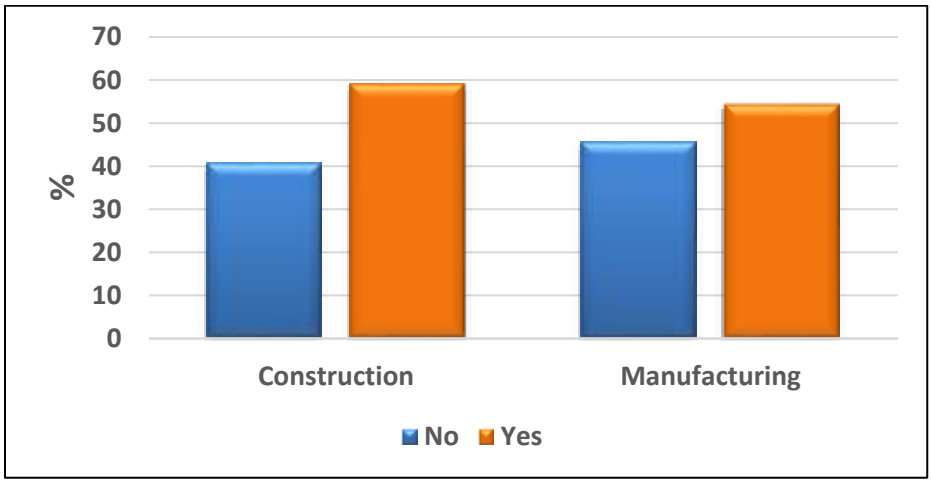
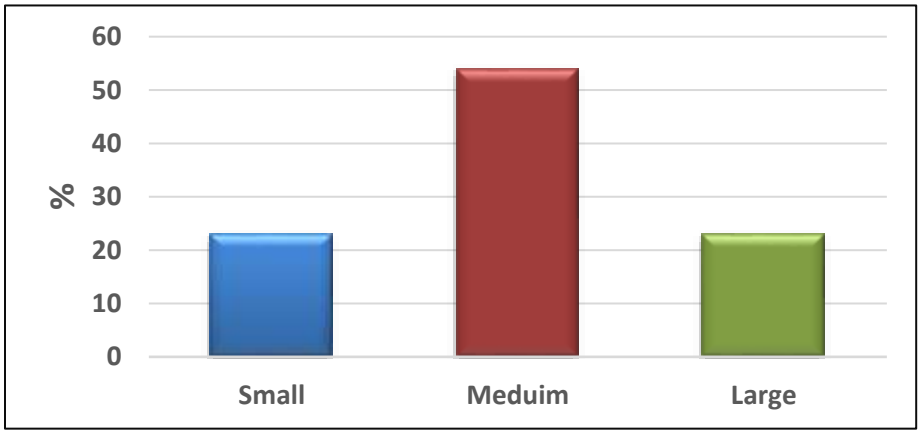


Table 83 *Percentage of Entities Retaining the Health and Safety Performance Records*

Company size	Percentage of Entities Recording Health and Safety Performance Records
Small	23
Medium	54
Large	23

Figure 125 *Percentage of Entities Retaining the Health and Safety Performance Records*



As per the above Table 83 and Figure 125, out of the entities which responded to the question 18 of the questionnaire, the highest percentage of entities retaining the Health and Safety

Performance Records are the Medium-sized entities at 54%, followed by an equal score of 23% for both the Small and Large-sized entities.

The above Figure 123 and Figure 124 show the track of maintaining OHS performance data in the companies, based on their Emirate and sector. 63% of the companies from the Emirate of Abu Dhabi had OHS performance data, while 37% of them did not have such records. This was mainly due to the regulatory framework requirements such as the OSHAD SF as well as the Al Adaa portal to maintain mandatory documents such as PPE records, Injury records, legal compliance records, Training records and risk assessments related records, for the high and medium risk entities only. 56% of the companies in the other Emirates had maintained OHS performance data records, whereas 44% of them did not. Though there is no mandatory requirement to maintain OHS performance data from the regulators, many of the large and medium companies from the other Emirates have implemented that policy and were certified to ISO 45001/OHSAS 18001 standards, due to having maintained their OHS performance records.

Looking at the OHS records' sector-wise maintenance, the Construction sector respondents showed around 59% of its companies having maintained their OHS performance records, whereas 41% of them did not. This is due to the major proportion of the Construction companies being medium to large-scale. Hence, as per the local regulatory requirements, they had to keep their OHS records to comply with ISO standards or the local compliance requirements, or both.

54% of the Manufacturing companies maintained their OHS performance records, while 46% of them did not. This was mainly due to the Manufacturing sector having a significantly larger segment of small companies 29%, which were low-risk entities (if situated in the Emirate of Abu Dhabi), and they do not have any recording/reporting obligation (if located in the other Emirates), hence they were not mandated to maintain OHS performance data.

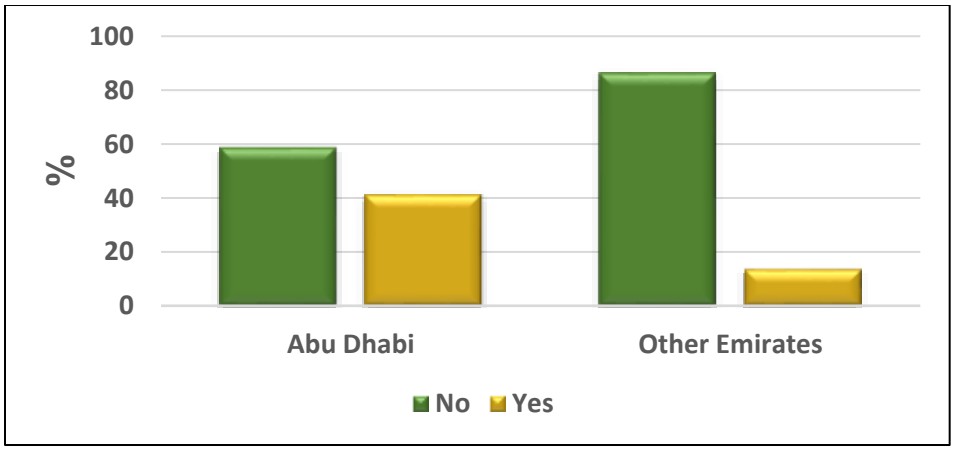
m. Contribution to Developing an Innovative Mechanism for Managing/Promoting Health and Safety

Question 38 of the survey questionnaire asked the participants to answer a "Yes" or "No" question: "Have you contributed to developing an innovative mechanism for managing/promoting Health and Safety in your organisation?". The responses were as Table 84 follows:

Table 84 *The Percentage of the Contribution to Developing an Innovative Mechanism for Managing/Promoting Health and Safety by the Location*

	Abu Dhabi	Other Emirates
No	59	86
Yes	41	14

Figure 126 *The Percentage of the Contribution to Developing an Innovative Mechanism for Managing/Promoting Health and Safety by the Location*

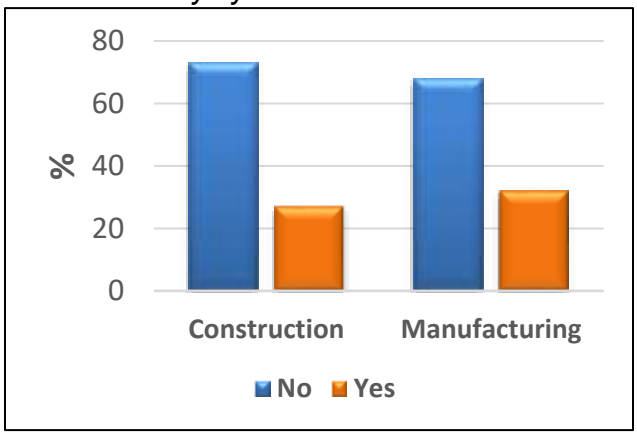


The above Figure 126 illustrates the use of human capital in contributing to innovative OHS improvements. 41% of the Abu Dhabi based respondents contributed to Innovative OHS activities through the OSHAD SF obligations such as employee consultation and participation in developing the OHSMS and the review of the system, including the risk register, legal register and control measures. Only 14% of the other Emirates respondents had contributed to innovation and improvement in OHS.

Table 85 *The Percentage of the Contribution to Developing an Innovative Mechanism for Managing/Promoting Health and Safety by the sector*

	Construction	Manufacturing
No	73	68
Yes	27	32

Figure 127 *The Percentage of the Contribution to Developing an Innovative Mechanism for Managing/Promoting Health and Safety by the sector*



The above Table 85 and Figure 127, illustrates the use of human capital in contributing to innovative OHS improvements. The proportion of contribution in the Manufacturing sector 32% is slightly higher than in the Construction sector 27%.

n. Nationalities that Comply with Health and Safety Requirements

Question 40 of the survey questionnaire, asked the participants: "Rank the nationalities by their appreciation of risk and attitude for compliance to Health and Safety requirements." The responses were as follows which are ranked in a descending order of the score, were a score to each position in each response were given, for example, 36 points for 1st place, 25 for 2nd place down to 1 for 6th place and total the number of points to give the order of the nationalities.

Table 86 *The Top Six Nationalities that Comply with Health and Safety Requirements in Small Construction Companies.*

Ranking	Nationality
1st	Indian
2nd	Egyptian
3rd	Pakistani
4th	Bangladeshi
5th	Syrian
6th	Sudanese

Table 87 *The Top Six Nationalities that Comply with Health and Safety Requirements in Medium-sized Construction Companies.*

Ranking	Nationality
1st	Indian
2nd	Pakistani
3rd	Egyptian
4th	Syrian
5th	Filipino
6th	Bangladeshi

Table 88 *The Top Six Nationalities that Comply with Health and Safety Requirements in Large Construction Companies.*

Ranking	Nationality
1st	Indian
2nd	Pakistani
3rd	Egyptian
4th	Jordanian
5th	British
6th	Filipino

With reference to Table 86, Table 87 and Table 88 above In the Construction sector, the analysis was conducted on the nationalities which respected the OHS risks and compliance. The top two positions were for the Indian and Pakistani nationalities, for the large, and medium sized entities.

The Egyptians and Bangladesh were the next frequent nationalities who respected the OHS compliance.

For example, one of the respondents from the Construction sector remarked during the site visit that the Indian workers from the Sikh religion were not supposed to remove their Turban, which was a challenge to protect their heads against injury (Case 5). Certain believers used candles or incense sticks during their prayer, at their accommodation area, which also posed a challenge in the fire safety (Case10).

Table 89 *The Top Six Nationalities that Complied with Health and Safety Requirements in Small Manufacturing Companies*

Ranking	Nationality
1st	Indian
2nd	Pakistani
3rd	Emirati
4th	Egyptian
5th	Bangladeshi
6th	Palestinian

Table 90 *The Top Six Nationalities that Complied with Health and Safety Requirements in Medium Manufacturing Companies*

Ranking	Nationality
1st	Indian
2nd	Pakistani
3rd	Bangladeshi
4th	Nepalese
5th	Filipino
6th	Egyptian

Table 91 *The Top Six Nationalities that Complied with Health and Safety Requirements in Large Manufacturing Companies*

Ranking	Nationality
1st	Indian
2nd	Pakistani
3rd	Egyptian
4th	Filipino
5th	Jordanian
6th	Nepalese

Reference to Table 89, Table 90 and Table 91 above. The analysis was conducted on the entities' nationalities within the Manufacturing sector, which respected the OHS risks and were compliant. The trend was like that of the Construction sector: the top two were for the Indian and Pakistani nationalities, for the large, medium and small sized entities. The Egyptians and Bangladesh were the next frequent nationalities who respected OHS compliance.

o. Workers' Nationalities Associated with a Higher Number of Accidents

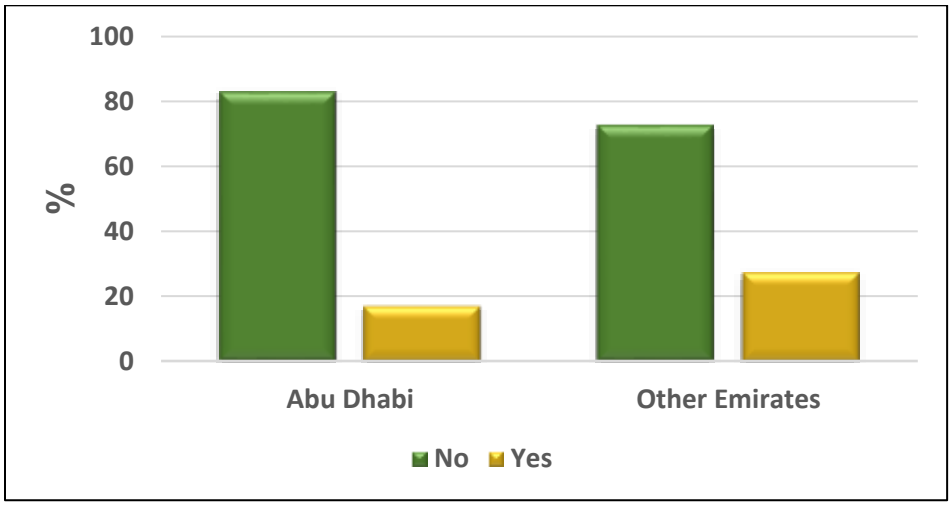
Question 44 and 54 of the survey questionnaires, asked the participants "Do you think workers from any specific country are associated with a higher number of accidents?" The responses were as follows:

The respondents from both Abu Dhabi and the other Emirates responded in a similar way, by 83% from the Emirate of Abu Dhabi and 73% from the other Emirates disagreeing to link any particular nationality involved in the incidents.

Among the respondents who agreed to certain nationalities involved in the accidents were as below:

For the Manufacturing sector in question 44.

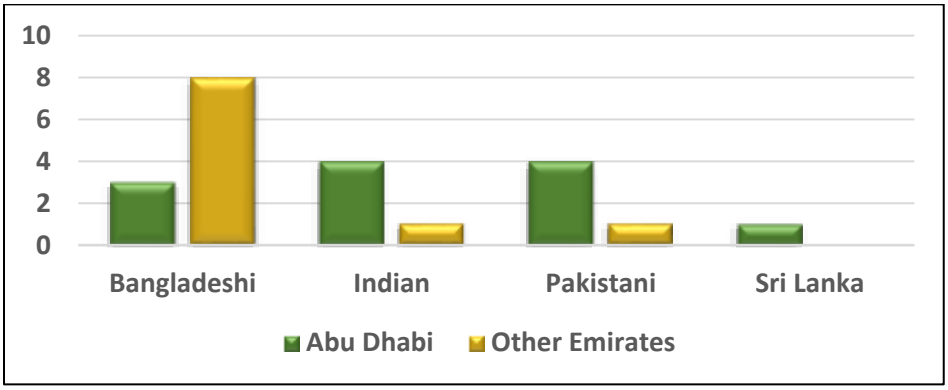
Figure 128 *The Percentage of Manufacturing Sector Respondents by Location Regarding Certain Nationalities Associated with a Higher Number of Accidents.*



The above Figure 128 illustrates that the respondents' perceptions regarding certain nationalities associated with a higher number of accidents. 17% of the respondents from the Emirate of Abu

Dhabi and 27% of respondents from the other Emirates perceived that certain nationalities (See Figure 129 below) were associated with frequent accidents.

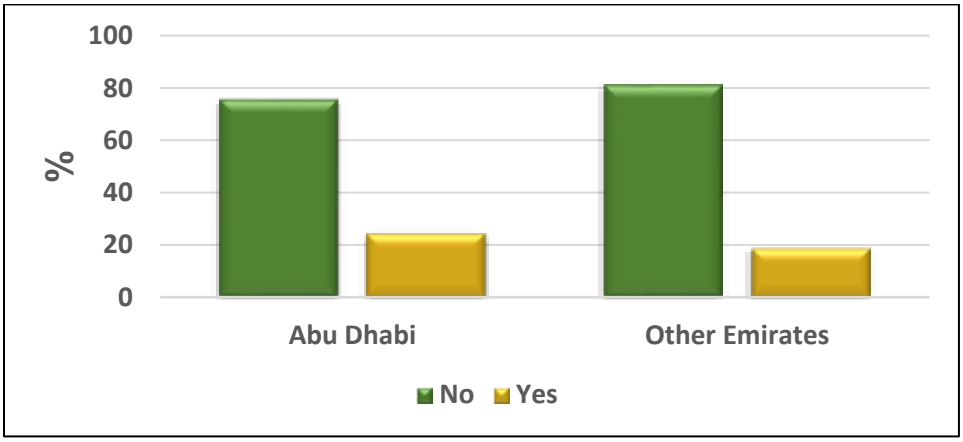
Figure 129 *Nationalities Associated with a Higher Number of Accidents in the Manufacturing Sector*



The highest nationalities associated with OHS incidents, as perceived by the respondents were Bangladesh with 50%, and the second was India, and third was Pakistan 23% each. 9% of the total employees of the respondents' organisations were Bangladesh nationals (Figure 112).

For the Construction sector in question 54, 99% of respondents answered this question.

Figure 130 *The percentage of Construction Sector Respondents by Location Regarding Certain Nationalities Associated with a Higher Number of Accidents.*

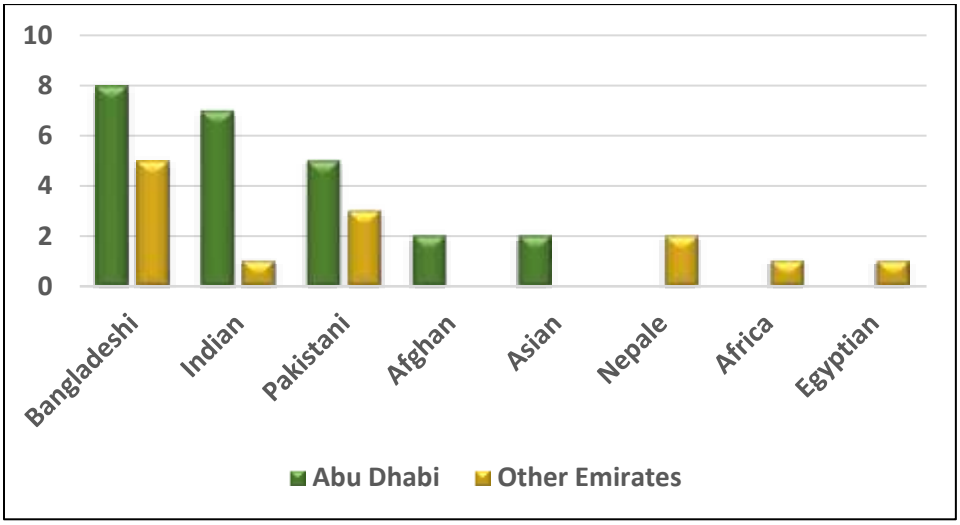


The above Figure 130 illustrates the respondents' perceptions regarding certain nationalities being associated with a higher number of accidents. 24% of respondents from the Emirate of Abu

Dhabi and 19% of respondents from other Emirates perceived that certain nationalities (See Figure 131) were associated with frequent accidents.

The highest nationalities were Bangladesh (35%), and India and Pakistan (22% each).

Figure 131 *Nationalities Associated with a Higher Number of Accidents in the Construction Sector*



4.3.2. Summary of Findings

In both the Construction and the Manufacturing sectors, medium-sized companies had the highest response rate, followed by the smaller companies. The large-sized companies had the least respondents, as per Table 58.

The Emirate of Abu Dhabi and the other Emirates had the same response figure of 90%. Their total respondents ranged between 21 and 50 years old.

Reference to Table 65, Table 66, Table 75 and Table 76. There was no significant difference between Abu Dhabi and the other Emirates, in terms of the Academic Qualification, OHS Qualification and the Qualification of those who headed the OHS, as verified through the ANOVA tests.

The organisations as per i, regardless of their sector and location, employed considerably fewer Emiratis. 76% of the Abu Dhabi Construction companies and 88% of the other Emirates'

Construction companies employed less than 5% of Emiratis. In reference to Figure 111, out of the 46 different nationalities working in the UAE, 68% of them were non-Arabic speaking, and the remaining 32% were Arabic speaking.

The innovative contribution by the surveyed participants from Abu Dhabi was more than that of the other Emirates.

There were no differences regarding the year of establishment and OHS records availability, between the organisations located in Abu Dhabi or the other Emirates.

Reference to Table 86, Table 87 and Table 88 above. In the Construction sector, the analysis was conducted on the nationalities which respected OHS risks and compliance. The top two positions were for the Indian and Pakistani nationalities, for the large, medium, and small sized entities. The Bangladeshi, Egyptians and Filipinos were the next frequent nationalities who respected OHS compliance.

Reference to Table 86, Table 87 and Table 88 above. The analysis was conducted on the nationalities of the entities within the Manufacturing sector, which were perceived as respected OHS risks and compliance. The trend was similar to that of the Construction sector. The top two were Indian and Pakistani nationalities, for the large, medium, and small entities. The Bangladesh, Egyptians and Filipinos were the next frequent nationalities who were perceived to respect OHS compliance.

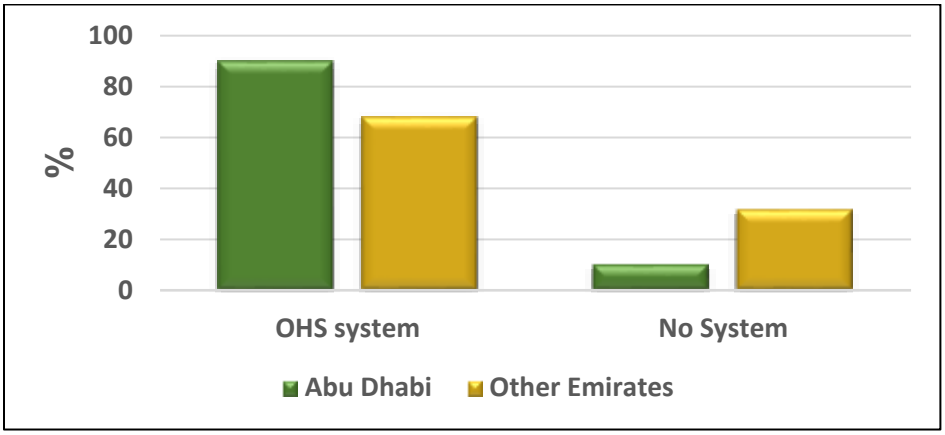
4.3.3. Occupational Health and Safety Practices in the Construction Sector

Entities in the Construction sector are often responsible for the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and others such as infrastructure construction roads, bridges, dams, etc. A sample of 100 Construction companies, of which 40 were from the Emirate of Abu Dhabi (see Table 56), were surveyed to study the impact of occupational health practices on Lost Time Injuries (LTIs) and their prevention.

In Construction sites, the supervisory and management staff's responsibility is to identify risks and to train the workers, in order to make them aware of the risk mitigation measures.

Figure 132 shows the difference between Abu Dhabi and the other Emirates in implementing an OHS systems in Construction establishments. It was observed that 90% of the Construction establishments surveyed within the Emirate of Abu Dhabi had an Occupational Health and Safety Management System, whereas 68% of the companies surveyed in the other Emirates had an OHS Management System.

Figure 132 *Percentage of Occupational Health and Safety Implantation in the Construction Sector*



a. Lost Time Injury Frequency Rate (LTIFR) Statistics

This section describes the Lost Time Injury Frequency Rate (LTIFR) in the Construction sector of Abu Dhabi and the other Emirates. For further analysis, a comparison of the Construction sector between the two regions was conducted in the year 2015. LTIFR is one of the significant KPIs to measure the effectiveness of compliance with Health and Safety policies and practices. Measurements include every occurrence of an occupational injury sustained by a worker that requires the employee to stay away from work for more than 24 hours or ultimately results in death or disability. Keeping that in mind, the LTIFR is the number of Lost Time Injuries per million manhours worked during the reporting period. The individual statistics and the implication of these trends are demonstrated below.

Figure 133 *Frequency Distribution of LTIFR in Construction Companies by Location and Size*

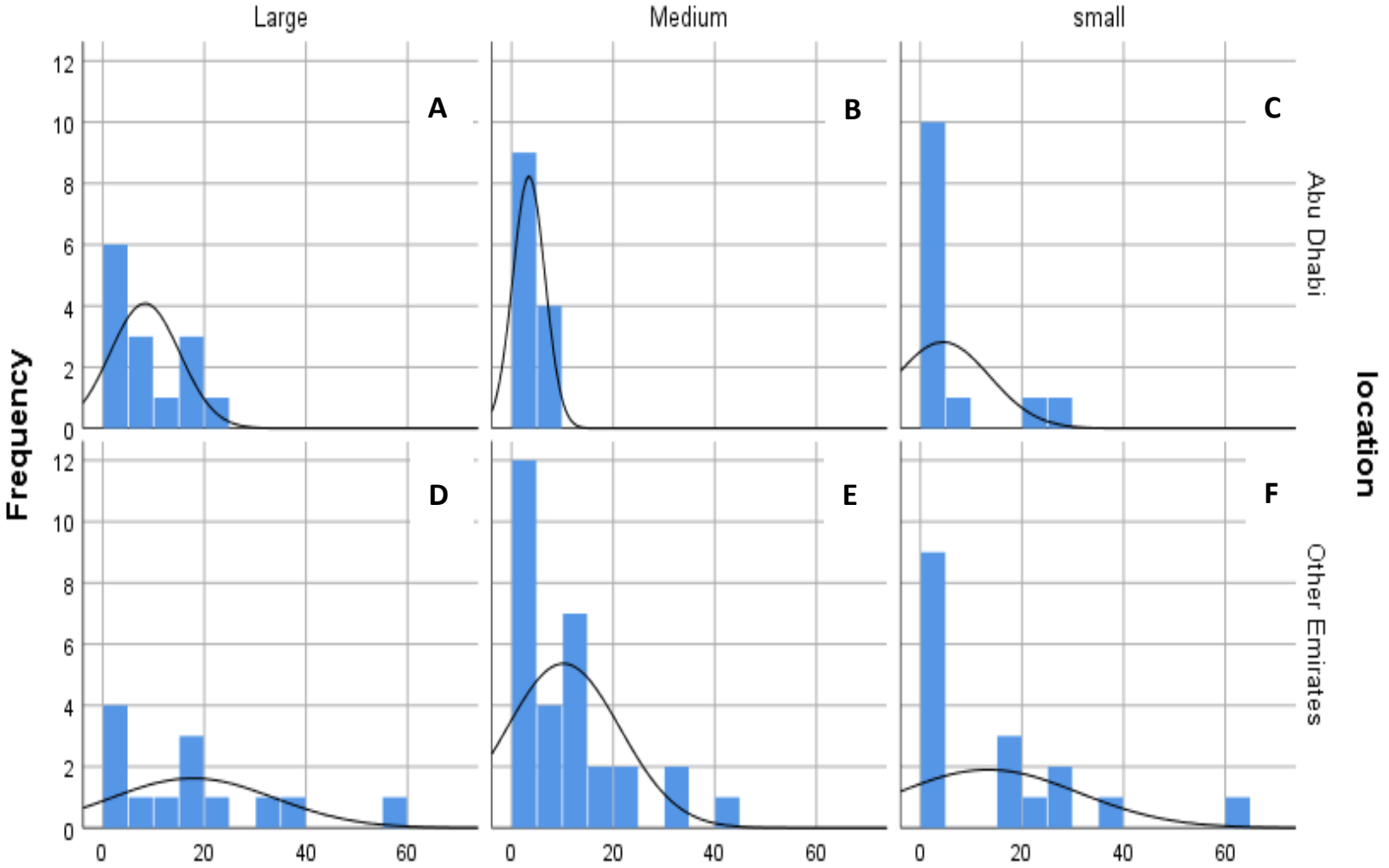


Table 92 *Statistics for Construction Companies in the Emirate of Abu Dhabi*

Abu Dhabi	*Large*	*Medium*	*Small*
Mean	8.3	3.4	4.4
Standard Error	1.8	0.9	2.5
Median	6.0	4.2	0
Standard Deviation	6.8	3.1	9.2
Sample Variance	46.9	9.9	84.7
Kurtosis	-1.2	-1.4	2.4
Skewness	0.6	0.1	1.9
Range	18.7	8.6	25.5
Minimum	1.2	0	0
Maximum	20	8.6	25.5
Sum	116.2	44.4	57.4
Count	14	13	13
Confidence Level (95.0%)	3.9	1.9	5.6

Table 93 *Statistics for Construction Companies in the Other Emirates*

Other Emirates	*large*	*Medium*	*Small*
Mean	18.8	10.2	13.3
Standard Error	4.4	2.0	4.3
Median	16.7	6.7	0
Standard Deviation	16.0	11.2	17.8
Sample Variance	256.6	124.5	318.5
Kurtosis	1.9	0.9	2.3
Skewness	1.3	1.2	1.5
Range	56.6	40.1	62.5
Minimum	0.5	0	0
Maximum	57.1	40.1	62.5
Sum	230.0	306.3	226.3
Count	13	30	17
Confidence Level (95.0%)	9.7	4.2	9.2

Figure 133, Table 92 and Table 93, shows the comparison of the LTIFR parameters between the sizes of Construction sector companies in two geographical areas, the Emirate of Abu Dhabi and the other Emirates.

The first graph (A) exhibits the result of a descriptive analysis of Lost Time Injury Frequency Rate for the year 2015 in large Construction companies in the Emirate of Abu Dhabi, showing a mean value of LTIFR was 8.3.

Graph (B) presented the Construction Sector showing the number of total companies operating in the Emirate of Abu Dhabi, which have reported their rate of Lost Time Injuries per million hours worked by employees.

The result of the descriptive analysis of LTIFR in medium sized Construction companies in the Emirate of Abu Dhabi is showing that the mean value of LTIFR was equal to 3.4.

Graph (C) shows the current study sample is 13 small-sized Construction companies operating in Abu Dhabi's Emirate. The result of the descriptive analysis of LTIFR in the small-sized Construction companies in the Emirate of Abu Dhabi showed that the mean value was equal to 4.4.

Graph (D), similar to the other graphs, shows that the study has assessed 13 large-sized companies, which operated in the Construction sector of the other Emirates.

The result of the descriptive analysis of the Lost Time Injury Frequency Rate for the year 2015 in the large-sized Construction companies in the other Emirates shows that the mean value was equal to 18.8.

Overall, graph (E) shows how many medium-sized construction-based companies (30) operating in the other Emirates of UAE, except those in Abu Dhabi, have recorded the injuries calculated per million manhours worked.

The result of the descriptive analysis of the LTIFR in the medium-sized Construction companies in the other Emirates shows that the mean value = 10.2.

Chart (F) represents a number of small-sized companies operating in the Construction sector within the other Emirates, and how many injuries in terms of LTIFR they recorded in the year 2015.

The result of the descriptive analysis of LTIFR in small-sized Construction companies in the other Emirates shows that the mean value is equal to 13.3.

Reference to Figure 134, the mean average of the LTIFR was lower in the Emirate of Abu Dhabi compared to the other Emirates. In the Emirate of Abu Dhabi, the medium-sized Construction sector companies had a lower mean average of the LTIFR than the small and large sized companies.

Figure 134 *Construction Sector Mean LTIFR in 2015*

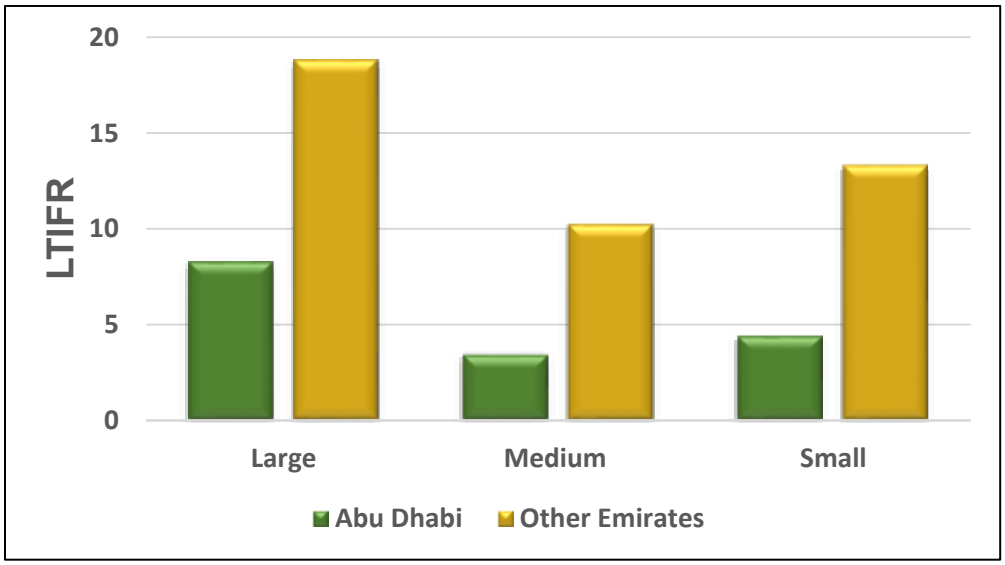
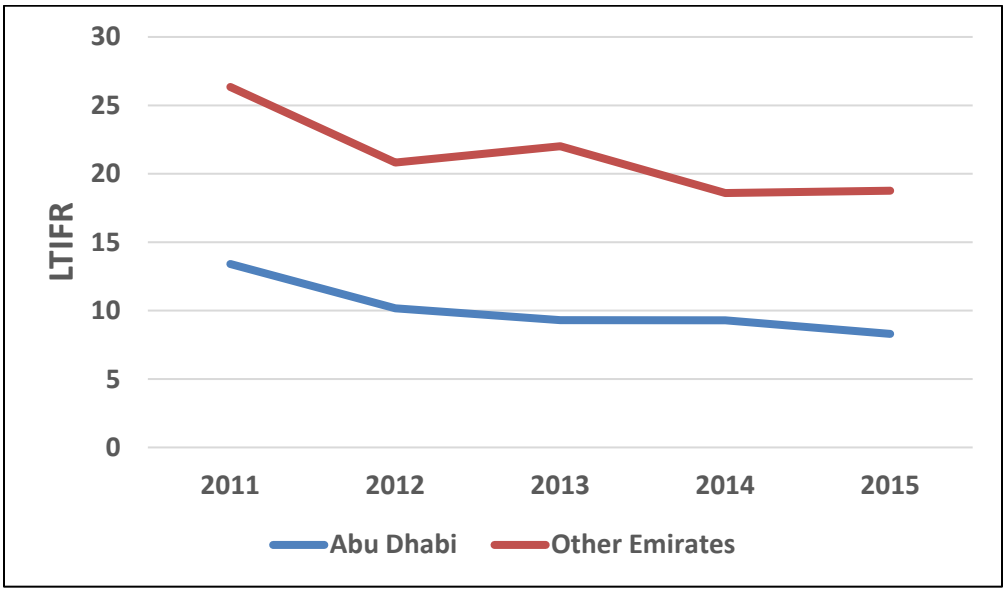


Figure 135 *Average Lost Time Injury Frequency Rate (LTIFR) for the Large Construction Companies*



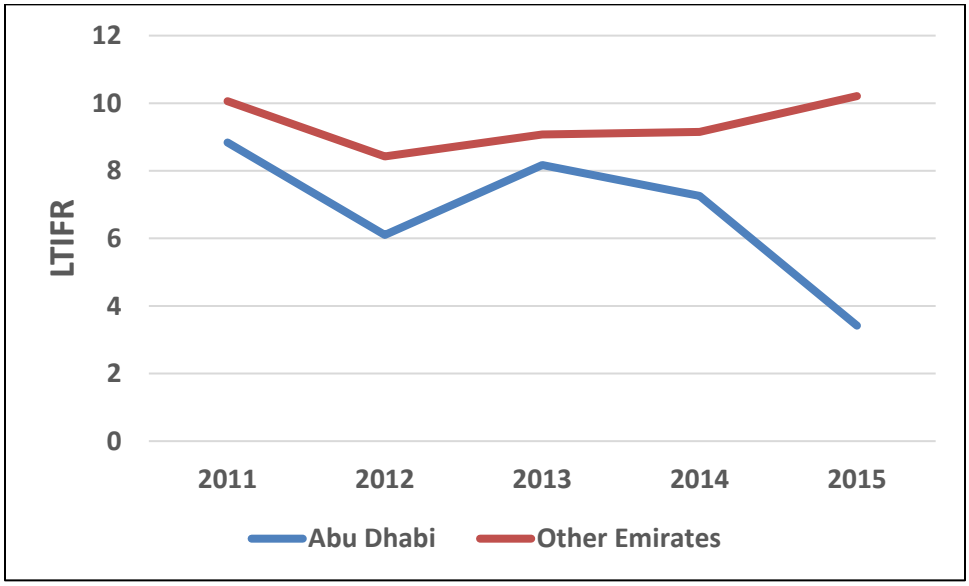
The above trend in Figure 135 shows the comparison of LTIFR in the large-sized Construction organisations between the Emirate of Abu Dhabi and that of other Emirates. The common feature in both projections was the downward trend; however, the following were the differentiators:

- The large Construction companies from the Emirate of Abu Dhabi were nominated and are registered as high-risk entities under OSHAD through the sector regulator (Department of Municipal Affairs), in line with the mandatory local regulation to classify the entities based on the OSHAD System Framework according to Section 2.7.1 to 2.7.3 of the Mechanisms number 3 version 3.3 (Abu Dhabi Occupational Safety and Health Center, 2018). Hence, they developed a full comprehensive OHS Management System and are committed to ensuring a sound OHSMS performance proactively. Thus, the reduction in LTIFR was observed from 13.4 in 2011 to 8.3 in 2015, reduced by a significant 38% of the original value in the last five years.

- The large-sized Construction companies in the other Emirates did not have any mandatory regulatory requirements specific to their respective Emirates, except for the standard federal requirements such as, the labour law number 8 of 1980. However, most of such large Construction establishments had a voluntary international system of conformity standards

such as ISO 45001/OHSAS 18001; hence this contributed to the reduction of LTIFR from 26.3 (2011) to 18.8 (2015) thereby reducing the total by 29% of its original value.

Figure 136 *Average Lost Time Injury Frequency Rate (LTIFR) for the Medium Construction Companies*

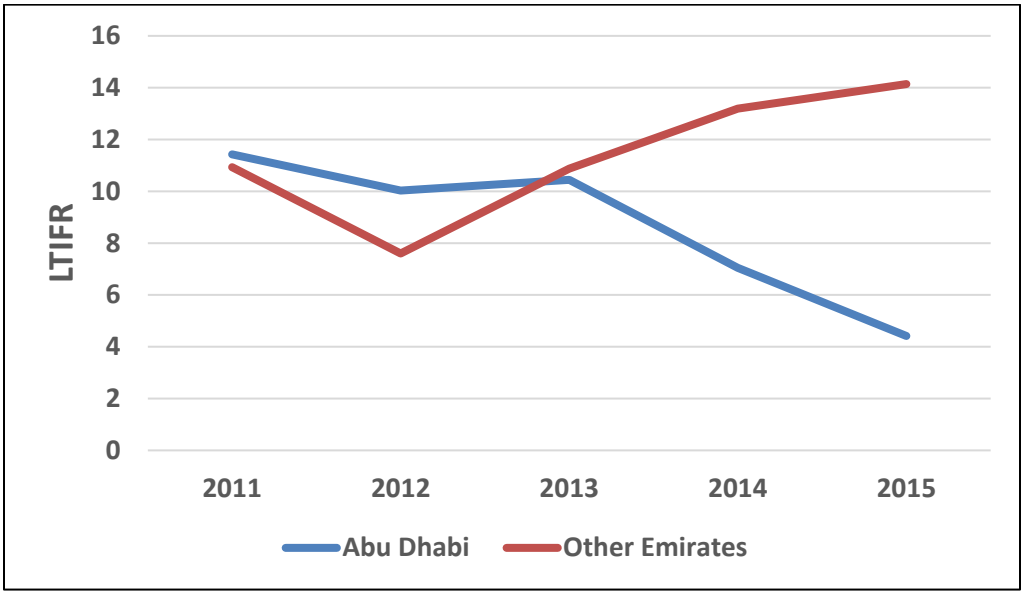


The above trend shows in Figure 136 the comparison of LTIFR in medium-scale Construction organisations between the Emirate of Abu Dhabi and that of the other Emirates. The salient characteristics of these trends are as below:

The medium-sized Construction companies from the Emirate of Abu Dhabi were nominated from the year 2011 and are registered as medium risk entities under OSHAD through the sector regulator, the Department of Municipal Affairs (Abu Dhabi City Municipality, 2012, 2013, 2014). Hence, they were bound to ensure a sound and proactive OHSMS performance, especially to comply with the requirements of mechanism 5 to maintain the OHS processes and key information, such as the legal register, risk register, occupational injury register, personal protective equipment register and the hazardous material register. Hence, a reduction in LTIFR was observed from 10.2 during 2011 to 3.4 in 2015, a reduction of 67% of the original value in five years. The medium Construction companies from the other Emirates did not have any mandatory regulatory requirements specific to their

respective Emirates; hence, this contributed to the same level of LTIFR (10) from 2011 till 2015, with no reduction.

Figure 137 *Average Lost Time Injury Frequency Rate (LTIFR) for the Small Construction Companies*



The above trend in Figure 137 shows the comparison of LTIFR in the small-scale Construction organisations between the Emirate of Abu Dhabi and that of the other Emirates. The key information from the trends are as below:

- The small-sized Construction companies from the Emirate of Abu Dhabi were nominated from the year 2011 and are registered as low-risk entities under OSHAD through the sector regulator the Department of Municipal Affairs (Abu Dhabi City Municipality, 2012, 2013, 2014); hence they were bound to comply with the minimum safety requirements as inspected by their regulator and OSHAD. A reduction in LTIFR was observed from 11.4 during 2011 to 4.4 in 2015, a reduction of 61% of the original value in the five years.
- The small-sized Construction companies from the other Emirates did not have any mandatory regulatory requirements specific to their respective Emirates; the LTIFR shot up from 11 (2011) to 13 (2015), an increase of 18% in the five years.

The interpretation of the above figures is summarised as the Lost Time Injury Frequency Rate of the entities from the Emirate of Abu Dhabi (Complying to Mandatory OHSMS Regulatory Framework) are less than those of other Emirates (Complying to Conventional/Traditional Regulatory Framework) (Reference to 0 and Figure 133).

b. The Relationship between LTIFR and the Other Variables

As per the below Table 94, the elements in the principal diagonal indicates "a strong positive linear relationship" between two variables, expressed as correlation coefficients. The correlation between the two sets of parameters according to Hinkle et al. (2003, p. 109).

Table 94 *The Correlation Analysis for Large Construction Companies in Abu Dhabi between LTIFR and Health and Safety Expenditure for Incidents for the Period 2011-2015*

		LTIFR				
		2011	2012	2013	2014	2015
Health and safety expenditure for incidents	2011	0.89				
	2012		0.79			
	2013			0.87		
	2014				0.74	
	2015					0.80

The high positive correlation between the LTIFR and the cost of safety was observed when the Lost Time Injury Frequency Rate (LTIFR) increased. The cost of safety (such as the cost of penalties, compensations, insurance premium and cost of investigation, repair and reconditioning) increased accordingly.

Table 95 *The Correlation Analysis for Large Construction Companies in Abu Dhabi between LTIFR and Health and Safety Budget for the Period 2011-2015*

		LTIFR				
		2011	2012	2013	2014	2015
Health and safety budget	2011	-0.33				
	2012		-0.21			
	2013			-0.24		
	2014				-0.29	
	2015					-0.34

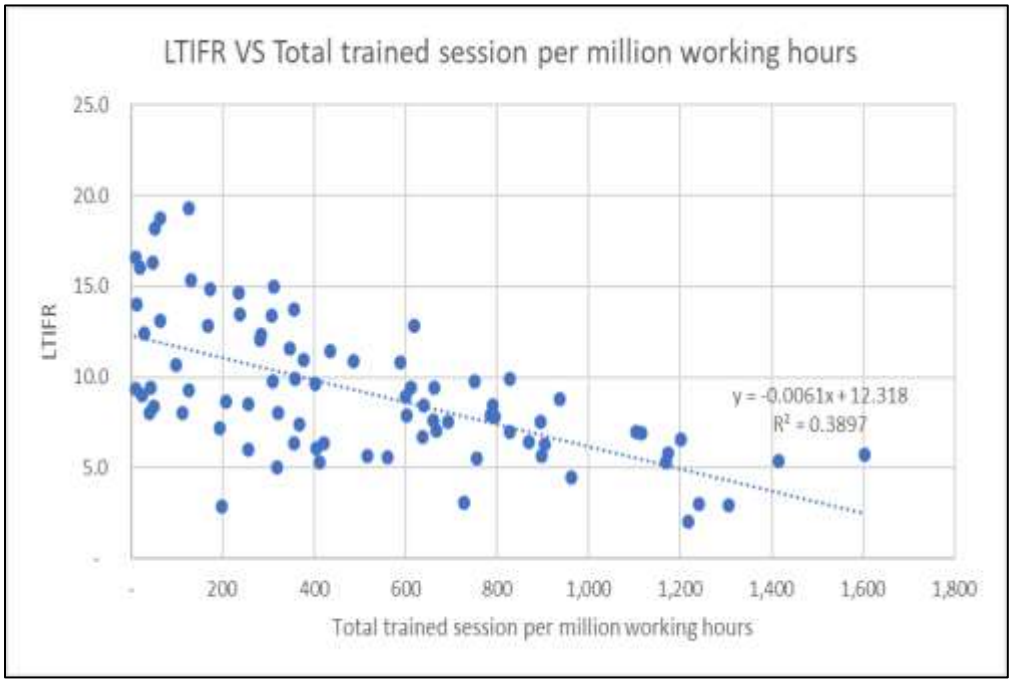
Table 95 shows, in the elements of the principal diagonal, a low negative correlation between safety budgetary investments and the LTIFR, with the coefficients ranging between -0.21 and -0.34, and considering the Health and Safety budget including the positive strategic OHS investments as well as the cost of safety. Also, the disaggregated data on the sector-wise or location-wise budget that are allocated to the responding companies were not third party verified, hence, were obtained as subjective data.

c. The Relationship Between the LTIFR and the Training Manhours

In order to obtain the relationship between LTIFR and the training manhours, given that the respondents did not provide the training manhours, secondary data were provided from the Government Authority through a consultant (Reference to 3.11). The data set contained the information of 83 large-sized Construction companies from the Emirate of Abu Dhabi (LTIFR and Training manhour), this data set was collected in 2015 from the yearly report, and it was extracted for the purpose of completing this thesis, where the training manhours were calculated based on the time invested for training like toolbox talks, workshops and external training and the number of trainees.

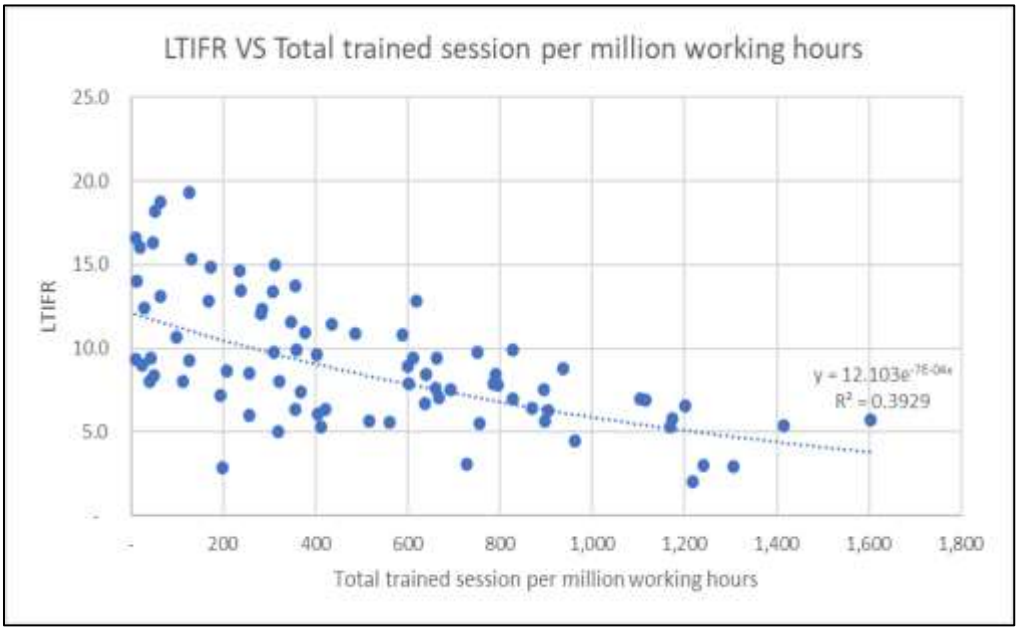
Figure 138 and Figure 139 show the relation between Lost Time Injury Frequency Rate and the total number of training sessions in the Construction establishment in the Emirate of Abu Dhabi in the year 2015. Figure 138 shows a negative correlation relationship between the dependent variable (LTIFR) and independent variable (Number of training sessions per million working hours) R^2=0.39.

Figure 138 *The Relationship between the LTIFR and the Training Manhours for the Large Construction Companies in the Emirate of Abu Dhabi using Linear Trendline.*



An exponential trendline was also studied to show which trendline was fitting more, and the equation resulted in the graph: y = 12.103e-7E-04x and R^2 = 0.3929, which shows a more fitting relation than linear trendline. The difference between the Linear and the Exponential charts was 0.0032 (03929-0.3897= 0.0032).

Figure 139 *The Relationship between the LTIFR and the Training Manhours for the Large Construction Companies in the Emirate of Abu Dhabi using Exponential Trendline.*



From the above figure, it is revealed that there was a negative correlation relationship (*r=-0.627*) between the dependent variable (LTIFR) and the independent variable (Training sessions per million hours of work). The relationship is not a strong negative relationship because the LTIFR might be influenced by many other factors such as the level of enforcement of OHSMS, management accountability and worker behaviour, etc. regardless of the level of training sessions undergone.

It was found that the negative exponential was a better fit than the linear regression since the data values rise or fall at increasingly higher rates as in Figure 139.

d. The Effect of Training on the Lost Time Injury Frequency Rate (LTIFR) Statistics

Labourers in the Construction sector are exposed to dangerous equipment's and operational risks such as falling from a height. Relevant training should be provided to the employees for implementing/supervising the control measures concerned. The training should be provided with the

required knowledge of the work-related risk as well as the respective risk mitigation measures that need to be practised for reducing Health and Safety related incidents.

This study examined Health and Safety training, and its impact on the LTIs reported in the last five years. The data was collected on the LTIs reported by Construction companies of different sizes (large, medium and small) with the corresponding training frequency. This study included the different scale of Construction companies: which had a conventional/traditional, and those who adopted the regulated OHS Management Systems.

Figure 140 shows the Construction companies' training frequency, where a total of 65% were highly frequent and frequent in providing OHS training in the Construction establishments.

Figure 140 *Percentage of Construction Organisations According to OHS Training Frequency*

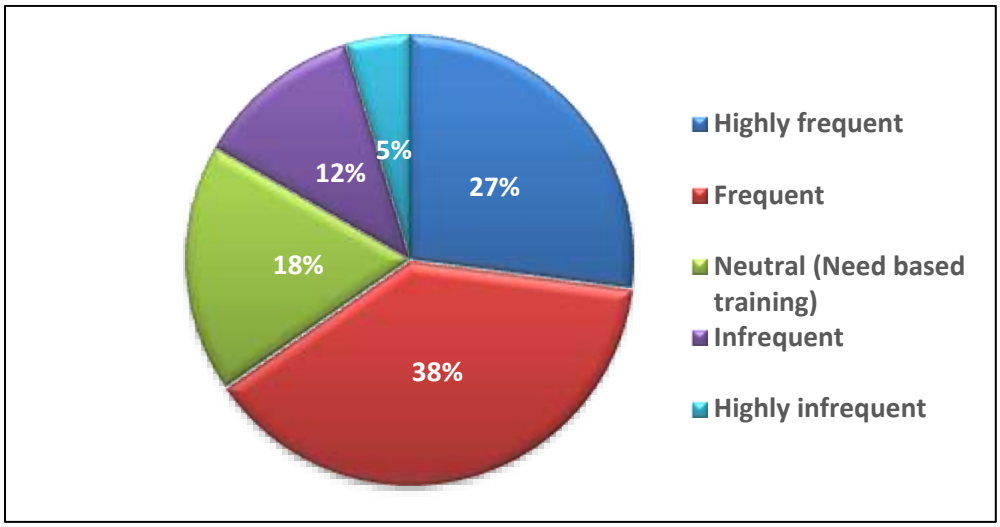


Figure 141 *LTIFR Reported by Construction Companies According to the Organisation's Size and Frequency of Training*

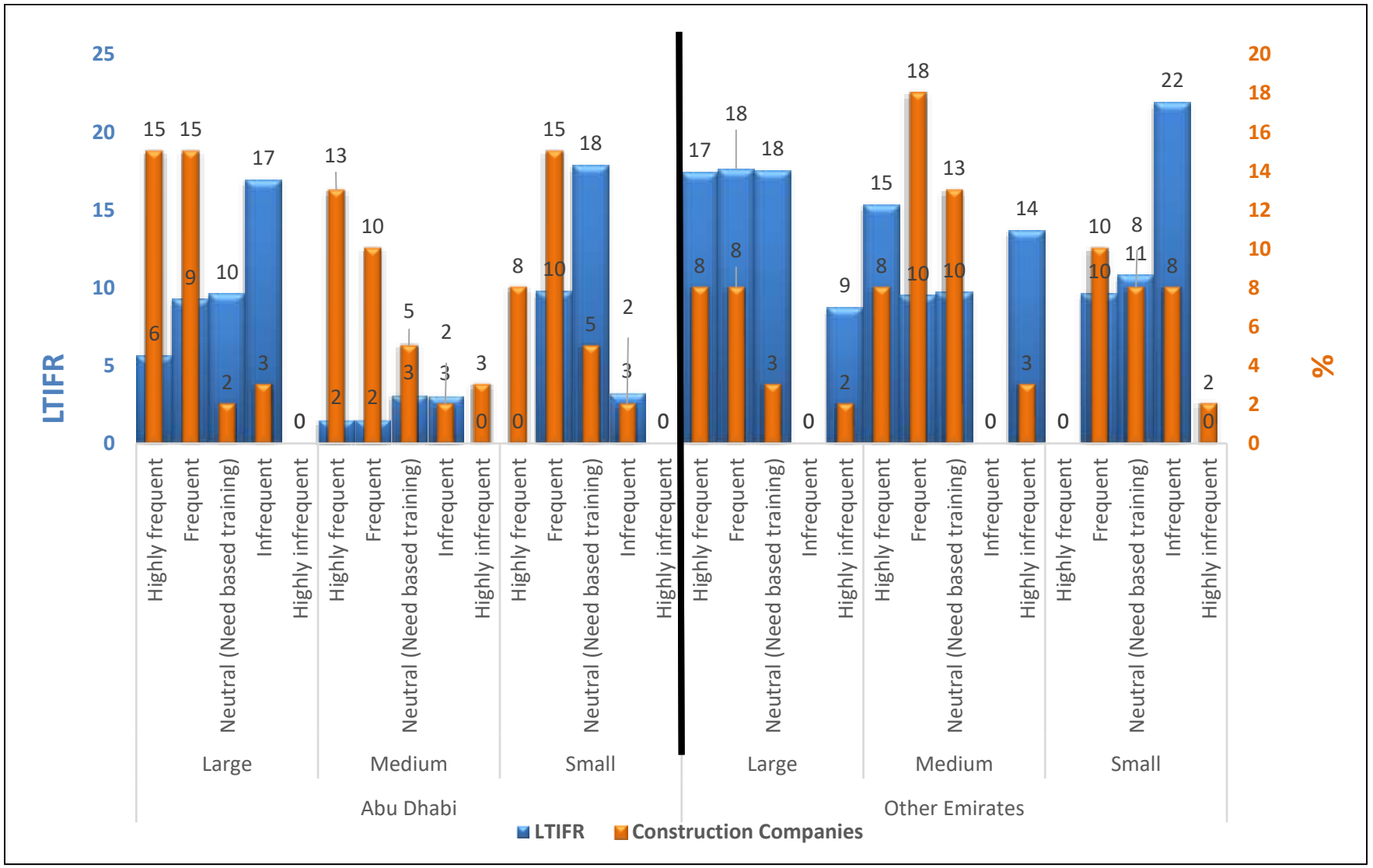
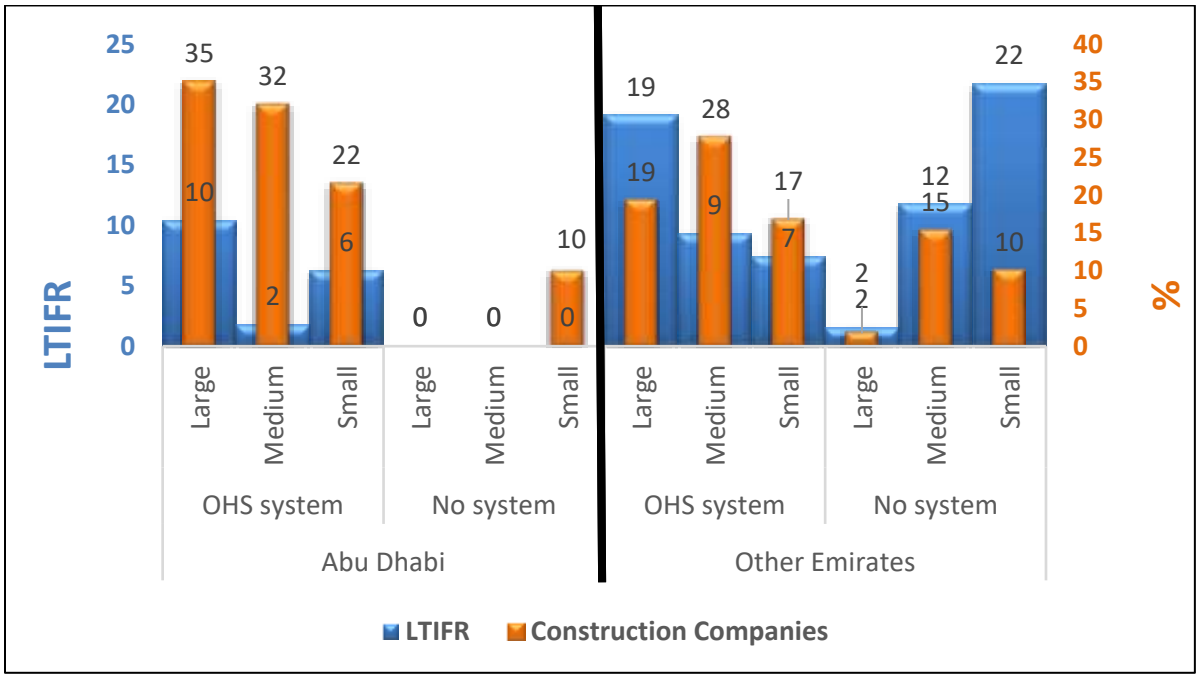


Figure 141 presents the data of LTIFRs reported (excluding non-responses, so n=21 for Abu Dhabi and n=33 for the other Emirates) for the surveyed sample of Construction companies within the Emirate of Abu Dhabi as well as the other Emirates, according to size and corresponding frequency of training. The results revealed that for the large Construction companies located in the Emirate of Abu Dhabi, the LTIFR increased as the frequency of training reduced for large-sized companies in Abu Dhabi except for the small number (2) of small companies in the infrequent category.

The medium and small sized Construction companies in the Emirate of Abu Dhabi reflected the same trend as that of the large-sized companies. When the training frequencies reduced, the LTIFR increased. The large and small sized Construction companies located in the other Emirates reflected the same trend of increased LTIFR where the training frequencies reduced. However, the medium-sized Construction companies located in the other Emirates were not consistent such that there was no notable difference in the LTIFR when the training frequencies reduced. This required further research to analyse what other factors influenced such a trend. In the Emirate of Abu Dhabi, the LTIFR in the large, medium, and small construction companies were less in comparison to the other Emirates.

In the other Emirates, it can be noted that there was no clear pattern to the relationship between training frequency and LTIFR for any of the size categories.

Figure 142 *LTIFR Reported by Construction Companies According to the Organisation's Size and with or without a Formal OHSMS*



The results presented in Figure 142 show that the larger-sized Construction companies with an OHS system had a higher number of LTIFRs in the Emirate of Abu Dhabi. The large entities with an OHS Management System from Emirate of Abu Dhabi and the other Emirates reported higher LTIFRs than smaller organisations. The LTIFR is lower in all categories in the Emirate of Abu Dhabi than in the other Emirates.

As far as the entities with no system are concerned, which are in the Emirate of Abu Dhabi, there were no entities represented from the Large and Medium segments. Only 10% of the entities represented were small entities. 90% of the entities were already nominated under their respective SRA to have a system for OHS and to comply with its requirements. In the other Emirates, small entities with no system revealed higher LTIFRs, than the small in the Emirate of Abu Dhabi.

This indicates the influence of the Regulatory Framework in reducing the LTIFR in the Emirate of Abu Dhabi.

e. Occupational Health and Safety Staff

The study covered the number of Health and Safety professionals working in the Construction sector vis-à-vis their nationality. Also, the study covered the changes in the LTIFR recorded in the United Arab Emirates for the period between 2011-2015, which are monitored by a government regulatory body, and its relationship with the number of LTIFRs over time.

The result in Figure 143 shows that the number of OHS professionals employed in the Construction sector in the Emirate of Abu Dhabi (64%) was significantly higher than other Emirates (36%) within a similar sample size of Construction companies.

Figure 143 *Percentage of Occupational Health and Safety Professional's Distribution in the Construction Sector, 2015.*

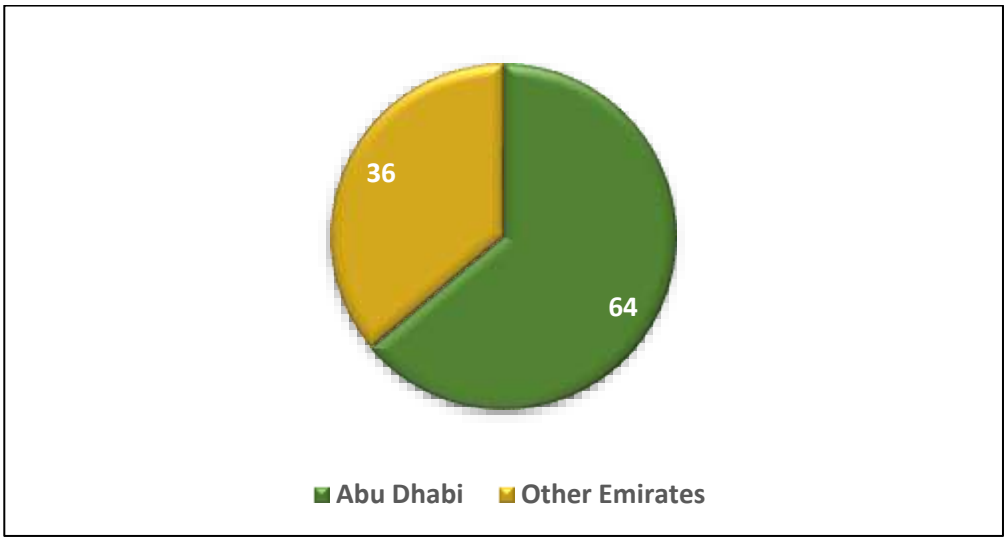


Table 96 below shows the average number of Occupational Health and Safety employees per entity, where obviously the number of OHS specialists is relative to the size of the Construction companies as per the below table. The large-sized companies relatively had more supervisors in OHS management than others. The Emirate of Abu Dhabi has shown a significantly better result in all sizes of companies compared to other Emirates. Also, small Construction companies in Abu Dhabi are at the least hiring an OHS specialist, whereas the medium and small Construction companies in other Emirates did not have OHS staff. In the Construction companies located in the other Emirates, the

OHS supervision was marginal (except for the large companies), which led to the ineffective implementation of the OHSMS. This clearly indicates that the Health and Safety supervision per Construction worker is higher in the Emirate of Abu Dhabi than in the other Emirates, which means Construction companies in Abu Dhabi had better monitoring, cascading of Health and Safety requirements and compliance assurance than those Construction companies from the other Emirates.

Abdullah (2010) illustrated in the study that “Supervisors” play an important and a vital role in building, maintaining and supporting the implementation of an effective OHSMS in the organisations.

Table 96 *The Average Number of OHS Supervisors per 100 Employees to the Size-wise Entities in the Construction Sector.*

	Abu Dhabi	Other Emirates
Small	0.69	0.06
Medium	2.08	0
Large	9.14	6.62

Figure 144 shows the importance of supervision and monitoring by a regulatory body in enforcing entities in achieving Emiratisation and capacity building in the specialised area of Health and Safety. In the Emirate of Abu Dhabi, 22% of the Occupational Health and Safety specialists were Emiratis, and 78% were expatriate hires. In the other Emirates, 17% of OHS specialists were Emiratis. OSHAD, being the regulatory body in the Emirate of Abu Dhabi, is rationally approaching nationalisation to support the Emiratis by establishing and monitoring key performance indicators on the Emirati employment percentage within the OHS job positions.

Figure 144 *Percentage of National Occupational Health and Safety Employee Distributed in Construction Establishments by Location*

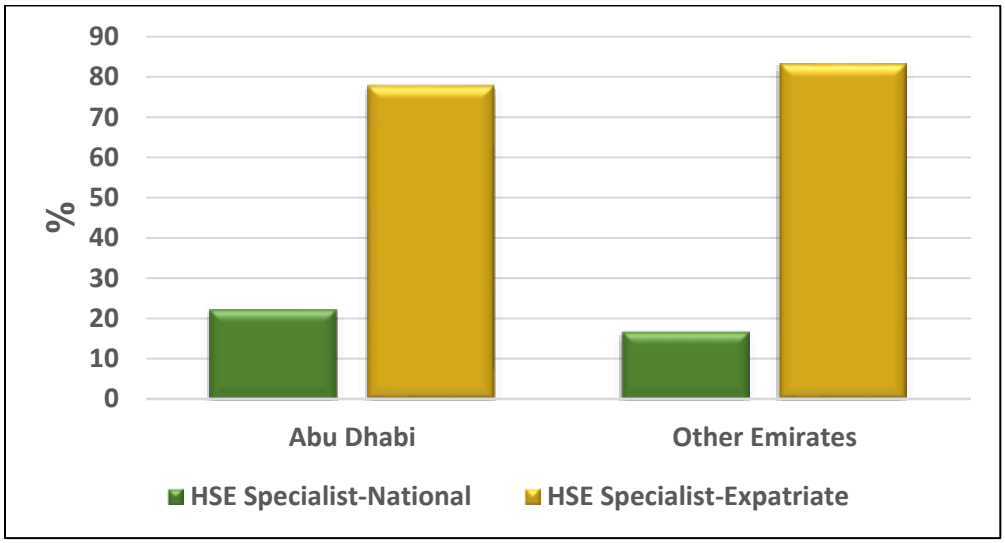


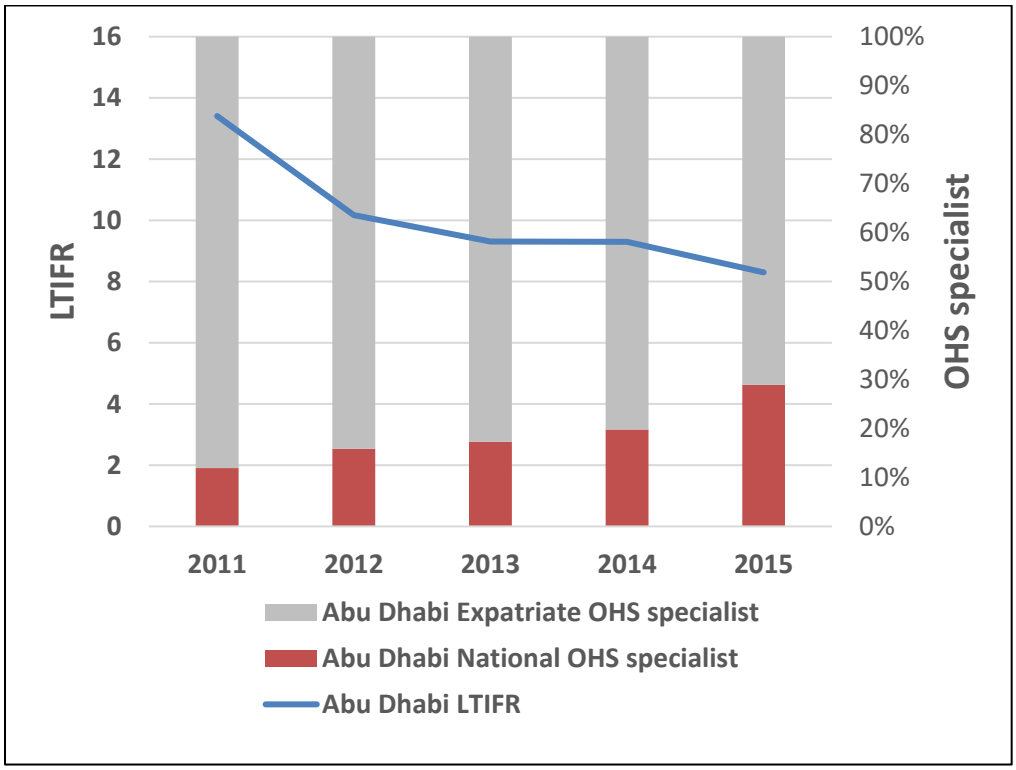
Figure 144 and Figure 145 show the percentage distribution of Occupational Health and Safety professionals, and United Arab Emirates nationals v/s expatriates within the different sizes of Construction companies and by the location. The United Arab Emirates' national Occupational Health and Safety professionals reached 22% in the large Construction companies. The hiring of the Emiratis in the OHS profession was relatively low in the Construction entities and showed significant dependency on expatriate Health and Safety professionals in the Construction sector. The share of the Emirati OHS professionals in the medium-sized companies was 17% which is lower than in the large-sized Construction companies. The small-sized companies showed that 10% of their Health and Safety professionals, are Emirati.

Figure 145 *Percentage of Occupational Health and Safety Employees in the Construction Sector by Nationality According to the Size of the Companies*

f. The Effect of Emirati OHS Specialists on Lost Time Injury Frequency Rate (LTIFR) Statistics

The relationship between the growth of the Emirati OHS specialists and its impact on the Lost Time Injury Frequency Rate (LTIFR) of the large Construction companies located at Abu Dhabi was explained in Figure 146.

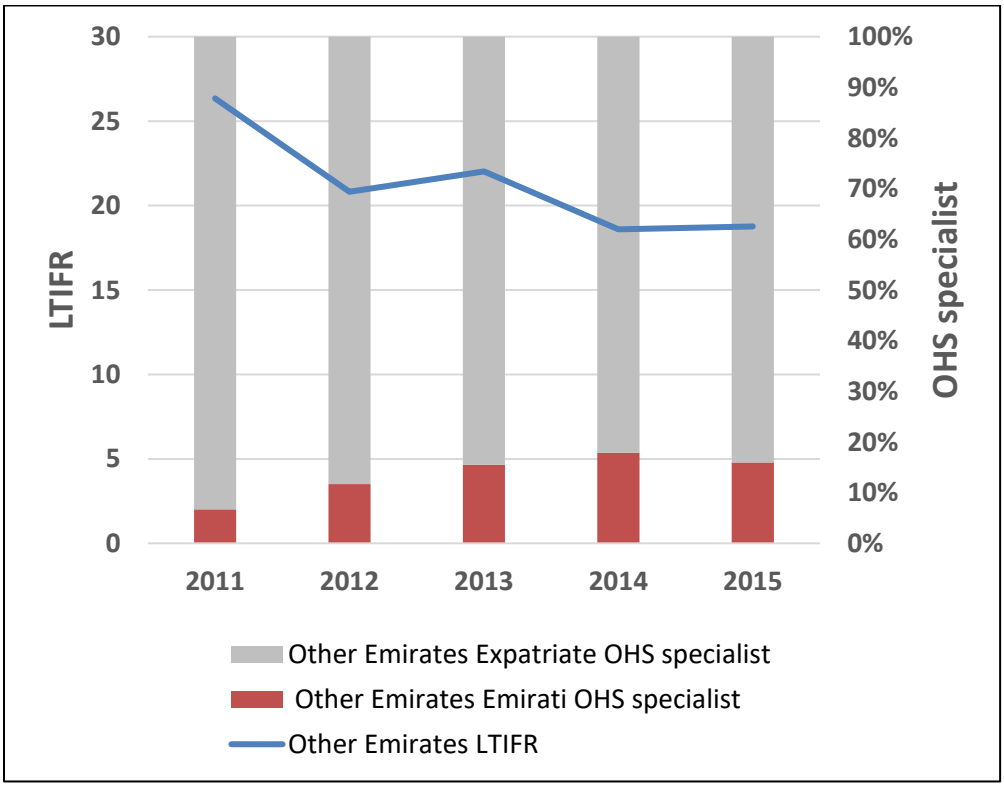
Figure 146 *The Percentage of Emirati OHS Specialist/Total OHS Workforce Compared to Lost Time Injury Frequency Rate (LTIFR) in Abu Dhabi Large Construction Companies*



The Emirati OHS specialists shares an inverse relationship with the LTIFR trend, such that when the participation by the Emirati OHS specialists in the United Arab Emirates increased from 12% (2011) to 29% (2015), the LTIFR reduced from 13 (2011) to 8 (2015), leading to a reduction of 38% of the original value in five years.

In 2015, Construction establishments in the Emirate of Abu Dhabi doubled their capacity (see Figure 146) of Emiratis as OHS specialists according to the regulatory body's recommendation.

Figure 147 *The Percentage of Emirati OHS Specialists/Total OHS Workforce Compared to Lost Time Injury Frequency Rate (LTIFR) in Other Emirates Large Construction Companies*



The above Figure 147, illustrates the relationship between the growth of the Emirati OHS specialists and its impact on the Lost Time Injury Frequency Rate (LTIFR) of the large-sized Construction companies located in the other Emirates.

When we evaluate the Emirati OHS specialists with the LTIFR trend, we can see an inverse relationship such that when the participation by the Emirati OHS specialists in the United Arab Emirates increased from 6% (2011) to 16% (2015), the LTIFR reduced from 26 (2011) to 19 (2015), leading to a reduction of 27% of the original value in five years.

Hence, we can understand that the large-sized Construction companies in the other Emirates have enhanced their OHS performance by increasing the number of Emiratis in the OHS team.

The trend of the LTIFR in the large-sized Construction companies in the Emirate of Abu Dhabi was downwards, which was reduced by 38% from 13 in 2011, to 8 in 2015, and in the other Emirates was reduced by 27%, from 26 in 2011, to 19 in 2015.

4.3.4. Occupational Health and Safety Practices in the Manufacturing Sector

The Manufacturing sector's establishments were the plants, factories, or mills that characteristically used power-driven machinery and material handling equipment. Bakeries, candy stores, and custom tailors were included in this sector. Manufacturing entities process materials or contract with other establishments to process their materials for them. Both types of establishments were included in the Manufacturing sector. The entities with fewer than ten employees were filtered out, as they were too small to reflect the character of the remaining entities sampled.

Since 2009, The Centre of Abu Dhabi Occupational Safety and Health “OSHAD” established support awareness, training and monitoring capabilities in all the economic sectors. OSHAD initiated supervisory training as a requirement under the OHS regulations within the Emirate of Abu Dhabi.

Figure 148, shows the difference between the Emirate of Abu Dhabi and other Emirates in implementing OHS systems in the Manufacturing sector. It was observed that about 98% of Manufacturing establishments surveyed within Abu Dhabi's Emirate had Occupational Health and Safety Management Systems. This was due to the structured and mandated requirement of OSHAD SF in the Emirate of Abu Dhabi.

Figure 148 *Percentage of Occupational Health and Safety Implementation in the Manufacturing S***ector**

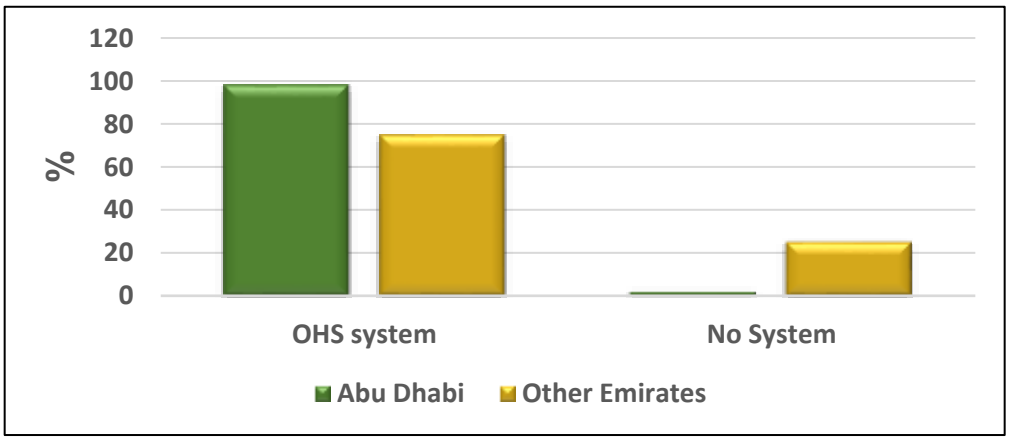


Figure 149 *Frequency Distribution of LTIFR in Manufacturing Companies by Location and Size in 2015*

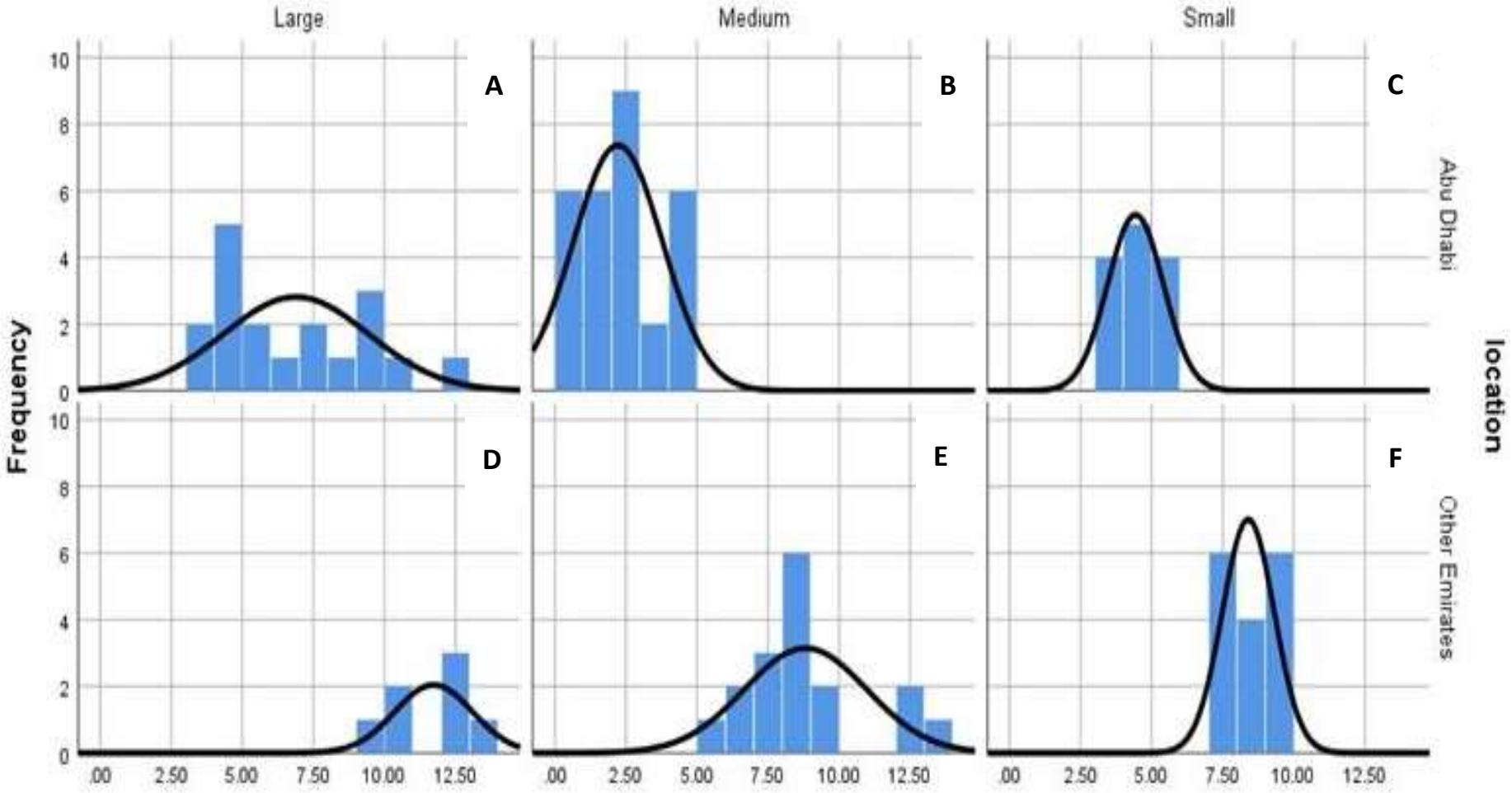


Table 97 *Statistics for Manufacturing Companies in the Emirate of Abu Dhabi in 2015*

Abu Dhabi	*Large*	Medium	Small
Mean	6.9	2.2	4.4
Standard Error	1.5	0.3	0.3
Median	3.7	2.2	4.5
Mode	2	0	5.6
Standard Deviation	6.4	1.6	1.0
Sample Variance	40.7	2.5	1.0
Kurtosis	-0.8	-1.0	-1.4
Skewness	1.0	0.1	-0.1
Range	17.0	4.5	2.4
Minimum	1.1	0	3.2
Maximum	18	4.5	5.6
Sum	124	64.4	57.6
Count	18	29	13
Confidence Level (95.0%)	3.2	0.6	0.6

Table 98 *Statistics for Manufacturing Companies in the Other Emirates in 2015*

Other Emirates	*Large*	*Medium*	*Small*
Mean	11.8	8.8	8.4
Standard Error	0.5	0.5	0.3
Median	11.8	8.4	8.4
Mode	10.5	8.4	7.4
Standard Deviation	1.3	2.0	1.0
Sample Variance	1.8	3.9	1.1
Kurtosis	-2.6	0.5	-2.3
Skewness	-1.1E-14	0.9	-5.9E-15
Range	2.7	6.3	2
Minimum	10.5	6.2	7.4
Maximum	13.2	12.5	9.4
Sum	82.9	149.9	134.4
Count	7	17	16
Confidence Level (95.0%)	1.2	1.0	0.5

Figure 149, Table 97 and Table 98 shows the comparison between the LTIFR parameters versus the different sizes of Manufacturing sector companies in two geographical areas, the Emirate of Abu Dhabi and the other Emirates.

Chart (A), the total measures of large-sized companies operating in the Emirate of Abu Dhabi who have recorded their LTIFR in the year of 2015 shows that the mean average value of the LTIFR was 6.9.

The second chart (B), illustrating the Manufacturing sector shows the number of total medium companies operating in the Emirate of Abu Dhabi, which have reported their rate of Lost Time Injuries per million hours worked by employees.

Medium-sized Manufacturing companies in the Emirate of Abu Dhabi show that the mean average value of the LTIFR was equal to 2.21.

In the third chart (C), the small Manufacturing companies in the Emirate of Abu Dhabi demonstrated that the mean average value of the LTIFR was equal to 4.4.

Chart (D) of the Manufacturing sector represents the number of cases and incidents of injuries reported by large-sized Manufacturing companies of other Emirates in the form of the LTIFR.

Large Manufacturing companies in other Emirates show that the mean average value of the LTIFR in 2015 had a mean average equal to 11.85.

Chart (E) illustrated above, helped to reveal how many medium-sized Manufacturing-based companies have reported LTI incidents per million manhours worked in the year 2015.

Medium manufacture companies in other Emirates shown that the mean average value of the LTIFR was 8.8.

The last graph (F) of the Manufacturing sector represents the LTIFR recorded by the small-sized Manufacturing companies operating in other Emirates.

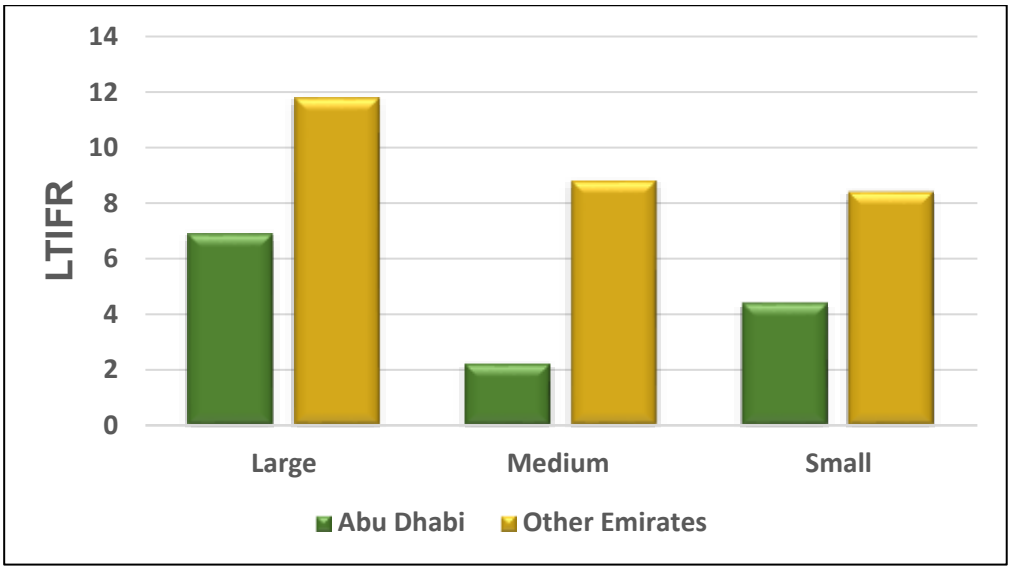
Small Manufacture companies in the other Emirates showed that the mean average value of the LTIFR was 8.4.

Reference to Figure 150, the mean average value of the LTIFR was lower in the Emirate of Abu Dhabi compared to other Emirates. In Abu Dhabi, the medium-sized Manufacturing sector companies had a lower mean average LTIFR than the small and large sized companies.

These results suggest that the entities of the Manufacturing sector in the Emirate of Abu Dhabi, if compared to the other Emirates, was doing better in managing their OHSMS that lead to fewer incidents of injuries in par with total hours worked. Thus, they show a better compliance to the OHSMS model in comparison to other Emirates.

Reference to Figure 134 and Figure 150, in general, the mean average value of the LTIFR for the Manufacturing sector was comparatively less than the mean average value of the LTIFR of the Construction sector.

Figure 150 *Manufacturing Sector Mean LTIFR in 2015*



a. Lost Time Injury Frequency Rate (LTIFR) Statistics

Figure 151 *Average of Lost Time Injury Frequency Rate (LTIFR) for the Large Manufacturing Companies*

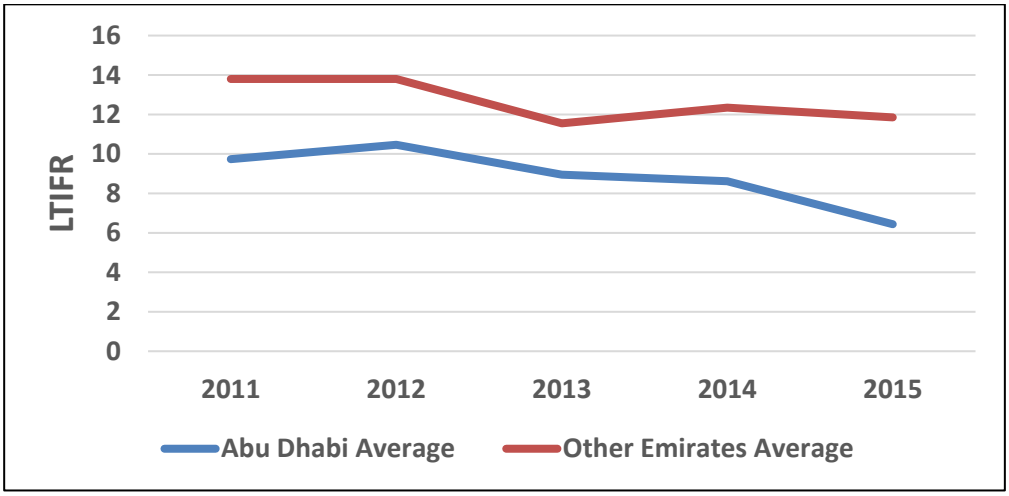
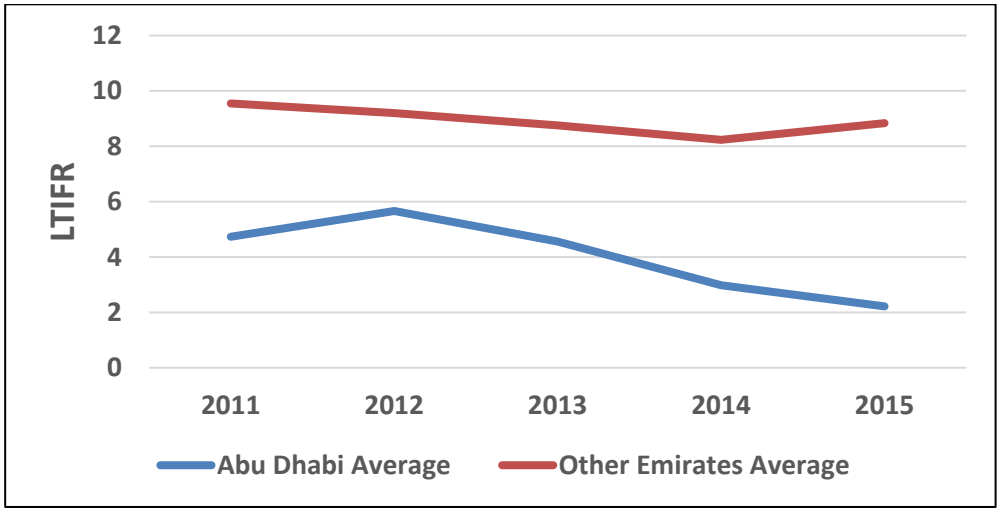


Figure 151 shows the comparison of the LTIFR in the large-sized Manufacturing organisations between the Emirate of Abu Dhabi and that of the other Emirates. The common feature in both projections is the downward trend. The large-sized Manufacturing companies in the Emirate of Abu Dhabi are nominated and registered as high-risk entities under OSHAD through the Sector Regulator (IDB Industrial Development Bureau - Department of Economic Development). Therefore, they are required to develop a fully comprehensive OHS Management System in line with Section 2.7.1 to 2.7.3 of the Mechanisms number 3 version 3.3 (Abu Dhabi Occupational Safety and Health Center, 2018) and are bound to ensure a sound OHSMS performance proactively. Hence the reduction in the LTIFR from 9.7 in 2011 to 6.9 in 2015, which was a reduction of 29% of the original value in the last five years. The other Emirates' large-sized Manufacturing companies did not have any mandatory regulatory requirements specific to their respective Emirate, except for the standard federal requirements such as labour law 8, Ministry of Labour & Social Affairs (1980). However, most of the large-sized Construction establishments had a voluntary system that complies with international standards such as ISO 45001/OHSAS 18001 which has contributed to a reduction of LTIFR from 14 (2011) to 12 (2015), a reduction of 14% of its original value.

When we compare the LTIFR reduction indices of the large-sized Manufacturing companies in 2011 – 2015, those that are from the Emirate of Abu Dhabi reveal a 34% reduction from the initial levels whereas the companies outside the Emirate of Abu Dhabi had reduced 14% from the initial values of the LTIFR.

Figure 152 *Average of Lost Time Injury Frequency Rate (LTIFR) for the Medium Manufacturing Companies*

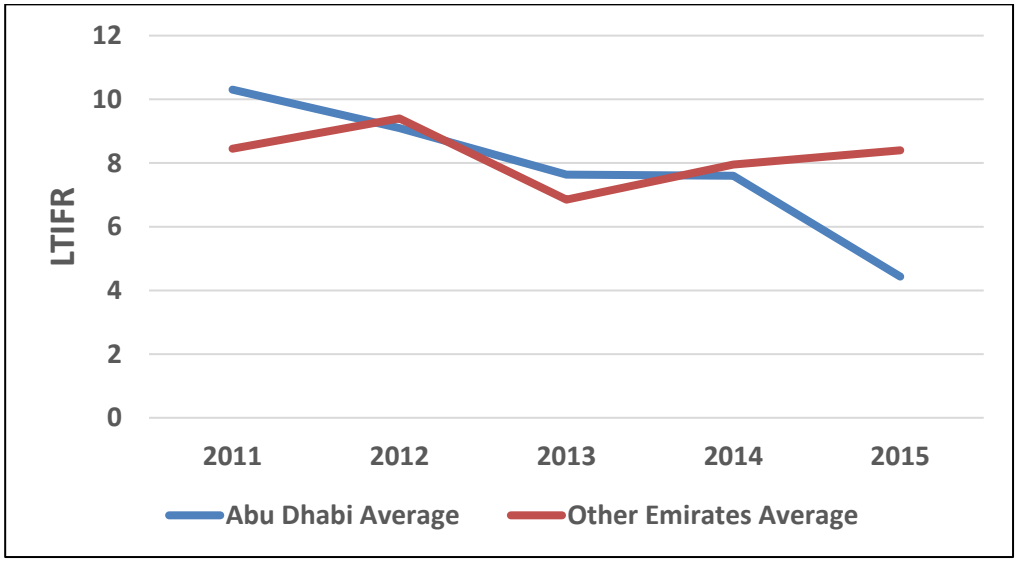


The above trend of Figure 152, shows the comparison of LTIFR in the medium-sized Manufacturing organisations between the Emirate of Abu Dhabi and that of the other Emirates. The key findings are as follows:

- The reduction of 53% in LTIFR in the Emirate of Abu Dhabi was from 4.7 in 2011 to 2.2 in 2015.
- The medium-sized Manufacturing companies from the other Emirates did not have any mandatory regulatory requirements; hence this contributed to a reduction of the LTIFR from 9.5 (2011) to 8.8 (2015) thereby achieving a reduction of 7% from its original value in the five years.
- When we compare the LTIFR reduction indices of the medium-sized Manufacturing companies in 2011 – 2015, those from the Emirate of Abu Dhabi achieved a significant 53%

reduction from the initial values, whereas the companies outside the Emirate of Abu Dhabi had a reduction of 7% from the initial values of LTIFR.

Figure 153 *Average of Lost Time Injury Frequency Rate (LTIFR) for the Small Manufacturing Companies*



The above Figure 153, explains the trends of LTIFR in the five years from 2011 to 2015 in the small-scaled Manufacturing companies inside and outside the Emirate of Abu Dhabi. The LTIFR of the small-scale industries from the Emirate of Abu Dhabi was reduced by 57% (From 10.3 during 2011 to 4.4 during 2015) whereas the entities from other Emirates did not reduce the LTIFR in those five years (same level 8.5 during 2011 and 2015).

b. The Relationship Between LTIFR and the Other Variables

The elements in the principal diagonal, as per the above Table 99, indicate the correlation between the dependent variables within the large Manufacturing companies of Abu Dhabi.

Table 99 *The Correlation Analysis for Large Manufacturing Companies in Abu Dhabi between LTIFR and Health and Safety Expenditure for Incidents for the Period 2011-2015*

		LTIFR				
		2011	2012	2013	2014	2015
Health and safety expenditure for incidents	2011	0.98				
	2012		0.77			
	2013			0.51		
	2014				0.60	
	2015					0.76

Based on Hinkle et al. (2003), Table 99 is a positive correlation (Very high to a high positive linear relationship) between the LTIFR and the cost of safety. When the incidents increased, the Lost Time Injury Frequency Rate increased, and the related expenses like the penalties, compensations, insurance premium and cost of investigation, repair and reconditioning also increased accordingly (see correlation coefficients range between 0.98 and 0.51 in the above table).

Table 100 *The Correlation Analysis Large Manufacturing Companies in Abu Dhabi between LTIFR and Health and Safety Budget for the Period 2011-2015*

		LTIFR				
		2011	2012	2013	2014	2015
Health and safety budget	2011	0.01				
	2012		-0.29			
	2013			-0.27		
	2014				-0.57	
	2015					-0.40

		LTIFR				
		2011	2012	2013	2014	2015
Health and safety budget	2011	0.01				
	2012		-0.29			
	2013			-0.27		
	2014				-0.57	
	2015					-0.40

Table 100 shows no clear relationship pattern between the safety budgetary investments and the LTIFR.

From the above figure, we can understand that the LTIFR is generally negatively influenced by the investment in OHS. With an increase in investment, the LTIFR was reduced.

c. The Relationship Between the LTIFR and the Training Manhours

In order to obtain the relationship between LTIFR and the training manhours, and since the respondents did not provide the training manhours, secondary data were provided from the Government Authority through a consultant (Reference to 3.11), the data set contained information on 87 large-sized Manufacturing companies from the Emirate of Abu Dhabi (LTIFR and Training manhour), these data were collected in 2015 from yearly reports, which were extracted for the purpose of the thesis, where the training manhours were calculated based on the time invested for training, such as toolbox talks, workshops and external training and the number of attendees.

Figure 154 and Figure 155 show the effect of conducting more frequent training on the Lost Time Injury Frequency Rate. Figure 154 shows a negative relation between the dependent variable (LTIFR) and independent variable (Number of training sessions per million-man hours).

Linear trendline equations expressed y = -0.0026x + 10.144 with regression R^2 = 0.2523 which showed a negative correlation relationship (*r=-0.502*).

Figure 154 *The Relationship between the LTIFR and the Training Manhours for the Large Manufacturing Companies in the Emirate of Abu Dhabi using Linear Trendline*

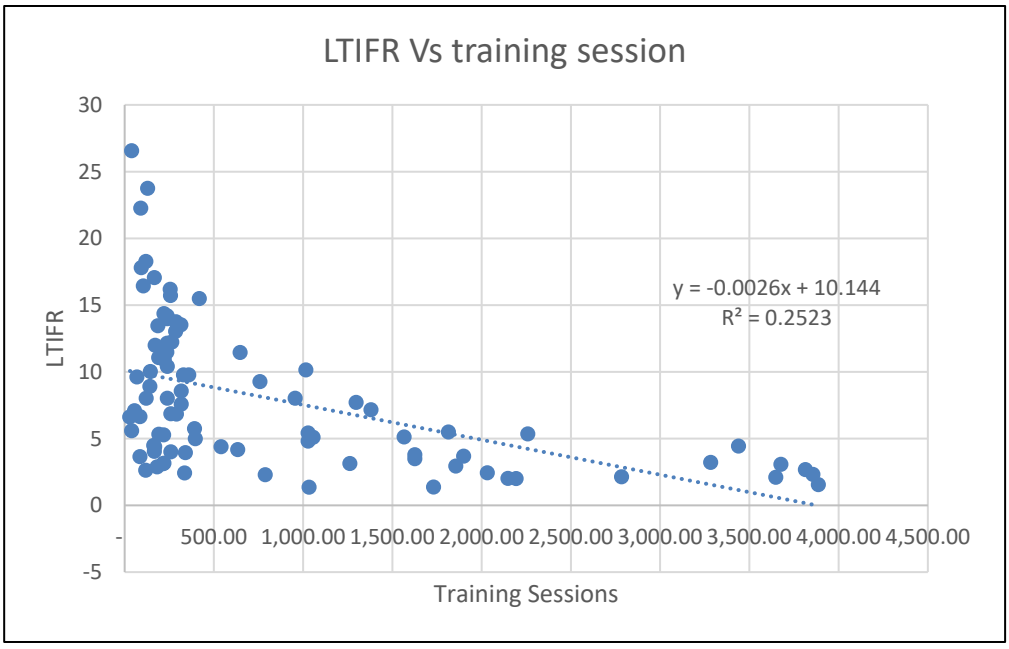
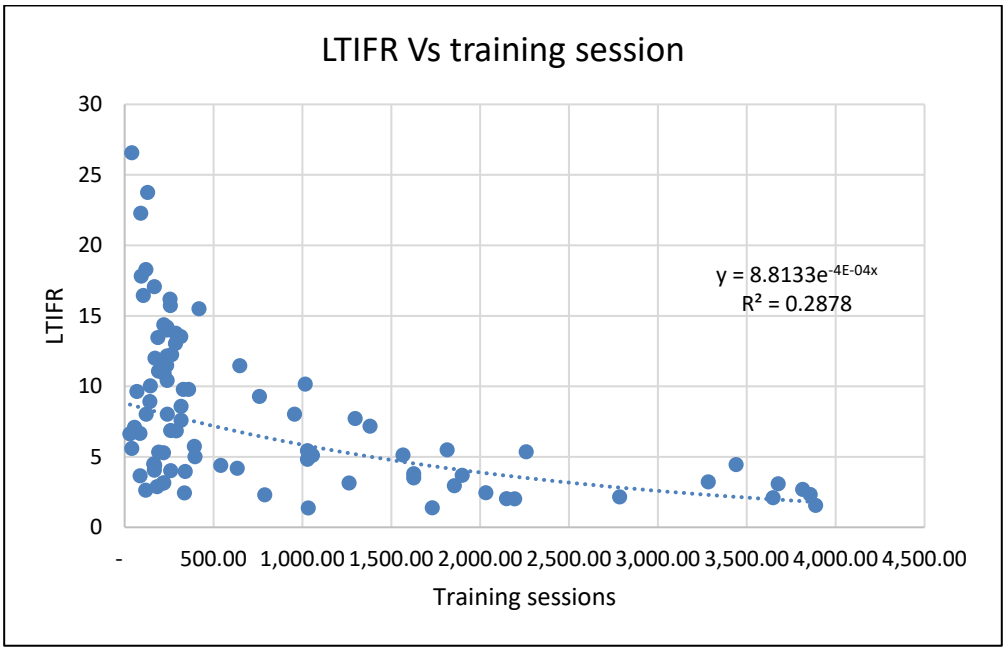


Figure 155, shows exponential trendline equations expressed y = 8.8133e-4E-04x with regression R^2=0.3591, which showed a negative correlation relationship (*r=-0.599*).

Figure 155 *The Relationship between the LTIFR and the Training Manhours for the Large Manufacturing Companies in the Emirate of Abu Dhabi using Expansional Trendline*



From the above Figure 154 and Figure 155, it is revealed that there is a negative relationship between the dependent variable (LTIFR) and the independent variable (Training sessions per million hours of work). This negative relationship is not strong because the LTIFR might be influenced by many other factors such as the level of enforcement of OHSMS, management accountability and worker behaviour. Regardless of the level of training sessions conducted.

It was found that the negative exponential was a better fit than the linear regression since the data values rise or fall at increasingly higher rates as in Figure 155, where it demonstrates the effect of training tails off at higher values of the training variable.

Referring to Figure 150, where it was found that the of the sample's LTIFR mean-average (6.9) is less than the government mean-average (7.9).

d. The Effect of Training on Lost Time Injury Frequency Rate (LTIFR) Statistics

This study examined the relationship between Health and Safety training, and its impact on the reduction of LTIFRs reported in the last five years in the Emirate of Abu Dhabi (which had an OHS system under OSHAD enforcement). Data analysis revealed a comparative account of the Emirate of Abu Dhabi, which had an OHS system under OSHAD regulatory framework with that of the other Emirates, which had the OHSMS derived from either the federal or regulatory requirements. The study also considered the relationship between the size of the establishments and LTIFR reporting and training frequencies, to see the impact of the same on the prevention of LTIs.

Figure 156 *Percentage of Manufacturing Establishments According to OHS Training Frequency*

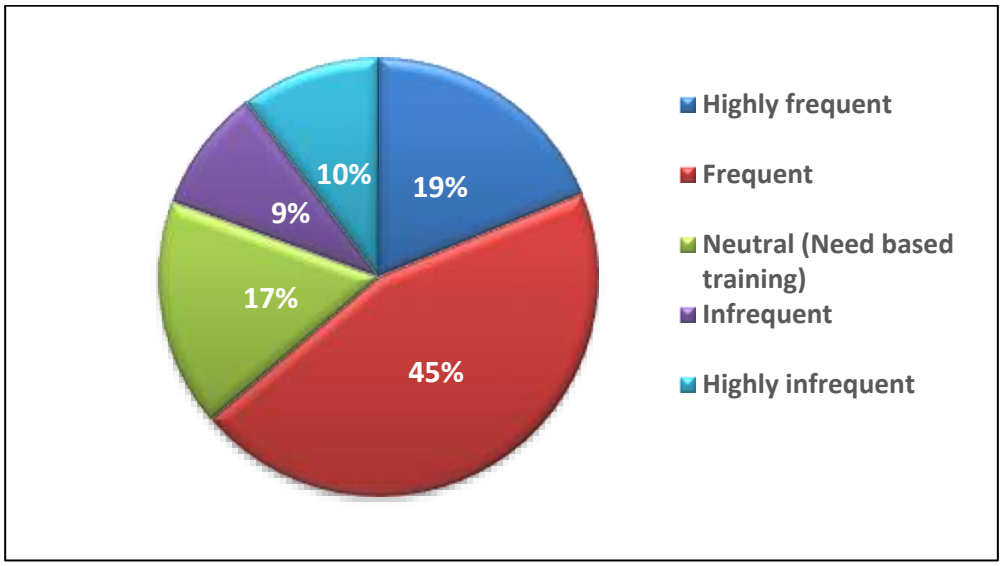


Figure 156 shows that 19 % are Highly infrequent and Infrequent, respectively, in providing OHS training in the Manufacturing entities. The importance of having a regulatory entity to monitor and control Occupational Health and Safety was examined in the study. Also studied, was the impact of training on the other Emirates, which did not have a unified OHS System Framework, like that of the Emirate of Abu Dhabi.

Figure 157 *LTIFR Reported by Manufacturing Companies According to the Establishment's Size, and Frequency of Supervised Training and the Location*

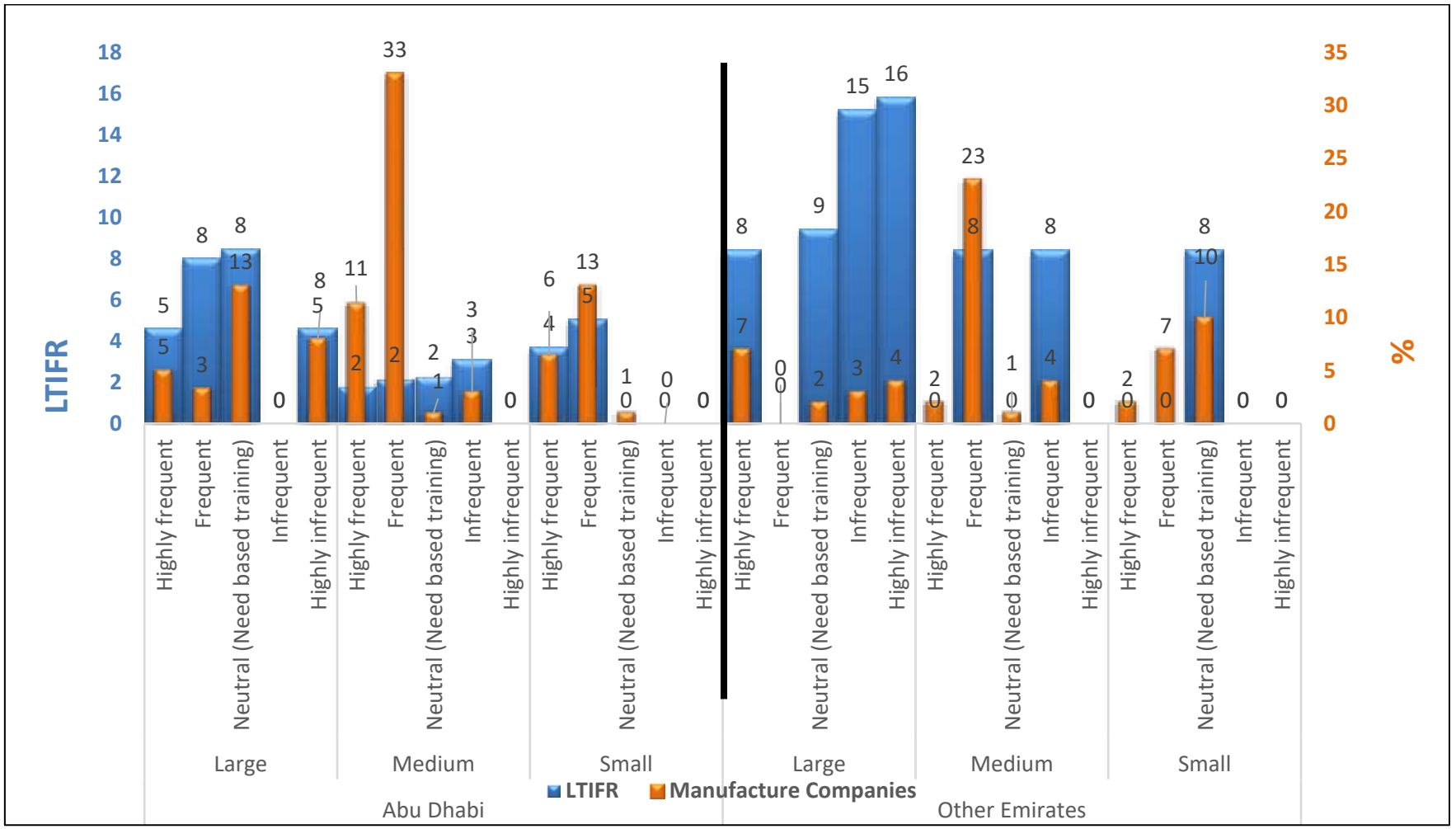


Figure 157 presents the data of LTIFRs reported within the surveyed sample and excluding non-responses of n=17 for Abu Dhabi and n=23 for the other Emirates) The results showed clearly that the LTIFR in all groups reporting was lower in the Emirate of Abu Dhabi compared to that of the other Emirates. The LTIFR tends to increase with reduced training frequency, but there are exceptions to this pattern, particularly the large infrequent training entities located in Abu Dhabi's Emirate.

When the training frequency increased, the LTIFR reduced. However, this pattern was not reflected in the small-sized Manufacturing entities located in the Emirate of Abu Dhabi, having a highly frequent and frequent training frequencies.

Figure 158 *LTIFR Reported by Manufacturing Companies According to the Establishment's Size, and with or without a Formal OHSMS*

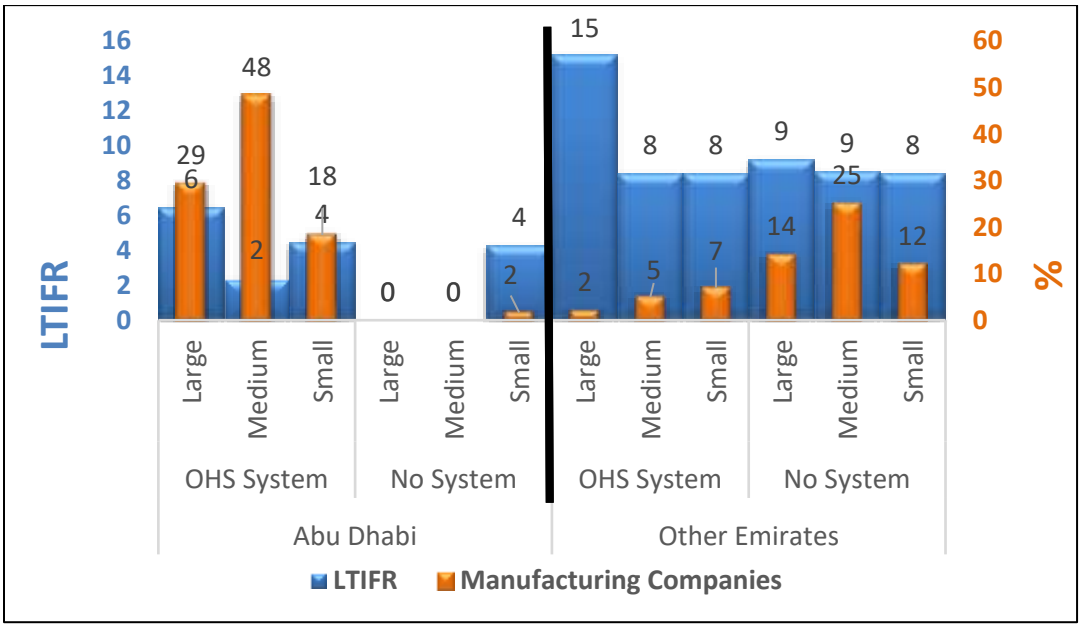


Figure 158 shows the Lost Time Injury Frequency Rate (LTIFR) effect in the sample surveyed within the Emirate of Abu Dhabi and the other Emirates, with and without OHS Management Systems.

The entities in all groups with and without an OHS Management System from the Emirate of Abu Dhabi reported less LTIFRs than those from the other Emirates.

e. Occupational Health and Safety Staff

The survey sample covered the employees working in the Manufacturing sector. The study included the nationality of the Occupational Health and Safety specialists in the surveyed organisations. The study also covered the changes in the LTI information recorded in the Emirate of Abu Dhabi (which has a regulatory body) for the period between 2011-2015 and its impact on reducing incidents.

Figure 159 shows that 77% of the Occupational Health and Safety employees in the Manufacturing sector are distributed in the Emirate of Abu Dhabi, and 23% distributed in the other Emirates. Staff are needed to ensure compliance, follow and obtain full instructions, and observe management systems requirements to meet the objective of reducing the number of injuries and incidents. Other Emirates' Manufacturing organisations show individual practices of hiring OHS staff. The distribution of OHS employees in general, varied and depended on the size of the establishments from the perspective of the number of employees, type of manufacture activity, location, etc.

Figure 159 *Percentage of Occupational Health and Safety Professionals Distribution in the Manufacturing Sector-2015*

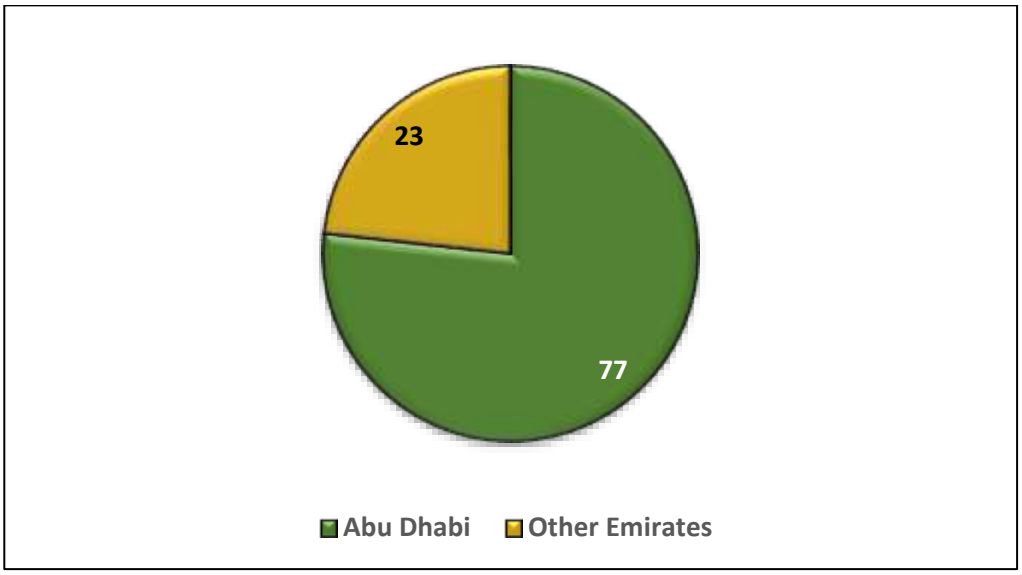


Table 101 below shows the ratio of the average number of OHS supervisors per 100 employees in entities of different sizes. The medium-sized companies have higher supervision ratios in OHS management in relation to other entity sizes. The Emirate of Abu Dhabi has shown greater OHS

supervision in all sizes of Manufacturing companies compared to the other Emirates. Small-sized Manufacturing companies in Abu Dhabi had a greater concern towards the Health and Safety supervision than the other Emirates. The large-sized companies in the Emirate of Abu Dhabi had more OHS supervisors to carry out monitoring activities, provide and deliver awareness and ensure usage and compliance of Health and Safety standard operating procedures.

Table 101 *The Average Number of OHS Supervisors per 100 Employees According to Size of Entities in the Manufacturing Sector.*

	Abu Dhabi	Other Emirates
Small	0.85	0.13
Medium	3.80	1.35
Large	2.72	1.43

Figure 160 shows the trend of Emiratis as OHS professionals in the large-sized entities in the Manufacturing sector were found to be increasing from the year 2011 (12%) to 2015 (24%). The Emiratis were found to be in executive and supervisory positions, thus reflecting the OHS governance. In the year 2011, the OHS awareness and the reporting were less, where the negative trend of LTIFR was clearly observed from 2012 till 2015. When the United Arab Emirates increased the number of Emiratis hired as OHS specialists, the LTIFR was reduced.

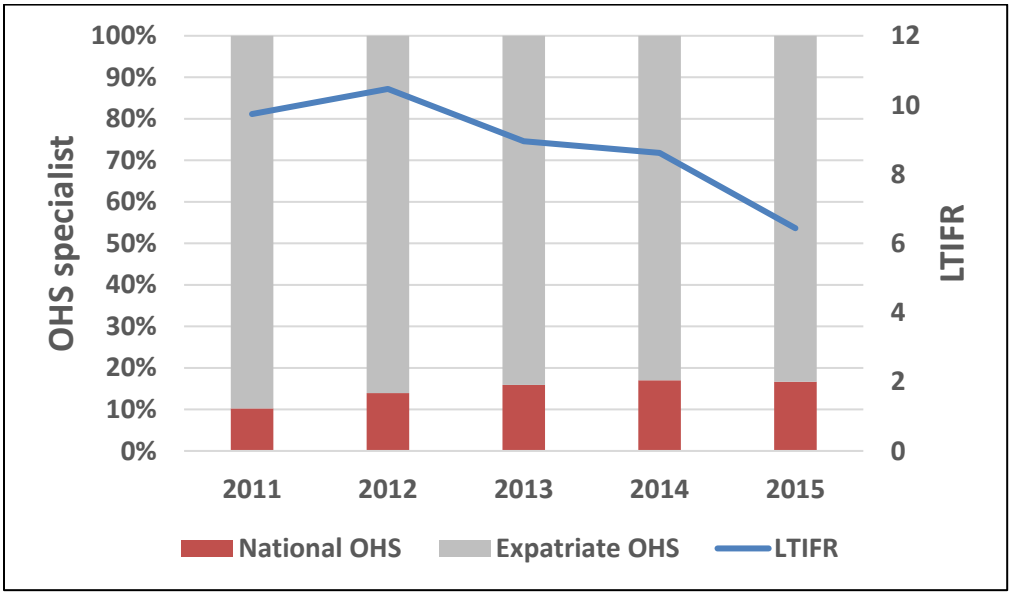
Table 102 shows that the Emiratis OHS specialists have reached 15% in the large-sized Manufacturing companies. Still, the percentage of Emiratis OHS specialists is low in the Manufacturing sector of the Emirate of Abu Dhabi, where there is a lack of full dependency on them in the Manufacturing operations. The share of Emirati OHS specialists in medium-size companies is 9% which is lower than large-sized Manufacturing companies.

Table 102 *The Percentage of Emirati OHS Specialists in the Manufacturing Entities*

Size	The Percentage of OHS Specialists	
	Emiratis	Expatriates
Large	15	85
Medium	9	91
Small	0	100

f. The Effect of Emirati OHS Specialists on Lost Time Injury Frequency Rate (LTIFR) Statistics

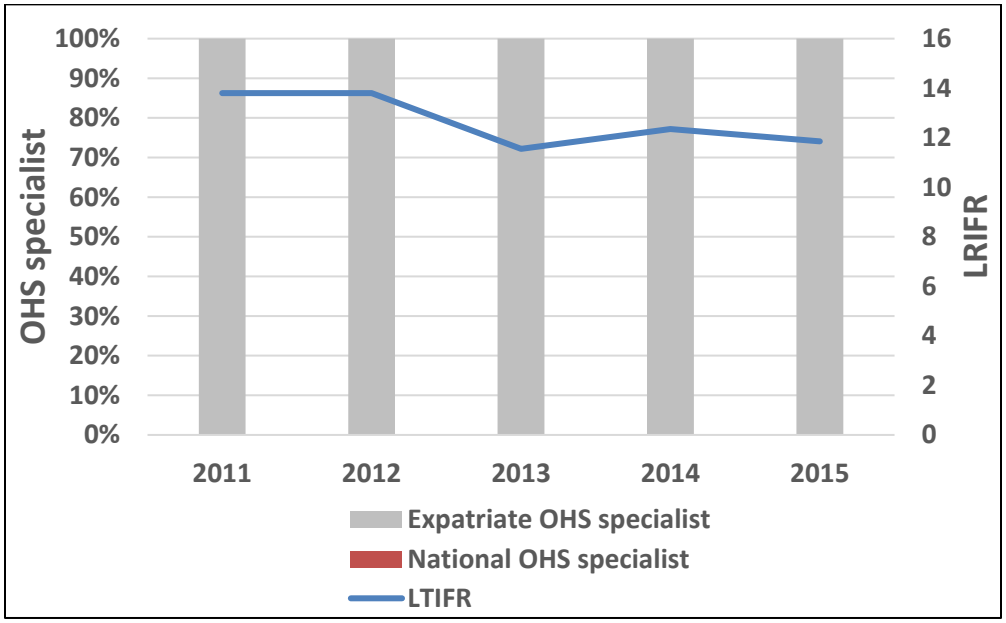
Figure 160 *The Percentage of Emirati OHS Specialists /Total OHS Workforce Compared to Lost Time Injury Frequency Rate in Abu Dhabi Large Manufacturing Companies*



There is a negative relation between the increasing number of Occupational Health and Safety specialists and Lost Time Injuries recorded in large and medium sized Manufacturing facilities in the Emirate of Abu Dhabi, as shown in Figure 160, where the result shows that with the increase in OHS supervision the number of Lost Time Injury Frequency Rate (LTIFR) reduces over time, which demonstrates the importance of monitoring, providing awareness, and ensuring usage and

compliance with Health and Safety standard operating producers in the Manufacturing sector. Also, the figure proves that the increase in the Emirati OHS workforce has a positive impact.

Figure 161 *The Percentage of Emirati OHS Specialists/Total OHS Workforce Compared to Lost Time Injury Frequency Rate in the Other Emirates, Large Manufacturing Companies.*



The above Figure 161 illustrates the relationship between the increase in the number of Emirati OHS specialists and its impact on the Lost Time Injury Frequency Rate (LTIFR) in large-sized Manufacturing companies located in the other Emirates. In the year 2011, from the respondents' details, we can observe a total of 3 OHS specialists during the year 2011, out of which none were Emiratis (0%).

By the year 2015, there were a total of 10 OHS Specialists, out of which none were Emiratis (0%). When we evaluate the Emiratis OHS specialists with the LTIFR trend, we can observe that there are no Emiratis as OHS Specialists for all the five years. However, the LTIFR reduced from 13.8 (2011) to 11.8 (2015), led to a reduction of 15% of the original value in the five years.

The LTIFR reduction in the large-sized Manufacturing companies in the other Emirates (14%) is comparatively less than that of Abu Dhabi (38%), as the Emirati OHS specialists was greater in the Emirate of Abu Dhabi. On the contrary, there were no Emirati OHS specialists was available in the

other Emirates' Manufacturing sector. This indicates that the Emirati OHS specialists was greater in the Emirate of Abu Dhabi than the other Emirates. Accordingly, the LTIFR reduced at a larger scale in the Emirate of Abu Dhabi.

4.3.5. Occupational Health and Safety Practices in the Government Sector

From the surveys completed by the respondents from the government entities (4.2.4), this thematic analysis aimed to identify different recommendations for the improvement and enhancement of the OHS Culture within the companies in the UAE. The findings, as mentioned earlier, highlighted the need for various operational changes to ensure positive results.

One of the respondents revealed that the most prominent obstacle in the implementation of this system was the mixed culture within the organisation. The recommendations were given in relation to four aspects, including culture and awareness, laws and implementation, control and internal improvement, and strategic planning. However, the need for promoting Health and Safety awareness among the workers, managers, and top-level management was emphasized. Furthermore, training and workshops were found to be an effective way of improving the OHS system's culture in the country. Other responses from the participants of this study assigned high importance to legal compliance, audit and inspection and incentives and discipline policies, for ensuring effective implementation of the OHS system.

As shown in Figure 162 to Figure 166, in addition to the Construction and the Manufacturing sectors surveys, 16 respondents from different government departments were surveyed. The response from these respondents are illustrated in the figures below.

a) Reference to Figure 162, 75% of the respondents from the government departments felt the mandated OHS framework was the most effective way to improve the OHS Culture in their workplaces.

b) According to Figure 163, 50% of the respondents believed in the voluntary OHS systems to develop their OHS system and culture. This response was mainly from organisations who had already subscribed to the international standards such as ISO 45001/OHSAS 18001 on OHS standards.

c) Figure 164, illustrated that most respondents (75%) had the perception that recording and reporting work-related serious incidents helped their organisations reduce the lost time injuries and frequency rates.

d) Figure 165, shows that 69% of the respondents were optimistic about the OHSMS regulatory framework enforcement, and felt it was supporting the enhancement of OHS performance in the workplace.

e) Interestingly in Figure 166 illustrated that 69% of the respondents felt that, like the OSHAD System Framework of the Emirate of Abu Dhabi, similar frameworks should be effective in reducing workplace incidents if established in the other Emirates.

f) All respondents (100% reply with Highly Effective) unanimously supported that OHS incident recording and reporting are key factors of establishing OHS policies.

Figure 162 *Do you Think the Mandatory Implementation of OHSMS is an Effective Way to Improve Health and Safety in the Workplace?*

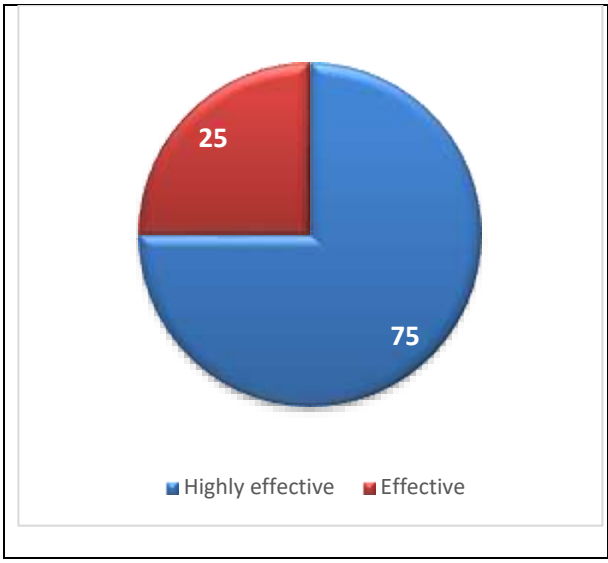


Figure 163 *Do you Think the Voluntary Implementation of H&S Practices is an Effective Way to Improve Health and Safety in the Workplace?*

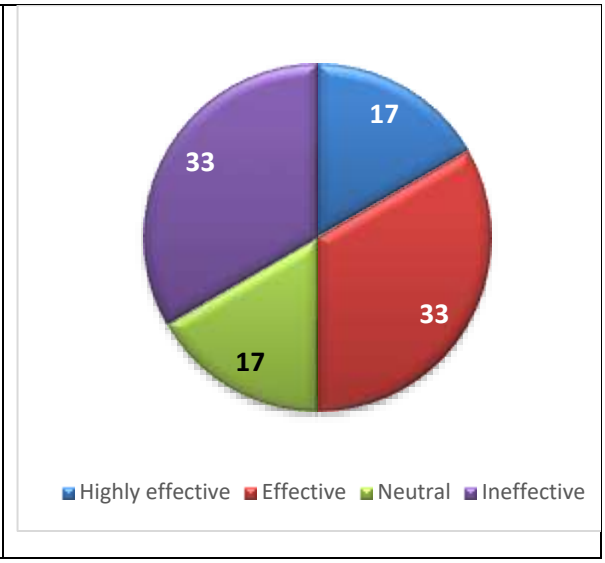


Figure 164 *Does the Requirement of Recording and Reporting Incidents Help in Reducing Workplace Incidents?*

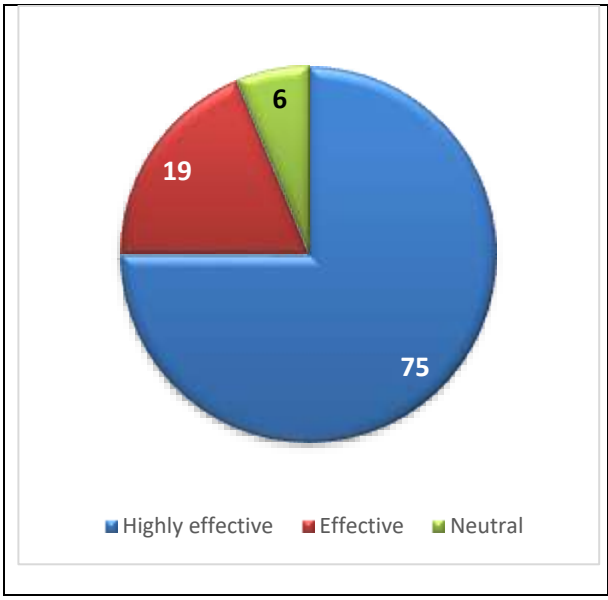


Figure 165 *How Effective is the Regulatory Enforcement Mechanism, Including Fines, in Improving Health and Safety in the Workplace*

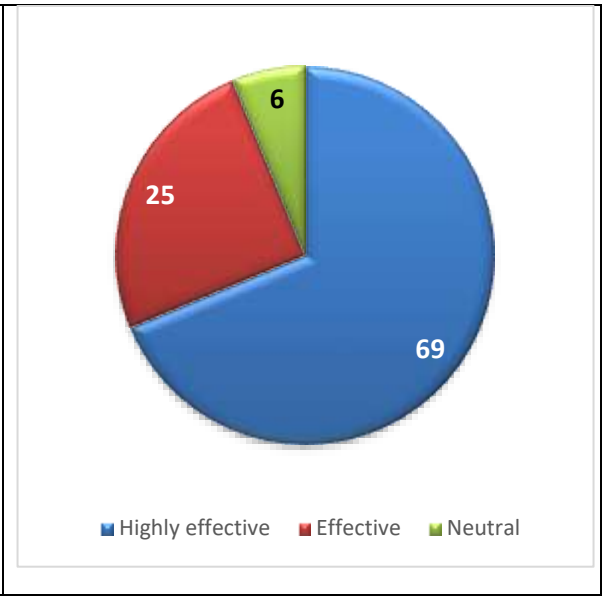
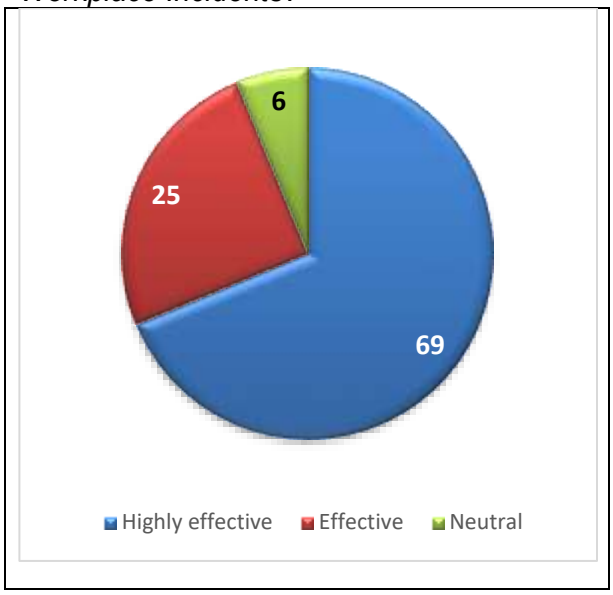


Figure 166 *Do you Think each Emirate's own OHS Regulatory Framework, like Abu Dhabi, would be Effective in Reducing Workplace Incidents?*



4.4. Discussion

4.4.1. Interpretation of Findings

This research aimed to investigate the benefits of the OHSMS based regulatory framework of OSHAD SF, implemented in Abu Dhabi compared to the conventional/traditional legal framework established by the UAE Federal Labour Law number 8 of 1980, which is implemented in the other Emirates. There are various factors that influence the effectiveness of Occupational Health and Safety Management. As a result of the qualitative (4.2), quantitative (4.2) and the secondary data collected and analysed (Table 1 and Table 2 in 1.2, and Figure 138 and Figure 139 in c, Figure 155 and Figure 156 and c, resulted in the following interpretations:

The effectiveness of OHS management, whether it is the conventional/traditional legal framework or the OSHAD System Framework, which requires the mandatory implementation of OHSMS, was influenced by the following factors:

I. The institutional framework governing the OHS management (Refer to the focus group discussion and outcome e).

II. The level of OHS training provided to the employees (4.2.3.1, 4.2.3.3, d and d).

III. The level of OHS governance within the organisation (4.2.2, 4.2.2, 4.2.3.2; 4.2.3.4; and Figure 41).

a. The OHS Institutional Framework

The overall assessment of the effectiveness of the OHS Management, as per the research question, on assessing which framework was more effective, the Abu Dhabi's OHSMS regulatory framework (OHSAD SF) or the conventional/traditional legal framework implemented in the other Emirates.

The institutional mechanism for OHS was neither unified nor was it equally implemented across the different Emirates (4.2.2). In the Emirate of Abu Dhabi, the framework was comprehensive with the clear establishment of the OHS Government Competent Authority (CA) and 11 Sector Regulatory Authorities (SRA's). As mandated by the Competent Authority (CA) and as managed by the SRA's, the entities were nominated, registered, and governed under the respective SRA to implement the OHSMS and make the regular performance reporting including those related to OHS incidents. This was achieved through a structured framework of policy, elements, mechanisms, codes of practice and the technical guidelines (Refer to Abu Dhabi Occupational Safety and Health Center (2017)). The reporting of OHS incidents was far better in Abu Dhabi across the two sectors compared to the other Emirates (Refer to Table 81). There was no formal mechanism to notify and investigate the other Emirates' incidents; The comprehensive incidents management reporting performance by Abu Dhabi entities was mandated through the OHSMS based regulatory framework of the Emirate of Abu Dhabi. this was highlighted in the focus group discussion, and also reflects what has been described in the Ministry of Human Resources and Emiratisation (2017) report. The report states that even though the Occupational Health and Safety requirements at a federal level are well established, there is an

ineffective enforcement mechanism (aa) in the other Emirates, despite their municipalities being responsible for their enforcement. This has been particularly evident during the inspection of manufacturing industries (as well as construction sites) and is considered to be the cause of an increase (in both rate and frequency) of lost time incidents in other Emirates as compared to the number of incidents reported in Emirate of Abu Dhabi (b 2and **Error! Reference source not found.**). It was therefore concluded that this enforcement mechanism is more effective due to its defined structure of governance within the regulatory framework.

The Qualitative Analysis of the positive theme has emphasised that Centralised Occupational Health and Safety Management improved the overall OHS governance, thereby improving the risk mitigation approach in the companies (Refer to c), Figure 39, Figure 58 and 4.2.6). The Qualitative Analysis also highlighted that continuous Occupational Health and Safety monitoring, and regular management meetings are indicators of better governance or management commitment, which significantly improves the OHS Culture in the organisation. This has been emphasised by the NCEMA study mentioned above. Another conclusion drawn from the focus group is that self-regulation of Occupational Health and Safety Management Systems (which is only mandatory in the Emirate of Abu Dhabi), is an efficient tool for effective monitoring (Refer to c.).

The Qualitative Analysis also concluded that integration of the Occupational Health and Safety Management System with other management systems (such as quality management), improved Occupational Health and Safety reporting and regular system reviews, thereby increasing its effectiveness (Refer to d). Furthermore, it highlighted that productivity and performance-oriented Occupational Health and Safety Management Systems improved efficiency, and overall employee performance (Refer to 4.2.3.4).

The analysis of negative themes (Refer to 4.2.3.2) concluded that poor Occupational Health and Safety insurance and poor employee motivation was primarily due to a lack of management commitment and management incompetence. Similarly, restrictive procedures, including

cumbersome documentation, inspection frequency and long Occupational Health and Safety review time, were reported to be the cause for Occupational Health and Safety ineffectiveness.

Even the analysis of site interviews (4.2.6) revealed that the Occupational Health and Safety risks could be prevented, mitigated or better managed through effective implementation of Occupational Health and Safety practices and procedures as well as through teamwork and continuous monitoring.

The focus group emphasised the need for effective governance (4.2.2). It underlined the need for an institutional mechanism to incentivise companies which to strictly comply with Occupational Health and Safety practices and requirements. Incentives would not only motivate those companies but would also set an example for others (e). 27 out of 32 online survey participants recommended that a unification of the occupational health and institutional safety framework across the UAE, would not only be feasible but also advantageous (4.2.8). The online survey revealed that a unification would reduce OHS incidents (Refer to b). These research findings clearly demonstrate the need for an effective unified National OHS regulatory framework in line with the OSHAD SF model. A common national regulatory framework based on OHSMS which has been successfully implemented in the Emirate of Abu Dhabi thereby reducing incidents, has not been enforced in the other Emirates (a, and Table 81).

b. The Level of OHS Training Provided to the Employees

The Qualitative Analysis (Figure 34), study revealed that training played an important role in improving OHS Leadership/Commitment. It was determined that training mitigates risks and enhances the positive OHS Culture of the organisation.

Analysis of the data showed a correlation between the number of training sessions provided and the Lost Time Injury Frequency Rate (LTIFR) The number of training sessions (per million man-hours) was compared to the number of hours of work performed. This revealed a common pattern that there was a negative relationship between those variables. (Refer to Figure 138, Figure 139 in 0 and Figure

154 and Figure 155 in 4.3.4). The role of training, if well established, also has a great influence on the effectiveness of Occupational Health and Safety Management (Refer to Figure 133Figure 137 in 00a; Figure 149 in 4.3.4; and Figure 155 in c, in the Quantitative Analysis). The findings show that training programs were effective in reducing the LTIFR (Figure 141 in 0 and Figure 157 in 4.3.4).

The existing practice was such that the OHS system was not integrated into the daily business operations in that; the OHS responsibilities were not owned equally by the operations staff. The focus group discussion (Refer to 4.2.2) concluded that senior and middle management should be trained on how to lead Occupational Health and Safety in their respective functions, which in turn would prevent the Occupational Health and Safety from being compromised.

Workforce training would involve identifying Occupational Safety hazards and recognising when PPE is to be used. Considering most workers, especially from the Manufacturing sector, were not trained on how to use the PPE, this was particularly important.

Large and medium-sized organisations located in the Emirate of Abu Dhabi were required to comply with the local regulations. One of the regulations specifically requires that the OHS competency criteria for employees is clearly defined; it must not only identify training needs, but regular training sessions also need to be provided accordingly. This increase in the number and duration of training sessions lead to downturn in the LTIFR (Refer to the Figure 138, Figure 139 and Figure 141 in d, and Figure 154, Figure 155; and Figure 157 in 4.3.4). Small-sized organisations in the Emirate of Abu Dhabi did not have any specific regulatory requirement in terms of training, therefore they followed the conventional/traditional OHSMS complying only with federal labour laws and requirements. Consequently, this approach was not as effective as compliance with the regulatory system of large and medium organisations in the same location (Refer to Figure 141 in d and Figure 157 in 4.3.4).

Organisations from other Emirates were following a conventional/traditional OHSMS (which required training to be provided and incidents to be investigated), however, their OHSMS approach was not consistent with the OHSMS of similar organisations in the Emirate of Abu Dhabi where federal

requirements for Health and Safety were enforced much more effectively (Refer to Figure 141 in d and Figure 157 in 4.3.4).

Regardless of the location and the industry, there is an inverse relationship between Training and the LTIFR, when amount and level of the training increased, the LTIFRs reduced. However, this pattern was not reflected where there were data gaps from the survey due to non-response (Figure 141 in d and Figure 157 in 4.3.4).

The Qualitative Analysis highlighted that a lack of Occupational Health and Safety consciousness, a lack of training and a lack of experience are the key factors responsible for poor Occupational Health and Safety compliance (4.2.3.2). Similar findings were found in the analysis of positive themes that emphasised that improved Occupational Health and Safety awareness and continuous training are essential in order to achieve effective safety and security management (4.2.3.4). Similarly, findings from the site interviews emphasised the need for Occupational Health and Safety training and showed that meticulous implementation of an Occupational Health and Safety Management System was crucial in minimising accidents and mitigating risk (4.2.6).

The above interpretations were further strengthened by the Quantitative Analysis findings, which demonstrated that adequate training was effective in controlling incidents and accidents.

A similar analysis in the Manufacturing sector established that the training frequency had an inverse relationship between the training frequency and the LTIFR (Figure 141 in d and Figure 157 in 4.3.4). The comparative Quantitative Analysis of Abu Dhabi against the other Emirates revealed that all of the Emirates there is a correlation between a consistent reduction in Health and Safety training and an increasing LTIFR (Excluding the non-responses).

c. The Level of OHS Governance within the Organisations

In the Emirate of Abu Dhabi as well as the other Emirates, the Health and Safety-related supervision was found to influence the effectiveness of the OHS system of the organisation. The level of

supervision was found to be influenced by the worker-supervisor ratio, OHS competency of the supervisors and the participation of the Emiratis in the internal OHS governance. There was a direct correlation between the LTIFR and Health and Safety expenses on incidents, as shown in Table 99 in b considering the downward trend of LTIFR in the Emirate of Abu Dhabi the level of OHS governance within the organisation located in the Emirate of Abu Dhabi was greater than the other Emirates. From the percentage of OHS professionals distributed in the Construction sector (Figure 143) and the Manufacturing sector (Figure 159), it is evidenced that 70% of the OHS professionals in the two sectors combined were from the Emirate of Abu Dhabi which reflected the OHS governance derived from the OSHAD SF element number 1 requiring OHS resources.

There was no data available on the OHS supervisors for the medium and the small entities regardless of the sector and location. In the Emirate of Abu Dhabi, the large Construction and Manufacturing entities were analysed for the impact of OHS supervision team size on the LTIFR. In both sectors, the increase in the OHS supervision resulted with a greater reduction in the LTIFR (Refer to Figure 146 and Figure 160).

In the other Emirates, the large Construction and Manufacturing entities were analysed for the impact of OHS supervision team size on the LTIFR, in both sectors the increase of the OHS supervision was not as effective as the Emirate of Abu Dhabi when the OHS supervision was increased more than two times; still, the reduction in the LTIFR was lesser than the rate of reduction in the Emirate of Abu Dhabi (Refer to Figure 147 and Figure 161).

From the above, it is evidenced that the level of OHS governance, through the OHS resources and supervision was more effective in the Emirate of Abu Dhabi than the other Emirates.

The OHS specialisations were more in the Emirate of Abu Dhabi, as a result of the mandatory OHS practitioner registration requirements, which clearly reflected on the better reduction of LTIFR in the Emirate of Abu Dhabi, than the other Emirates (Refer to Table 71, Figure 133 and Figure 149).

Moreover, a critical aspect of governance is the need for any entity's Occupational Health and Safety Strategy as well as an Enterprise Strategy to focus on improved employee commitment, Improved management commitment towards Occupational Health and Safety. It is very important to practise wider consultation on Occupational Health and Safety issues, significantly improving OHS Culture within the organisation (4.2.3.4).

This research (Figure 146) has clearly demonstrated the effectiveness of Occupational Health and Safety supervision through the inverse relationship between the Emirati Occupational Health and Safety specialists' growth and the Lost Time Injury Frequency Rate (LTIFR) in large Construction companies located at the Emirate of Abu Dhabi. Even in other Emirates, similar improvement was seen (Figure 147), where the Lost Time Injury Frequency Rate (LTIFR) of the large Construction companies significantly reduced with the Emirati OHS specialists' growth in the other Emirates. This was established in this research over a period of five years. This clearly demonstrates the qualitative analysis and quantitative analysis of Construction companies in Abu Dhabi as well as other Emirates, which revealed a positive influence on the Occupational Health and Safety performance, with the increase in OHS supervision. This resulted on an improved OHS governance (Refer to Figure 17, and Figure 18 in Negative Theme 1: Management Incompetence, and Figure 38 in Positive Theme 2: Centralised OHS Management, and Figure 146 and Figure 147 in f, Figure 160, and Figure 161 in f).

As part of the focus group discussions (g) and the qualitative analysis (Positive Theme 3: OHS Strategy and Enterprise Strategy Integration. in 4.2.3.3), another important contributing factor of governance was identified as the budget allocated by entities for Occupational Health and Safety Management. While the qualitative analysis of negative themes highlighted that, due to the high cost of safety equipment as well as the cost of Occupational Health and Safety being considered to be high, the management of most companies cut back on the resources required for effective Occupational Health and Safety Management. On the other hand, the focus group emphasised the

need for enforcing a minimum budget allocation for Occupational Health and Safety Management, which would help entities overcome the challenges of lack of resources and contribute towards governance for effective Occupational Health and Safety Management in both Construction and Manufacturing sectors.

4.4.2. Interpretation and Discussion of the Merged Results

This research work has investigated the impact of the OHSMS based regulatory framework of OSHAD SF implemented in the Emirate of Abu Dhabi in comparison to the conventional/traditional legal framework established through the UAE federal labour law # 8 of 1980 and implemented in the other Emirates of UAE. In 4.4.1 we have demonstrated how the factors mentioned below have influenced the effectiveness of the OHS management, both the conventional/traditional legal framework as well as the regulatory framework requiring the mandatory implementation of OHSMS:

I. The institutional framework to govern the OHS management (Vide the focus group discussion and outcome e).
II. The level of OHS training provided to the employees (4.2.3.1, 4.2.3.3, d and d).
III. The level of OHS governance within the organisation (4.2.2, 4.2.2, 4.2.3.2; 4.2.3.4; and Figure 41).

The OHS Institutional Framework

The impact of the comprehensive incident management reporting performance by Abu Dhabi entities mandated through the OHSMS based regulatory framework of the Emirate of Abu Dhabi by comparison to the no formal mechanism to notify and investigate the incidents in the other Emirates was clearly demonstrated (Refer Table 81). It is evident that the institutional mechanism for OHS management was not unified and equally matured across the different Emirates of UAE (4.2.2). Researchers (Eyssen et al., 1980; Zohar, 1980; Chew, 1988; Gallagher, 1994; Simard & Marchand, 1995; Shannon et al., 1996) have studied the effectiveness of OHSMS, but not particularly the effectiveness of OHSMS as a regulatory framework or as compared to a legal framework without any

requirement of incident reporting. This research demonstrates the benefit of comprehensive incidents management reporting mandated by the regulatory framework.

Another finding is that integration of the Occupational Health and Safety Management System with other management systems, like quality management, improved Occupational Health and Safety reporting and regular system reviews, increases OHS management's effectiveness (d). Also, Centralised Occupational Health and Safety Management in the companies were found to improve the overall OHS governance, including improving the risk mitigation approach within the companies (4.2.3.4, Figure 39, Figure 58 and 4.2.6). (Quinlan & Bohle, 1991; Else, 1994; Rahimi, 1995), have emphasised integration as a precondition to making Health and Safety effective within the workplace. The current research also supports the same approach of integration of Occupational Health and Safety Management Systems with other management systems like quality management, to achieve ease of implementation across all management systems, as well as to attain better Occupational Health and Safety reporting being part of mainstream reporting like production/construction reporting, and regular system reviews for effectiveness (d)).

Hovden and Tinmannsvik (1990) reported that a high degree of understanding between the company management and the regulators as well as between employers and the employees resulted in the successful implementation of internal controls, which can be considered as an OHS system being in place for internal controls, although not specified. Saksvik and Nytrø (1996) reported that early implementation of internal control in Norway had better general awareness among those companies that implemented it. It was concluded that the initial impact of the legislation was positive, although most of the effort was targeted towards improving documentation of existing Health and Safety practices, as also focusing on improving Health and Safety Management Systems development rather than on the actual needs for effective reduction of incidents. Additional aspects of institutional mechanism highlighted through this study that impact the OHS management are, management commitment and management competency, continuous monitoring, simpler and easier to implement

procedures and documentation (4.2.3.2 and 4.2.6). Research by (Eyssen et al., 1980; Zohar, 1980; Chew, 1988; Gallagher, 1994; Simard & Marchand, 1995; Shannon et al., 1996) emphasised the importance of effective communication but did not elaborate on the need for simpler and easier to implement procedures being the factor responsible for the OHS Management System's effectiveness. Frick et al. (2000) reported that although 'OHSM has been an effective tool to cut down ill-health at work', there is still a dearth of vital assessment of such a system's effectiveness. This lack can be overcome, as illustrated in this study, by the mandatory OHSMS based regulatory framework which addresses the shortcomings of the conventional/traditional legal framework, particular to the findings from the delimited sample used in the study.

The OHS Training Provided to Employees

The research also investigated the influence of OHS training on the effectiveness of the two-different Occupational Health and Safety Management governance models in Construction as well as Manufacturing sectors in the Emirate of Abu Dhabi and the other Emirates of UAE. In 4.4, this research's findings have demonstrated that higher frequency of training, has improved the OHS performance in terms of LTIFR (Refer to Figure 141 in d and Figure 157 in d). Similarly, Weekes (2017), has reported that a safe working environment can be created and maintained by an effective safety management system in a company that is efficiently designed, developed, and implemented. Weekes' study concluded that a company should not only adopt a safety management system but should also continually ensure that workers are complying with instructions and procedures, training of employees, and supervising of the employees to ensure compliance. This research has concluded the frequency of training, as well as quality supervision, plays a key role in effective OHS Management. OHS supervision is discussed under OHS Governance in the next sub-section. Research emphasises the need for training for better OHS management. Cohen and Cleveland (1983) emphasised the need for training and induction as the factors that ensure the success of Occupational Health and Safety Management, as well as the welfare of the employees. Hopkins

(2000), in his investigation of the Esso gas disaster, concluded that insufficient training was one of the factors responsible for the disaster. Järvis (2013) emphasised Occupational Health and Safety training needs for different levels of staff should be identified, arguing that they should be planned with necessary training programs (In-House or External), with training provided and recorded with the necessary evaluation of the training effectiveness. Loney et al. (2012) reported the challenges of raising safety awareness among the multinational workforce in the United Arab Emirates. Loney et al. (2012) concluded the 21st century (from 2011 onwards) have necessitated the recruitment of a large multinational workforce due to rapid development. Although researchers emphasise the need for training, the impact of training frequency on the OHS performance needs more elaboration. This study demonstrates the linkage of training frequency with the frequency rate of lost time injuries. The findings revealed that in both the Emirate of Abu Dhabi as well as the other Emirates, there is a positive correlation between the decrease in LTIFR and increased frequency of Health and Safety training (Figure 138, Figure 139 in c and Figure 141 in d Figure 154 and Figure 155 in c and Figure 157 in d).The findings of this research have demonstrated the negative impact of inadequate training and awareness on the ability to develop a proper Health and Safety culture at workplaces. The issue is not limited just to the training, but also to the frequency of training as well as Health and Safety supervision (discussed in more details in next sub-section). These factors remain critical to improving the effectiveness of Occupational Health and Safety Management, which is structured by the OSHAD SF, as demonstrated by this research.

The Level of OHS Governance within the Organisation

Loney et al. (2012) argues that educational interventions alone cannot prevent injuries or fatalities, but effective risk assessment, mitigation measures and surveillance are required. This study established the influence of supervision, management commitment, and budget allocation on the effectiveness of Occupational Health and Safety Management (4.2.2).

Cohen and Cleveland (1983) reported that supervision is a key factor contributing to the success of Occupational Health and Safety Management. Supervision ensures that all the employees are adhering to safety obligations. Cohen and Cleveland concluded that high supervision is required in situations when the company has implemented less effective control measures. Research also points to the need for supervision to ensure adherence to safety procedures. This study expanded on the research and focussed on supervision frequency and qualified supervision. The findings emphasise the need for continuous monitoring and increased Occupational Health and Safety surveillance (Refer to b and c), as well as the increase of the OHS supervision, which results in a greater reduction in the LTIFR (Refer to Figure 146 and Figure 160). It also highlights that, with the increase of Emirati OHS supervision, the LTIFR significantly reduced (Refer to Figure 146 and Figure 147 in f). It is worthwhile mentioning that the Emiratis engaged in OHS supervision are qualified OHS professionals and, in case of the Emirate of Abu Dhabi, all OHS professionals are required to obtain professional registration from OSHAD (the OHS regulator in the Emirate of Abu Dhabi).

In summary, one may argue that an OHSMS based regulatory framework is an effective institutional instrument to effectively enforce the development of specific OHS Management Systems. This would be the case within organisations that base such implementation on identifying and controlling risks associated with the organisations' activities. Also, as part of the OHS Management System, a well-defined structure of training and governance seems to be a requirement. Just providing training for the sake of records is irrelevant, and not having professional supervision or no OHS supervision are key aspects responsible for OHS incidents/accidents and injuries. A conventional/traditional regulatory framework appears to be lacking in these pivotal components. Something significantly addressed through a unified OHSMS based regulatory framework. Such a framework would yield benefits upon implementation across the United Arab Emirates.

4.4.2.1. Analysis of the Effect of Sector

Similarities between the sectors

The broad patterns observed under the three headings in 4.4.1, namely The Institutional Framework, The Level of OHS Training Provided to the Employees, and The Level of OHS Governance within the Organisations, were the same for both sectors.

The fundamental similarity between the Construction and the Manufacturing sectors was that their thematic characteristics were influenced by the location (The Emirate of Abu Dhabi or the other Emirates) and regardless of the sectors.

Under the Negative themes

The Negative themes as per Figure 13, Figure 15, and Figure 16 used in both sectors had the same order of the top five themes, namely Management Incompetence, High Costs Associated with OHS, Lack of OHS Consciousness, Lack of Human Resources and Restrictive procedures.

Under the Positive themes

The Positive themes as per Figure 29, Figure 31, and Figure 32 used in both sectors had the same order of the top three themes, namely the Safety and Security Maximisation, Centralised OHS Management and the OHS Strategy and the integration to the Enterprise Strategy. The same two themes, namely, Integrated OHS System Implementation and Productivity & Performance-oriented OHS Management, occupied fourth and fifth places but in a different order, though this only reflected a 2% difference in the frequency of their occurrence.

Differences between the sectors

The differences between sectors were all very specific, as set out below.

Under the Negative themes

High costs associated with the OHS (4.2.3.1– Negative Theme 2: High Costs Associated with OHS), the item "High costs of Certification", was found in the Manufacturing sector that was not found in the companies under the Construction sector. The Manufacturing companies had different customers,

and in order to fulfil their compliance requirements, different certifications were required to be obtained and managed in the Manufacturing companies such as the Product Certification, Management System Certifications, Export Consignment Certifications, etc. and due to this, the costs of OHS certification were higher in the Manufacturing companies, which was not found in the Construction companies.

Lack of OHS Consciousness (4.2.3.1– Negative Theme 3: Lack of OHS Consciousness), the item "Negligence" was found in the Manufacturing sector that was not found in the companies of the Construction sector. The OHS requirements of the Construction companies were closely monitored by different interested parties, such as the supervisor of the organisation, the client, the consultant, and the regulators such as the municipality of the respective locations. The Manufacturing companies did not have these many layers of supervision; hence the probability for negligence is relatively higher in the Manufacturing sector than that of the Construction sector.

Lack of Human Resources (4.2.3.1 – Negative Theme 4: Lack of Human Resources), the item "High Turnover" was identified in the Construction sector, which was not found in the Manufacturing sector. The nature of the Construction sector activities on site had diverse job requirements for the front liners; in a challenging work environment, the extreme weather conditions for extended work hours was something unique to the companies in the Construction sector. This made it difficult for the workers to stay in their jobs for a longer duration of employment.

Restrictive Procedures (4.2.3.1 – Negative Theme 5: Restrictive Procedures), the item "Poor Ease of Acquiring the OHS Permits" was identified in the Construction sector and not in the Manufacturing sector. The Construction companies had to obtain permits to carry out some high-risk activities, such as Working at Height, Hot-Works like welding, and scaffolding, which make it complicated to manage the permits every day. For the Manufacturing companies, the process of obtaining permits was not as complicated as that of the Construction companies.

Under the Positive themes

OHS Strategy and Integration with the Organisational Strategy (4.2.3.3 – Positive Theme 3: OHS Strategy and Enterprise Strategy Integration.), the item of "Environmental Preservation" was found in the Construction companies, unlike the Manufacturing sector companies. The Construction companies had more and higher critical environmental aspects and obligations for the environmental impact control than the entities in the Manufacturing sector. Also, Under the theme OHS Strategy and Strategy Integration, another item “Change Management” was found only under the company’s in the Manufacturing sector. Given that the customer orders are dynamic in nature, change management was only found addressed in the Manufacturing sector.

Integrated OHS System Implementation, refer to 4.2.3.3 – Positive Theme 4: Integrated OHS System Implementation., the introduction of the surveillance system was found only in the Manufacturing sector.

Productivity & Performance Oriented OHS Management, refer to 4.2.3.3 – Positive Theme 5: Productivity and Performance-Oriented OHS Management, the item "Improved Business Continuity" was found only in the Construction sector. Considering the nature of work, Construction work setups were prone for disruption more than the Manufacturing sector work setups, due to, the large number of blue-collar workers on site, the use of specialised and critical equipment, the hefty investments for each project and an array of OHS risks on site. The items "Improved Total Quality Management" and "Setting up Performance Measurement" appeared only in the Manufacturing sector, as the productivity and quality were measured better in a standard Manufacturing set up than in the Construction companies.

4.4.2.2. Analysis of the Effect of Size

A common feature was that the highest number of entities that responded to the questionnaire were the Medium-sized entities, followed with the Small-sized entities, both of which are from the other

Emirates. On the other hand, the number of Large-sized entities who responded were more in the Emirate of Abu Dhabi than the other Emirates.

The effect of size on the Level of OHS Governance could not be analysed as data was only available for Large-size entities.

As for The Level of OHS Training provided to the employees, the Small-sized entities in the Emirate of Abu Dhabi do not have any specific regulatory requirement mandating any training requirements, whereas the Medium and Large-sized entities were required to comply with the local regulations that specifically require the clear definition of the OHS competency criteria for their employees and that the training sessions are also provided accordingly, which for the Medium and Large-sized entities proved a downturn in the LTIFR's (Refer to the Figure 138, Figure 139 and Figure 141 in d, and Figure 154, Figure 155; and Figure 157 in 4.3.4).

4.4.2.3. Analysis of the Effect of Age

As per Table 80, Percentage of entities' establishment according to the years ranges with relation to size shows, the number of organizations in most size/age categories is too small to conduct any meaningful analysis.

Chapter 5. Conclusion and Recommendations

5.1. Chapter Summary

This chapter will introduce the research conclusions and recommendation. It undertakes the summary of the research developed to assess the research questions, identify the contributions provided and mentions niches for future research.

5.2. Conclusion of the Study

This research evaluated the effectiveness of the Occupational Health and Safety Management System in the United Arab Emirates, which was focused on the Construction and the Manufacturing sectors.

This research was based on assessing both the Construction and the Manufacturing sectors since both these sectors have a history of a large number of serious incidents, even fatalities, due to the lack of effective Health and Safety Management. This research has been conducted in all the seven Emirates to compare the management system in the Emirate of Abu Dhabi with that of the other Emirates. The literature review suggests that, in the other Emirates, there is a very low level of compliance to HSE rules due to the lack of enforcement, mainly caused by the lack of the availability of a structured HSE authority to give information to employers and implement HSE rules and regulations. The research questions were (See 1.5):

- What are the benefits of Abu Dhabi's OHSMS regulatory based framework (OSHAD SF) in comparison to that of the conventional/traditional legal OHS framework (UAE Labour law number 8 of 1980) as implemented in the other Emirates of the United Arab Emirates?
- What is the influence of OHS trainings on the effectiveness of the two different OHS frameworks governances (OSHAD SF in Abu Dhabi and conventional/traditional legal framework as per the federal UAE labour law number 8 of 1980 in the other Emirates) in the Construction and the Manufacturing sectors of the United Arab Emirates?

Based on the primary research data, which was collected and qualitatively and quantitatively analysed, the below was derived:

- The Abu Dhabi OHSMS based regulatory framework of OSHAD has been effective in almost all aspects of OHS management, as demonstrated in the findings (Reference Table 59, 4.2.2 and 4.2.2e). Be it the reporting of performance or the self-regulation, effective supervision by competent OHS professionals, the provision of effective training (4.2.2, 4.2.3.2, 4.2.3.4 and 0d) or improving the risk mitigation approach within the companies (4.2.3.4c), Figure 39, Figure 58 and 4.2.6). By comparison, even though the conventional Federal Labour Law number 8 of 1980 issued by the Ministry of Labour & Social Affairs (1980), also contains certain requirements, there is no clear mandate for the local agencies defined in the law pertaining to the enforcement thereof, which leads to its ineffectiveness.
- The OSHAD System Framework was found more beneficial than the conventional/traditional legal framework as per the federal labour law number 8 of 1980 issued by the Ministry of Labour & Social Affairs (1980). This was verified in this research through the reduced costs of both the direct and the indirect OHS expenses (see 4.2.3.1) and the comparison of the Lost Time Injury Frequency Rate's (LTIFR's) (see a).
- This study clearly illustrated the relationship between some variables such as the work-related incidents which revealed a negative correlation with the training frequency (See Figure 138 and Figure 139 in c); In the study, it was a clear pattern demonstrated, When the training was provided frequently, the staff awareness level was enhanced; hence the injury frequency rate reduced. When the training was infrequent, the LTIFR's spiked. It was also evident from the five years' data which was studied, that the Manufacturing and the Construction entities in the other Emirates, regardless of their size, had a higher LTIFR in comparison to the entities in the Emirate of Abu Dhabi.

- The implementation of the OHS Management System in the United Arab Emirates is proven to reduce the cost of safety and to reduce the injury rates. In the Emirate of Abu Dhabi, OHS governance is mandated, which ensures a higher level of compliance with the OHS rules and regulations in the Construction and the Manufacturing companies (See c). Considering the downward trend of LTIFR in the Emirate of Abu Dhabi, the level of OHS governance within the organisations located in the Emirate of Abu Dhabi was greater than the levels in the other Emirates.
- A high level of dependency on three Asian countries was observed, namely India, Pakistan and Bangladesh. These countries were the highest population of the workforce, regardless of their location and sectors. Their behaviour towards safety was a dominant factor in developing a safe workplace and to promote a positive OHS Culture. The diversification of cultures, religions and beliefs drastically influenced the OHSMS effectiveness level in the United Arab Emirates. For example, and as mentioned in n, the blue-collar employees from the Sikh religion from India were not, according to their religion, supposed to remove their Turbans. This does not comply with the personal protective requirements to wear a hard hat, which will not fit onto their heads, in lieu of their Turbans. Another example is the religious practice of using candles, camphor or incense sticks which are associated with fire hazards at an ordinary labour camp. However, care has to be taken in balancing between nurturing the multicultural beliefs and safety enforcement (Ministry of Labour & Social Affairs, 1980; Ministry of Human Resources and Emiratisation, 2016b).

5.3. Theoretical and Practical Contributions

The theoretical contributions are as stated below:

1) In the United Arab Emirates, a mandatory OHSMS regulatory-based framework, as implemented in the Emirate of Abu Dhabi, is better than a conventional/traditional framework as implemented in the other Emirates, as the Emirate of Abu Dhabi has:

i. Reduced costs of direct and indirect OHS expenses.

ii. Lower LTIFR's than the other Emirates for the sectors covered.

iii. A higher level of compliance with OHS rules and regulations.

2) An increase in the number of employed Emirati OHS specialists, lowers the risks of dependencies on specific nationalities, as measured by the LTIFR.

3) An increase in the number of training sessions provided was associated with a decrease in the LTIFR. The effect was clearly proven for both the Manufacturing and Construction sectors for the Large-sized organisations in the Emirate of Abu Dhabi. For other combinations of sector, size, and location there was a tendency towards this effect but with a few exceptions.

As a practical contribution, the study determined the need for a unified OHS Management System in all sectors (not only the Construction and Manufacturing sectors) in the other Emirates under one authority to ensure governance is implemented, to reduce incidents and ensure the effectiveness of the Occupational Health and Safety Management System in the United Arab Emirates as a whole, like that of the framework in the Emirate of Abu Dhabi.

5.4. Recommendations

Recommendations are presented for practising OHS improvements for the UAE government and the management team, as well as possible areas for future research in similar and/or related fields.

5.4.1. Recommendations for the UAE government to Improve the Effectiveness of OHS Management in the UAE

In order to achieve improvements in the OHS management within the Construction and the Manufacturing sectors specific to the United Arab Emirates, within which the research has been conducted considering the below three aspects:

Figure 167 *Recommendations for the UAE government to Improve the Effectiveness of OHS Management*

Source: Developed by Author

- The regulatory framework based on OHS Management System itself,
- OHS governance.
- OHS training both in terms of quality and frequency.

Each of the above aspects are further elaborated below:

OHS Institutional Framework.

With reference to the conclusion section of this chapter, it is evident that establishing a common national regulatory framework that is based on OHSMS, as established in the Emirate of Abu Dhabi (OSHAD), will result in the reduction of incidents (See a). Therefore, it is recommended that an OHSMS based regulatory framework should be adopted across all the other six Emirates of the UAE, like that of the Emirate of Abu Dhabi. It is further recommended that, although the research was focused on the Construction and the Manufacturing sectors, other sectors such as the Energy, Food, Agriculture, Tourism, Transport, Healthcare, Education, and other sectors can also benefit by adopting an OHSMS based regulatory framework.

OHS governance.

Based on the findings (Refer to b, c, 4.2.3.2, 4.2.3.4, III and Figure 41), it was evident that the Health and Safety supervision influenced the effectiveness of the OHSMS of an organisation. In comparing

the trends of LTIFR, the Emirate of Abu Dhabi demonstrated a downward trend due to the greater level of OHS governance than the other Emirates. It is therefore recommended that a unified federal level professional registration system and a continuous professional development practices framework is developed and implemented for the OHS professionals. This should be done for different grades within different OHS disciplines, as it is done for health care professionals. The federal requirements OHS professional registration should be linked with the academic requirements to be taken to the next level, on-site and through suitable inductions, on the job training and OHS probationary requirements for the professional job specialities concerned, such as Engineers, Doctors, Occupational Hygienists, Technician, Nurses, Drivers, Food handlers, etc., and as applicable.

OHS training.

Based on the findings (Refer to 4.2.3.1, 4.2.3.3, d, 0d and II) and the results from the Qualitative Analysis (Figure 34), which revealed that the level of OHS training played an important role in improving OHS Leadership/Commitment, ultimately resulting in the mitigation of risks and enhancing a positive OHS Culture in the organisation. Therefore, it is recommended to develop and implement a federal mechanism across the United Arab Emirates, mandating entities to identify training needs based on the entities specific risk assessment and to conduct trainings at an adequate frequency as per the requirement of the risk mitigation plan in order to reduce the risk as low as reasonably practicable. This emphasises the need of quality training, which needs to be addressed in the Federal mechanism for registration of the 'Training Service Provider'. Even as part of the OHS Professional Registration system to be developed and implemented that has been recommended in the above section on OHS governance, OHS trainers need to be registered.

5.4.2. Recommendations for the Management Team to Improve the Effectiveness of OHS Management in the UAE

Considering that the United Arab Emirates has more than 200 nationalities, it is evident that there is a great dependency on the expatriate workforce, which in turn involved a difficulty to develop a unified OHS Culture. To ease the process of developing a unified OHS Culture, the below drivers are to be addressed:

Figure 168 *Recommendations for the Management Team to Improve the Effectiveness of OHS Management*

Source: Developed by Author

- Culture Management.
- Emiratisation.
- OHS Training.

To manage cultural diversity

The diversity of the workgroup makes the OHSMS implementation more challenging (Refer to d). By identifying and understanding the similarities and the differences between the diverse cultures of the workforce and their major cultural patterns in terms of religion, language, and beliefs. This in turn will

ensure that the workforce cultures feel supported, resulting in minimising cultural barriers, which leads to a better OHS Culture.

Emiratisation

The initiative to employ Emirati nationals, called the Emiratisation, is not a new concept and it is to increase the level of employing Emirati nationals. As demonstrated, the risks related to the dependency on specific nationalities will be reduced (Refer to Figure 146 in f). The management team should consider the Emiratisation process at a company level or even a department level.

OHS Training

The training of the employees was found instrumental in improving the OHSMS performance of the organisation. In the Thematic analysis (Refer to a), there were many factors contributing to the effectiveness of the trainings; therefore, it is recommended that managers should concentrate on the context of the training and to ensure its relevancy to the industry of work, given that different sectors have different types and levels of trainings. As an example, the training needs of the Aviation industry are totally different from that of the Construction industry. Other points regarding trainings that managers should concentrate on as well are as stated below:

- **The Scope of the work:** The type and nature of the work is a factor that decides the intent of the training; where the activities are more complex, the more comprehensive the training shall be. The frequency of training depends on the subject and type of training. If the competency is bound for expiry, the training frequency shall consider that timeline of expiry, in addition to the risk level of the operations and the past OHS history of the organisation.
- **The trainer's competency:** The ability of the trainer to apply his knowledge to make the trainees aware of the concepts and learn the know-how is very important. The trainer shall be knowledgeable, skilful, and able to communicate well the subject of training that is understandable by the audience.

- **The training method:** The type of training (on the job or off the job), Venue of training and the level of audio and visual aids also play a role in delivering effective training to the employees. The language, accent and modulation are also factors influencing the effectiveness of the training. "*Most adults learn best when they are actively involved in their learning experiences. When learners discover concepts, rather than listen to them in a lecture or video, retention improves*" Barbazette (2006, p. 5).
- **The target audience:** The OHSMS involves the capability of development across the organisation. The strategic concepts of OHS, such as safety leadership, shall be provided to the top management. The technical trainings on Health and Safety shall be provided to the competent staff at the operational level. The activity-based training shall be provided to the front liners. "*Pictures are a great way to access a participant's right brain activity. Often stick figures or symbolic drawings are made by those without any artistic talent*" Barbazette (2006, p. 72).

Therefore, the right training to the right person using the appropriate method plays a vital role in, not only avoiding incidents, but also improve the overall OHS performance, which in turn improves the OHS Culture of the organisation.

5.4.3. Recommendations for Future Research

This research involved a study at the UAE level. Prospective research scholars may want to consider comparing which Emirate in the United Arab Emirates had a better OHSMS compliance for the other sectors or which of the sectors demonstrated a better OHS Culture.

This research was focused on only two sectors, the Construction, and the Manufacturing sectors. Additional research can involve other sectors such as the Healthcare, Agriculture, Education, Transport, Tourism, Energy, Hospitality and Waste Management to conduct a more detailed comparison study in these sectors, as opposed to generalising the findings from this research alone.

Another interesting aspect to consider for possible future research is the social impact, and economic impact of an OHSMS based Regulatory Framework on the different sectors mentioned above.

Future researchers could develop and carry out a hypothesis test on specific variables and identify how the behaviour of the blue-collar workers from certain countries impact the OHS performance and the impact of the behaviour-based safety programs as well as other OHS interventions.

The focus group discussions of this research have recommended having an integrated management system, including quality, occupational safety, security, etc., in one integrated management system (See 4.2.2). Although the benefits of an Integrated Management System are well known, future studies could amplify the impact of integration versus standalone Occupational Health and Safety Management System and quality management system.

5.5. Study Limitations

During this research study, several shortcomings and weaknesses which may have directly or indirectly affected the results are as described below:

a- Coverage of only two sectors (Construction and Manufacturing)

This research involved two sectors of business activities, namely the Construction and the Manufacturing sectors. The other sectors influencing the OHS performance were not considered in this research, such as the Transportation, Food, Healthcare and Tourism sectors.

b- Lack of Aggregate data on OHS Statistics.

This research lacked aggregate OHS data at the country level or even at an Emirate level, which impaired the baseline study and understanding of the OHS Culture. There were no OHS performance statistics available for the study.

c- Lack of Disaggregate data on OHS Statistics.

The disaggregated data was not available specific to the location nor the sector. For the period from 2011 till 2015, some scattered data were available, for example, the OHS statistics for 2015 were released by a certain government department, but there were no annual publications for sale or freely available. Some departments had the data, but they could not officially share them with the researcher, as there was no formal mechanism to share the statistics and information to aid research studies.

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Appendices

1) Briefing Document

Study Briefing for questionnaire survey site interview / focus group

Aston University

The Effectiveness of the Occupational Health & Safety Management System in the United Arab Emirates

Dear Sir,

You are being invited to take part in a research study as a respondent to a questionnaire survey or participant in a face to face interview / focus group. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

Purpose of the Study

I Eng. Hani Hossni, a student of Doctorate of Business Administration Programme at Aston Business School, United Kingdom. Abu Dhabi as part of their occupational health and safety regulatory framework have mandated Occupational Health & Safety Management System (OHSMS) across all sectors. Although it appears the OHSMS model of Abu Dhabi has been successful in developing a health and safety culture; however, a detailed research is required to assess how effective has been the management system based regulatory framework as compared to conventional laws and regulations in developing a health and safety culture. I am conducting the research on the effectiveness of mandatory OHSMS against the conventional health and safety regulations based regulatory framework as well as voluntary OHSMS implementation within manufacturing and construction sectors in the United Arab Emirates. As part of my research I need some information about the health and safety practices in your organisation.

Why have you been invited to participate?

This study involves 100 participants from construction sector and manufacturing sector within Abu Dhabi and a similar number from other Emirates, including Dubai, Sharjah and the northern Emirates. Your company has been identified as an important stakeholder in this study representing Construction / Manufacturing Sector in Abu Dhabi / Other Emirates, for your valuable contribution in the sector.

You are invited to participate in the questionnaire survey / face to face interview / focus group to provide an insight to the health & safety management practices within your organisation. This would take about 30 to 45 minutes for your time only.

DBA Research "The Effectiveness of the Occupational Health and Safety in the United Arab Emirates", by Eng. Hani Hossni Zurub; Aston University, UK

Study Briefing for questionnaire survey site interview / focus group

Aston University

Do you have to take part?

The decision of participating in the study as a respondent is solely yours. If you do decide to take part, you will be given this information sheet to keep and will be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason. You are free to decline to answer any particular question you do not wish to answer for any reason.

What will happen, if you take part?

Once you decide to take part in the study as a respondent, you will be requested to respond to a questionnaire survey / participate in site interview / participate in focus group discussion. The questionnaire survey will be sent to you by email, if you desire otherwise a print copy of the questionnaire will be given to you.

The questionnaire survey or the site interview or the focus group discussion, is designed to gather information about the health & safety management practices in your organisation, as well as benefits your organisation has achieved from the same. Also, if your organisation has faced any challenges in implementing health & safety management practices. Also, historical record of workplace incidents, illness will be requested as part of the questionnaire.

What are the possible benefits of taking part?

At the end of the study I will share with you and your organisation the outcomes of the study, including what would be a best model of implementing health and safety management practice in a construction / manufacturing industry as well as furthering your understanding as to how one can draw maximum benefit from streamlined health and safety management practice implementation.

Will the data / information provided for this study be kept confidential?

Kindly, be assured that all your questionnaire survey or site interview or focus group discussion answers, feedback and the information (like health and safety performance records, etc.) provided by you in this questionnaire or during the interview will be used for research purposes only. All companies or individuals will only be identified by a unique identification number and not the name of company or individual. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.
The information and data collected and any Audio records would be used for research analysis, no names or identifying information would be included in

Study Briefing for
questionnaire survey
site interview / focus group

any research publications or presentations based on these data, and your responses to this survey will remain confidential.

What will happen to the results of the research study?

The data collected through the questionnaire survey / site interview / focus group will be analysed and used in the thesis for Doctorate of Business Administration. Also, the results of the analysis will be published in an international journal and copies of the same will be emailed to you for your information. I reiterate that even in such publications, nowhere the individual information or data will be used so that the company or individual can be identified.

Who is organising and funding the research?

I am conducting the research as a student of Aston University, UK, under the supervision of Professor Prasanta Dey, Dr. Chris Owen and Professor John Edwards.
This research is not funded by any company or government body or non-profit organisation. I am carrying out the research on my own.

Who has reviewed the study?

The above-mentioned research has been approved by the University Research Ethics Committee, Aston University.

Contact for Further Information

For further information or any queries please contact Eng. Hani Hossni on zurubhh@aston.ac.uk

In case you have any concerns with the research you may contact the Secretary of the Aston Business School Research Ethics Committee on r.hancock@aston.ac.uk.

Thank you for taking time to read the information sheet.

Yours sincerely,

Eng. Hani Hossni
Email: zurubhh@aston.ac.uk
Mobile#: +971506415061
Date:

2) Consent Form

Consent form

Aston University

Full title of Project: The Effectiveness of the Occupational Health & Safety Management System in the United Arab Emirates

Name, position and contact address of Researcher:

Eng. Hani Hossni
Email: zurubhh@aston.ac.uk
Mobile#: +971506415061

	Please initial box
I confirm that I have read and understand the study briefing document for the above study and have had the opportunity to ask questions.	☐
I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.	☐
I agree to take part in the above study.	☐

	Please tick box	
	Yes	No
I agree to the interview / focus group being audio recorded	☐	☐
I agree to the use of anonymised quotes in publications	☐	☐

Name of Participant _____ Date _____ Signature _____

DBA Research "The Effectiveness of the Occupational Health and Safety in the United Arab Emirates", by Eng. Hani Hossni Zurub; Aston University, UK

3) Health and Safety Survey Questionnaire

Health & Safety Management Survey Questionnaire

Aston University

This questionnaire is for academic research purposes only. Therefore, we do not need the name of the individual participant/respondent. This survey is to be completed by representatives of the following industries only: manufacturing, construction and government agencies.

General Information

	Please provide us with the following information:	
1.	**Type of organisation**	□ Manufacturer □ Construction Company □ Government Agency **If the participant is from a government agency, please proceed to Q 60.**
2.	**Age**	□ Less than 21 years □ 21-30 □ 31-40 □ 41-50 □ 51-60 □ More than 60 years
3.	**Gender**	□ Male □ Female
4.	**Emirate Location**	□ Abu Dhabi □ Dubai □ Sharjah □ Ajman □ Umm Al Quwain □ Ras Al Khaimah □ Al Fujairah
5.	**Level of your Education**	□ High School □ Bachelor's Degree □ Master's Degree □ PhD Degree □ Other, please specify: _____
6.	**Membership** Related to Heath & Safety	□ Yes □ No If Yes, Please specify: _____
7.	**Qualifications** Related to heath & Safety	□ Yes □ No If Yes, Please specify: _____
8.	**Approximate number of employees**	□ Fewer than 10 □ 10-49 □ 50-249 □ 250-499 □ 500-999 □ More than 1,000
9.	**Percentage of Emirati and Expatriate employees**	Emirati employees: ___% Expatriate employees:___%
10.	**Please list the nationalities of expatriate employees**	1_____ 2_____ 3_____ 4_____ 5_____ 6_____
11.	**Years of experience in the current organisation**	□ Fewer than 2 □ 2-5 □ 6-10 □ 11 or more
12.	**Total experience in Manufacturing/ Construction**	□ Fewer than 5 years □ 5-10 years □ 11-15 years □ 16 years or more
13.	**Your current position**	□ CEO / General Manager □ Health & Safety Director / Manager □ Chief of Operations □ Other, please specify ----------
14.	**Level of education of Head of Health & Safety Department**	□ High School □ Bachelor's Degree □ Master's Degree □ PhD Degree □ Other, please specify: _____
15.	**Year the organisation was established**	□ Prior to 1975 □ 1975-1980 □ 1981-1990 □ 1991-2000 □ 2001-2010 □ After 2011

16.	**Does your company provide official accommodation to employees?**	□ All □ Only site staff □ Only blue-collar employees (workers) □ Other (please specify): _____
17.	**Do your company have Health & Safety performance records**	□ Yes □ No If Yes, Please specify since when: _____

General Health and Safety for Both Manufacturing and Construction Industries

18. Does your company have a formal health and safety management system?

□ Yes □ No

18.1 If yes, is your OHSMS

(kindly select one of the following):

□ A voluntary system accredited by OHSAS 18001
□ A mandatory requirement under Abu Dhabi OSHAD SF
□ A mandatory requirement as per any other government agency (e.g., JAFZA, TECOM, NCEMA, etc.)

19. Have you contributed in any way to the development of the OHSMS in your organisation?

□ Yes □ No

19.1 If yes, please specify: _____

Rank the following questions on a scale of 1 to 5:

(1 highly ineffective, 2 ineffective, 3 neutral, 4 effective and 5 highly effective)

20.	How effective are the UAE federal and local laws, regulations and policies in ensuring the health and safety of your employees?	1	2	3	4	5
21.	Does the requirement for recording and reporting incidents help in reducing workplace incidents?	1	2	3	4	5
22.	How effective is the inspection and enforcement mechanism of regulatory agencies in improving health and safety in the workplace?	1	2	3	4	5

Rank the following questions on a scale of 1 to 5:

(1 highly infrequent, 2 infrequent, 3 neutral, 4 frequent and 5 highly frequent)

23.	How frequently does your company provide health and safety training to its employees?	1	2	3	4	5
24.	How frequently does your company replace its Personal Protective Equipment (PPE)?	1	2	3	4	5

Rank the following question on a scale of 1 to 5:
(1 Immediately, 2 Monthly, 3 Quarterly, 4 Yearly and 5 Never)

25.	How frequently does your company record accidents and incidents on-site?	1	2	3	4	5

Rank the following question on a scale of 1 to 5:
(1 weekly, 2 monthly, 3 quarterly, 4 biannually and 5 yearly)

26.	How frequently does your company review its legal/regulatory requirements?	1	2	3	4	5

27. Are the reasons for absenteeism investigated and recorded in your company?

□ Yes □ No

Rank the following questions on a scale of 1 to 4:
(1 always, 2 sometimes, 3 not sure / don't know, 4 not at all)

28. In the performance of critical or more hazardous tasks:

a)	H&S control and supervision is intensified	1	2	3	4
b)	A specific task process is designed and risk assessment is undertaken	1	2	3	4
c)	Specialists are trained/contracted for the specific job only	1	2	3	4
d)	More descriptive signage is used	1	2	3	4
e)	There are no particularly hazardous tasks	1	2	3	4

29. What mechanism does your company use for evaluation and prevention of occupational risk and for employees to contribute to the same?

a)	Specific team to analyse risk prevention/control issues	1	2	3	4
b)	Formal prevention questionnaire and studies	1	2	3	4
c)	Suggestion system to encourage comments and recommendations	1	2	3	4
d)	Informal channel via immediate supervisors/line managers	1	2	3	4
e)	Your company reviews/re-evaluates the concerned risk assessment	1	2	3	4

30. How are Occupational Health and Safety (OHS) activities coordinated with contracted/subcontracted firms?

a)	Contracted/subcontracted firms are required to develop project-specific OHS plans in line with your OHS management system	1	2	3	4
b)	Joint planning of OHS activities with contracted/subcontracted firms	1	2	3	4
c)	Regular meetings involving corresponding risk prevention teams	1	2	3	4
d)	Your company gives specific OHS training to contracted/subcontracted firm employees	1	2	3	4
e)	Direct supervision during execution of tasks	1	2	3	4

31. Health and safety statistics for the past five years:

		2015	2014	2013	2012	2011
a)	No. of fatalities					
b)	No. of Lost-Time Injuries (LTI)					
c)	Lost Time Injury Frequency Rate (LTIFR) (Number of lost time injuries in accounting period/total hours worked in accounting period) x 1,000,000					
d)	Lost Time Injury Severity Rate (LTISR) (Number of workdays lost in accounting period/total hours worked in accounting period) x 1,000,000					
e)	Health and safety budget/annum					
f)	Actual expenditure for accidents/incidents (for remedial action, insurance, compensation, investigation, etc.)					
g)	Health and safety resources (actual OHS staff available) **Emirati**					
h)	Health and safety resources (actual OHS Staff available) **Expatriate**					

32. Does your organisation encourage workers to:

a) report accidents and near misses? □ Yes □ No
b) identify work health and safety risks? □ Yes □ No
c) discuss work health and safety concerns with managers,/supervisors? □ Yes □ No
d) remove and minimise hazards as much as possible? □ Yes □ No
e) adhere to safe work practices? □ Yes □ No

33. Does your organisation use any kind of incentives or rewards to promote a health and safety culture?

□ Yes □ No

If Yes, please check whatever is applicable below.

Incentive/reward given for:

a) reporting accidents and near misses: □
b) identifying work health and safety risks: □
c) reporting workplace H&S risk to managers/supervisors: □
d) complying with H&S requirements and using PPE: □

34. Rank the following types and causes of accidents/incidents on a scale of 1 to 5

(1 highly infrequent, 2 infrequent, 3 frequent, 4 highly frequent and 5 not applicable)

In the past **five years** in your organisation:

34.1	**Nature of Injury / Illness / Damage**					
a)	Abrasions/Bruising	1	2	3	4	5
b)	Amputation - Traumatic	1	2	3	4	5
c)	Bite/Sting	1	2	3	4	5
d)	Burn	1	2	3	4	5
e)	Concussion	1	2	3	4	5
f)	Crush/Internal Injury	1	2	3	4	5
g)	Cuts/Laceration/Open Wound	1	2	3	4	5
h)	Hearing Loss/Deafness	1	2	3	4	5
i)	Dislocation	1	2	3	4	5
j)	Electric Shock	1	2	3	4	5
k)	Equipment/Property Damage	1	2	3	4	5
l)	Fracture	1	2	3	4	5
m)	Foreign Body in Eye	1	2	3	4	5
n)	Foreign Body under Skin	1	2	3	4	5
o)	Hernia	1	2	3	4	5
p)	Heat-Related Illness	1	2	3	4	5
q)	Infectious Disease	1	2	3	4	5
r)	Musculoskeletal Disorder - Chronic/repetitive strain injury (RSI)	1	2	3	4	5
s)	Nerve/Spinal Cord Injury	1	2	3	4	5
t)	Occupational Illness/Disease	1	2	3	4	5
u)	Poisoning/Toxic Effect - Ingestion	1	2	3	4	5
v)	Poisoning/Toxic Effect - Inhalation	1	2	3	4	5
w)	Psychological (Stress)	1	2	3	4	5
x)	Respiratory Disease	1	2	3	4	5
y)	Skin Irritation/Disease	1	2	3	4	5
z)	Strain/Sprain	1	2	3	4	5
aa)	Other _____	1	2	3	4	5
34.2	**Injury / Illness**					
a)	Animal Bite/Sting	1	2	3	4	5
b)	Biological Factors	1	2	3	4	5
c)	Cave-In or Collapse	1	2	3	4	5
d)	Chemicals/Substances/Radiation	1	2	3	4	5
e)	Drowning/Submersion	1	2	3	4	5
f)	Dust/Fumes/Gases	1	2	3	4	5
g)	Extreme Temperature/Fire	1	2	3	4	5
h)	Electricity	1	2	3	4	5
i)	Fall from Height	1	2	3	4	5
j)	Hit by Moving Object/Crush/Vehicle	1	2	3	4	5
k)	Manual Handling	1	2	3	4	5
l)	Mental Stress	1	2	3	4	5
m)	Occupational Violence	1	2	3	4	5
n)	Penetrating Injury (nail/sharp tool stick/puncture wound)	1	2	3	4	5
o)	Repetitive Motion	1	2	3	4	5
p)	Slip, Trip and Fall	1	2	3	4	5
q)	Sound and Pressure	1	2	3	4	5
r)	Struck by Falling Object	1	2	3	4	5
s)	Journey Incident	1	2	3	4	5
t)	Incident occurred during work-related travel, including travelling to or from work	1	2	3	4	5
u)	Other: _____	1	2	3	4	5

34.3	Source of Injury					
a)	Animal/Human	1	2	3	4	5
b)	Confined Space	1	2	3	4	5
c)	Environmental Conditions	1	2	3	4	5
d)	Fixed Machinery/Plant	1	2	3	4	5
e)	Infectious Agent	1	2	3	4	5
f)	Materials or Chemical Substances	1	2	3	4	5
g)	Mobile Plant/Equipment	1	2	3	4	5
h)	Non-Powered Equipment/Tools/Appliances	1	2	3	4	5
i)	Powered Equipment/Tools/Appliances	1	2	3	4	5
j)	Road Transport/Vehicles	1	2	3	4	5
k)	Scaffolding or Ladders	1	2	3	4	5
l)	Sharps/Scalpels/Needles, etc.	1	2	3	4	5
m)	Trench or Excavations	1	2	3	4	5
n)	Other _____	1	2	3	4	5
34.4	Immediate Cause (Unsafe Act)					
a)	Failure to secure	1	2	3	4	5
b)	Operating equipment without authority	1	2	3	4	5
c)	Failure to warn	1	2	3	4	5
d)	Servicing equipment in operation	1	2	3	4	5
e)	Removing/defeating safety devices	1	2	3	4	5
f)	Using defective equipment/tools	1	2	3	4	5
g)	Failure to use PPE properly	1	2	3	4	5
h)	Improper use of equipment	1	2	3	4	5
i)	Operating at improper speed	1	2	3	4	5
j)	Improper lifting/loading/placement	1	2	3	4	5
k)	Lack of awareness/knowledge	1	2	3	4	5
l)	Improper position for task	1	2	3	4	5
m)	Lack of attention/concentration	1	2	3	4	5
n)	Horseplay (practical joke with harmful impacts)	1	2	3	4	5
o)	Violation/taking shortcuts	1	2	3	4	5
p)	Other _____	1	2	3	4	5
34.5	Immediate Cause (Unsafe Conditions)					
a)	Inadequate guards or barriers	1	2	3	4	5
b)	Inadequate or improper protective equipment	1	2	3	4	5
c)	Inadequate warning system or notice	1	2	3	4	5
d)	Inadequate or excess illumination	1	2	3	4	5
e)	Inadequate ventilation	1	2	3	4	5
f)	Congestion/restricted action/poor access	1	2	3	4	5
g)	Fire and explosion hazards	1	2	3	4	5
h)	Poor housekeeping/disorder	1	2	3	4	5
i)	High/low temperature exposure	1	2	3	4	5
j)	Excessive noise exposure	1	2	3	4	5
k)	Hazardous gases/dusts/vapours/fumes	1	2	3	4	5
l)	Radiation exposure	1	2	3	4	5
m)	Defective tools, equipment or materials	1	2	3	4	5
n)	Equipment failure	1	2	3	4	5
o)	Other _____	1	2	3	4	5
34.6	Root Causes (Personal factor)					
a)	Physical Capability (any sensory deficiency, Inadequate size or strength or physical disabilities)	1	2	3	4	5
b)	Physical Condition (previous injury/illness, fatigue, blood sugar or impairment due to drugs)	1	2	3	4	5
c)	Mental State (poor judgment, memory failure, poor condition, fears or emotional disturbance)	1	2	3	4	5
d)	Skill Level (inadequate required skill, lack of coaching on skill or infrequent performance of skill)	1	2	3	4	5

e)	Behaviour (e.g., save time, avoid discomfort, improper supervision, inadequate disciplinary process or inappropriate aggression)	1	2	3	4	5
f)	Mental Stress (frustration, confusion/conflicting directions, emotional overload, extreme meaningless activities or concentration/judgment demands)	1	2	3	4	5
g)	Human Error	1	2	3	4	5
h)	Other _____	1	2	3	4	5
34.7	**Root Causes (System Factor)**					
a)	Inadequate Training/Knowledge transfer	1	2	3	4	5
b)	Inadequate Leadership Supervision	1	2	3	4	5
c)	Inadequate/Missing Work Procedures	1	2	3	4	5
d)	Inadequate Incident Investigation/Analysis	1	2	3	4	5
e)	Inadequate Purchasing/Material Handling	1	2	3	4	5
f)	Inadequate Engineering/Design/Controls	1	2	3	4	5
g)	Inadequate Tools/Equipment	1	2	3	4	5
h)	Inadequate Maintenance	1	2	3	4	5
i)	Inadequate Risk Assessment/Management	1	2	3	4	5
j)	Inadequate Communication	1	2	3	4	5
k)	Inadequate Contractor Management	1	2	3	4	5
l)	Inadequate Planned Inspections	1	2	3	4	5
m)	Inadequate Management of Change	1	2	3	4	5
n)	Inadequate Emergency Response Plan	1	2	3	4	5
o)	Other _____	1	2	3	4	5

35. What is your organization's plan for Emiratisation of OHS staff/resources?

_____

_____

_____

_____

_____

36. What does your organisation do in terms of best practices and the degree to which individuals are willing to accept responsibility for their safety and the safety of others?

_____

_____

_____

_____

37. What innovative practices does your organisation use to promote a H&S culture?

_____

_____

_____

_____

38. Have you contributed to developing an innovative mechanism for managing/promoting health and safety in your organisation?

□ Yes □ No

38.1 If yes, please specify: _____

39. Have you contributed in any way towards development of regulations for UAE or at an Emirate level or for any government agency (e.g., JAFZA, TECOM, etc.) or for any other country or international body?

□ Yes □ No

If yes, please specify: _____

40. Rank the nationalities by their appreciation of risk and attitude for compliance to health and safety requirements (on a scale of 1 being most compliant and 6 being least compliant):

1_____ 2_____ 3_____

4_____ 5_____ 6_____

41. Which group of employees receives specific occupational risk prevention training from the organisation?

(Please tick (✓) the appropriate box)

a)	Employees/workers performing hazardous activity only	
b)	All workers of the company on general health and safety only once a year	
c)	All workers of the company on general health and safety only once	
d)	Only new employees	
e)	Only health and safety staff	

42. At what moment, or in what situations, does a worker receive information about risk prevention?

a)	Induction training upon joining the company	
b)	Induction training for new project	
c)	Selected employees (production/operation/site supervisors) on an annual basis	
d)	Upon deployment of new equipment or for new activity	
e)	After a major incident/fatality to all employees	
f)	Upon repeated incidents of a similar nature to all employees (quarterly or annually)	
g)	Upon revision of the risk assessment/HSMS	

Specific for the Manufacturing Industry Only

43. Does your company conduct a pre-employment medical examination of the employees and maintain the records?

□ Yes □ No

44. Do you think workers from any specific country are associated with a higher number of accidents?

□ Yes □ No

44.1 If yes, please specify the country _____

45. Do you believe that certain high-risk activities/tasks are better performed by workers from a specific country?

Kindly provide details by activity/task:

#	Activity / Task	Country	#	Activity / Task	Country
1			5		
2			6		
3			7		
4			8		

46. Rank on a scale of 1 to 6 how much your company deals with the following
(1 does everything to minimise risk, 2 only training, 3 only signage, 4 tends only to complaints, 5 combinations of any two and 6 does nothing)

a)	Manual handling and handling heavy loads	1	2	3	4	5	6
b)	Repetitive movements	1	2	3	4	5	6
c)	Mental fatigue in tasks requiring intense concentration	1	2	3	4	5	6
d)	Adaptation of rigid shifts to personal need of employees	1	2	3	4	5	6

Rank the following questions on a scale of 1 to 5
(1 strongly agree, 2 agree, 3 neutral, 4 disagree and 5 strongly disagree)

47. What are the main challenges for implementation of an Occupational Health and Safety Management System (OHSMS) in your company?

a)	Complicated documentation	1	2	3	4	5
b)	Lack of human resources and budget for OHSMS implementation	1	2	3	4	5
c)	Lack of regulatory requirement for OHSMS	1	2	3	4	5
d)	System developed by consultant or senior management without consultation with operations	1	2	3	4	5

48. What, in your opinion, is the benefit of implementing an Occupational Health and Safety Management System (OHSMS)?

a)	Prevention of accidents	1	2	3	4	5
b)	Ensuring legal compliance	1	2	3	4	5
c)	Effective on-site safety and health management	1	2	3	4	5
d)	Improving productivity	1	2	3	4	5
e)	Reducing management costs	1	2	3	4	5
f)	Improving company image	1	2	3	4	5
g)	Others, please specify?					

49. Are process-specific engineering risk control measures used in your company?
□ Yes □ No

49.1 If yes, please specify _____

50. Do you have a system to rotate workers' duties to limit exposure to certain chemicals/fumes/radiation, etc.?

□ Yes □ No

50.1 If yes, please specify. _____

51. Rank the barriers listed below on the scale of 1 to 5
(1 not influential, 2 less influential, 3 quite influential, 4 influential and 5 highly influential)

51.1	**OHS Management System**					
a)	Irrelevant/off-the-shelf system imposed without modification	1	2	3	4	5
b)	System imposed by corporate management without consultation with site	1	2	3	4	5
51.2	**Internal Organisational Factors**					
c)	Inadequate resources	1	2	3	4	5
d)	Limited accountability mechanism	1	2	3	4	5
e)	Health and safety activities restricted and responsibility of H&S staff only	1	2	3	4	5
f)	Inadequate training of employees in OHS practices	1	2	3	4	5
g)	High workforce turnover, part-time workforce	1	2	3	4	5
51.3	**Nature of Organisation**					
h)	Small firm with limited resources and unfamiliar with OHSMS concept	1	2	3	4	5
i)	Labour supply company with employees working between multiple sites	1	2	3	4	5

Specific for the Construction Industry Only

52. Does your company develop each construction project-specific OHS management plan, including task-specific risk assessment?

□ Yes □ Yes, if asked by client □ No

53. How frequently are scaffoldings inspected on your construction sites?

□ Daily □ Weekly □ Monthly □ Only after Installation

54. Do you think workers from any specific country are associated with a higher number of accidents?

□ Yes □ No

If yes, please specify the country _____

55. Do you believe that certain high-risk activities/tasks are better performed by workers from a certain specific country?

Please provide details by activity/task:

#	Activity / Task	Country	#	Activity / Task	Country
1			5		
2			6		
3			7		
4			8		

56. Rank the barriers listed below on a scale of 1 to 5:
(1 not influential, 2 less influential, 3 quite influential, 4 influential and 5 highly influential)

56.1	**OHS Management System**					
a)	Off-the-shelf system imposed without modification	1	2	3	4	5
b)	System imposed by corporate management without consultation with site	1	2	3	4	5
56.2	**Internal Organisational Factors**					
c)	Inadequate resources	1	2	3	4	5
d)	Limited accountability mechanism	1	2	3	4	5
e)	Health and safety activities restricted and responsibility of H&S staff only	1	2	3	4	5
f)	Inadequate training of employees in OHS practices	1	2	3	4	5
g)	High workforce turnover, part-time workforce	1	2	3	4	5
56.3	**Nature of Organisation**					
h)	Small firm with limited resources and unfamiliar with OHSMS concept	1	2	3	4	5
i)	Labour supply company with employees working among multiple sites	1	2	3	4	5
56.4	**Contractor Relations**					
j)	Principal contractor simply requires subcontractor to have an OHS management system/plan	1	2	3	4	5
k)	Principal contractor simply imposes his/her own OHSMS on subcontractor	1	2	3	4	5
l)	Subcontractors' H&S management system inconsistent with principal contractor's OHSMS	1	2	3	4	5

Final Questions for Both Manufacturing and Construction Industries

57. Describe three positive aspects of health and safety that you would like in your organisation's OHS Management System:

a) _____

b) _____

c) _____

58. Describe three negative aspects of health and safety that you would not like included in your organisation's OHS Management System:

a) _____

b) _____

c) _____

59. Please feel free to comment on any aspect of this survey you wish in the space provided below or on an additional page.

_____
_____
_____
_____
_____
_____
_____
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_____
_____
_____
_____
_____

The end of the Survey for Both Manufacturing and Construction Industries participant
Specific for Government Agencies Only

Rank the following questions on a scale of 1 to 5:

(1 highly ineffective, 2 ineffective, 3 neutral, 4 effective and 5 highly effective)

60.	Do you think the mandatory implementation of OHSMS is an effective way to improve health and safety in the workplace?	1	2	3	4	5
61.	Do you think the voluntary implementation of H&S practices is an effective way to improve health and safety in the workplace?	1	2	3	4	5
62.	Does the requirement of recording and reporting incidents help in reducing workplace incidents?	1	2	3	4	5
63.	Is the mandatory requirement of recording and reporting incidents helpful in drafting policies and regulations?	1	2	3	4	5
64.	How effective is the regulatory enforcement mechanism, including fines, in improving health and safety in the workplace?	1	2	3	4	5
65.	Do you think each Emirate's own OHS Regulatory Framework, like Abu Dhabi, would be effective in reducing workplace incidents?	1	2	3	4	5

66. What, in your opinion, should be done to improve the health and safety culture in the workplace?

The end of the Survey for Government Agencies participant

4) Focus Group

Health & Safety Management
Focus Group

Aston University

This Focus Group is for academic research purposes only. Therefore, we do not need the name of the individual participant/respondent. This survey is to be completed by representatives of the following industries only: manufacturing and construction organisations.

Date :
Sector : □ Manufacturer □ Construction Company □ Government Agency
Emirate: □ Abu Dhabi □ Dubai □ Sharjah □ Ajman □ Umm Al Quwain □ Ras Al Khaimah □ Al Fujairah
Serial number of the Focused Group

Q#	Question / Answer	Note
1	What are the typical challenges you face with respect to compliance to OHSMS?	

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by Eng. Hani Hossni Zurub; Aston University, UK

2	Do you find complacency among workers? If yes, why do you think there is complacency among workers even after training and making them aware of the risk associated?	

DBA Research "The Effectiveness of the Occupational Health and Safety in the United Arab Emirates",
by Eng. Hani Hossni Zurub; Aston University, UK

3	Operations always has stricter targets to achieve, do you think this makes them cut corners when it comes to risk control measures? If yes, how do you overcome such issues?	

DBA Research "The Effectiveness of the Occupational Health and Safety in the United Arab Emirates",
by Eng. Hani Hosni Zurub; Aston University, UK

4	How can we ensure that the operations supervisors and site engineers are committed to health & safety practices & comply to OHSMS.	

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by Eng. Hani Hosni Zurub; Aston University, UK

5	In this highly competitive market, do you think that the operations and marketing feels, health & safety is a burden and is the first area to cut cost. If so, would mandatory compliance to OHSMS be helpful and effective.	

5) Site Interview

Health & Safety Management
Site Interview

Aston University

This Site Interview is for academic research purposes only. Therefore, we do not need the name of the individual participant/respondent. This survey is to be completed by representatives of the following industries only: manufacturing and construction organisations.

Date :
Sector : □ Manufacturer □ Construction Company □ Government Agency
Emirate: □ Abu Dhabi □ Dubai □ Sharjah □ Ajman □ Umm Al Quwain □ Ras Al Khaimah □ Al Fujairah
Serial number of the interview

Q#	Question / Answer	Note
1	Could you describe a typical day at work?	
2	What kinds of tasks or activities were difficult for you?	

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3	In your view, what are the risks associated with your work and how do you deal with them?	
4	Tell me if an accident happened, what would be your role and what would you do?	
5	Give me an example of the reporting with respect to health & safety in your organization?	

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6	Tell me about your experience with the HS Management System?	
7	Could you describe one of your most challenging experiences and explain how you dealt with it?	
8	Could you describe one of your most interesting experiences?	

9	How do you deal with the health and safety inspections reports that are reported to you? And what is your commitment towards them as a Leader/Manager within your organisation	
10	How would you or your team know that there is a risk of occupational noise or inhalation exposure? Do you monitor noise and occupational air quality, if yes, how?	
11	Tell me about the steps you use in dealing with chemicals handling	

12	Who are the members of the investigation committee/ team, in investigating a major accident / incident?	
13	Do you face complacency among workers (for example, even after the workers are provided with safety equipment / PPE and they are not using with the excuse that they never had an incident in past without safety equipment / PPE)?. If so how do you deal with such complacent workers?	
14	How many Health and Safety training hours are spent per worker, per month / year?	

15	If there is a fire in the kitchen, and one of the labour got injured, and you have noticed it or have come to know about it, what will you do?	
16	Do you face certain workers group are more comfortable than others to work in a stressful environment, like working near the furnace without any personal protection or safety equipment? If yes how do you deal with it?	
17	What do you do to reach the organisation's health & safety objectives and goals?	

6) Survey Debriefing Document

Health & Safety Management Study
Survey Questionnaire / Site interview /
Focus Group Debriefing

Aston University

Thank you for your participation in today's study. World-wide implementation of Occupational Health and Safety Management Systems (OHSMS) is mostly voluntary and not mandatory. The most mature health and safety regulatory framework like in UK is based on laws and regulations and not management system based. Abu Dhabi as part of their occupational health and safety regulatory framework have mandated OHSMS across all sectors. Although it appears the OHSMS model of Abu Dhabi has been successful in developing a health and safety culture; however, a detailed research is required to assess how effective has been the management system based regulatory framework as compared to conventional laws and regulations in developing a health and safety culture and how beneficial has it been to attract investors and skilled workforce from developed countries. The primary purpose of the research is to study how effective has been the Abu Dhabi's mandatory OHSMS based regulatory framework as compared to voluntary OHSMS and how the OHSMS based regulatory framework controls and improves the investment environment in the Emirate of Abu Dhabi.

Our study is addressing OHSMS implementation through practitioners who works for large, medium and small entities in manufacturing and construction sectors within the Emirate of Abu Dhabi and compare with similar entities from both the sectors from other Emirates, where conventional health and safety laws and regulations based regulatory framework is practiced.

All the information we collected in today's study (questionnaire survey / site interview / focus group) will be kept confidential, and there will be no way of identifying your responses in the data archive. We are not interested in any one individual's responses; we want to look at the general patterns that emerge when the data are aggregated together.

Your participation today is appreciated and will help health and safety practitioners and decision makers to discover more ways of promoting Health and Safety Management System. We ask that you do not discuss the nature of the study with others who may later participate in it, as this could affect the validity of our research conclusions. If you have any questions or concerns, you are welcome to talk with Eng. Hani Hossni at zurubhh@aston.ac.uk.

If you have any questions about subjects' rights, you may contact Professor Prasanta Dey at p.k.dey@aston.ac.uk

If your participation in this study has caused you concerns, anxiety, or otherwise distressed you, may contact the Secretary of the Aston Business School Research Ethics Committee on r.hancock@aston.ac.uk.

THANK YOU AGAIN FOR YOUR PARTICIPATION.

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7) Site Interview Protocol

Site Interview Protocol Matrix

	Background information	Question 1	Research Question 2
Sector	✸		
Emirate	✸		
Interview Q1	✸		
Interview Q2	✸		
Interview Q3		✸	✸
Interview Q4			✸
Interview Q5	✸		
Interview Q6	✸	✸	
Interview Q7	✸		
Interview Q8	✸		
Interview Q9		✸	✸
Interview Q10		✸	
Interview Q11	✸	✸	
Interview Q12		✸	
Interview Q13			✸
Interview Q14			✸
Interview Q15	✸		
Interview Q16			✸
Interview Q17		✸	✸

Step 1	Aligning interview question with research question.	⇨	Increase utility of interview questions Ensure question necessity of the study
Step 2	Constructing an inquiry-based conversation	⇨	Interview question different from research question Social rules of ordinary conversation Variety of questions Prompt questions
Step 3	Receiving feedback from interview protocol	⇨	Expert feedback of the interview protocol — enhance reliability Anticipate respondent answers Ensure understandability
Step 4	Piloting the interview protocol	⇨	Feedback from actual respondent Gaining experience of interview Testing of interview setting